EVALUATION OF THE 2006/7 AGRICULTURAL INPUT SUBSIDY PROGRAMME, MALAWI

FINAL REPORT

MARCH 2008

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Undertaken for the Ministry of Agriculture and Food Security

Funded by:

DFID

USAID

Future Agricultures Consortium

Acknowledgements and Disclaimer

This report was prepared by a team consisting of Andrew Dorward (SOAS), Ephraim Chirwa (Wadonda Consult) , Valerie Kelly (MSU), Thom Jayne (MSU), Rachel Slater (ODI) and Duncan Boughton (MSU). Different consortium members contributed to different sections of the report. The contributions of Maxton Tsoka, Margaret Beaver, Eric Crawford, Jonathan Kydd, David Kamchacha and Jake Ricker-Gilbert to different parts of the work are gratefully acknowledged.

The Evaluation Team would like to express their thanks to members of staff of the Ministry of Agriculture, members of the fertiliser and seed industry, staff of donor organisations, and farmers who have generously given time and information for the compilation of this report and to participants at workshops in Malawi who have commented on earlier drafts of this report . Any errors or omissions remain the responsibility of the authors.

The views expressed in this report imply no endorsement by the Ministry of Agriculture and Food Security, DFID, USAID or any other party.

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Executive Summary

This report evaluates the 2006/7 Malawi Government Agricultural Input Subsidy Programme (AISP). The main objective of the evaluation is to assess the impact and implementation of the AISP in order to provide lessons for future interventions in growth and social protection. The evaluation combined qualitative and quantitative methods of data collection and analysis. Quantitative data were collected through a national survey in 2007 of 2,491 households who were previously interviewed in the 2004/05 Integrated Household Survey,, a survey of retail shops selling inputs in six districts and data on stocks and sales from manufacturers, large-scale importers and dealers of fertilizers and seeds. The quantitative data was triangulated by qualitative data from focus group discussions with smallholder farmers in 12 districts, and key informant interviews with government staff, input distributors and beneficiary and non-beneficiary households. The analysis is based on descriptive statistics, econometric modelling and livelihood and rural economy modelling. An Interim Report in March 2007 provides fuller details of the implementation of the programme.

Evaluation of the impact of the AISP needs to recognise both the context in which it is implemented and its objectives.

Malawian smallholder agriculture is characterised by large numbers of very poor farmers heavily dependent on low input maize production on small land holdings which are very short of nitrogen. Maize production by these farmers is not normally sufficient to meet annual consumption needs, and they depend upon casual labouring and other income earning opportunities to finance the purchase of the balance of their needs. In the 2002/3 and 2003/4 seasons when TIPs were implemented, around 40% of smallholder households purchased fertilizer on commercial terms, with mean purchases of around 65 kgs per household. These numbers suggest that for more than half of the smallholder population, commercial fertiliser purchases in adequate quantities are unaffordable, leaving many farmers locked into impoverished livelihoods based on low productivity maize cultivation and casual labouring. Food insecurity problems facing such farmers have worsened in recent years with national food shortages due to poor production seasons and late and expensive government-funded imports leading to large increases in maize purchase prices.

In this context, the government started implementing the AISP in the 2005/06 season with the stated objectives of improving smallholder productivity and food and cash crop production and reducing vulnerability to food insecurity and hunger. Other objectives are to promote food self sufficiency, development of the private sector input markets, and wider growth and development.

In the 2006/7 programme 2 million seed and 3 million fertiliser coupons were initially allocated to districts and areas within districts in proportion to maize (and for 'tobacco fertilisers', tobacco) areas for distribution to targeted households. 'Supplementary' NPK and urea coupons were distributed in two subsequent batches, the first comprising 1 million coupons. Coupons were supposed to be allocated to targeted households (able farmers who would otherwise be unable to purchase inputs) by Village Development Committees at the rate of one NPK (23:21:0) and one urea coupon per household, and one D compound and one CAN coupon per recipient tobacco farmer. Allocation procedures in practice varied widely between different areas, with some local authorities deciding to give one coupon each to a larger number of households. There were reports of substantial diversion of coupons in some areas, but few large scale confirmed cases. Farmers were required to redeem fertiliser vouchers and pay MK950 per 50kg bag,

representing roughly 28% of the full cost, with government paying for the remaining 72% of the cost.

A total of just under 175,000 tonnes of fertiliser and 4,500 tonnes of improved maize seed was distributed. Disbursement of inputs in the southern region was late for a variety of reasons (late fertilizer procurement, late issue of coupons, late opening of markets) and this, together with stock-outs in some markets, led to many farmers spending long periods queuing for their inputs, delaying planting and/or fertilizer applications. The total cost to government and donors was MK10.3 billion, just under US$91 million, of which 87% was funded by the Malawi Government. Fertiliser sales were 17% over budget, due to the issue of supplementary coupons, while the Government expenditures were 25% over the budgeted cost (which itself represented just over 40% of the Ministry of Agriculture budget).

The analysis of evidence available (a) recognizes the programme's potential to contribute positively to its stated objectives and to wider government objectives for pro-poor growth, and (b) indicates that the 2005/6 and 2006/7 AISPs made a positive contribution toward the achievement of those objectives. However it also identifies several improvements that could increase the programme's effectiveness and efficiency.

The positive contributions of the 2005/6 and 2006/7 programs include:

- Increased maize output: MoAFS estimated total maize production of 3.4 million tonnes, over 30% more than the record harvest of 2005/6. Subsequent price movements and the resumption of maize importation from Mozambique suggest that this is an overestimate of 2006/7 production. Incremental maize production that can be attributed to the 2006/7 subsidy is estimated at 670,000 tonnes, with a low estimate of just over 5000,000 tonnes and a high estimate of just under 900,000 tonnes. The wide range is because the estimates are sensitive to estimated rates of displacement of commercial fertilizer sales by subsidized sales, and assumptions about the effectiveness of incremental fertilizer and seed in improving yields[1].
- Improved household food security: Rural households' own subjective ranking of their economic well-being was 8% higher in May/June 2007 than in 2004, and the proportion of households reporting a major shock from high food prices in the previous 3 years fell from 79% in 2004 to 20% in May/June 2007. This results from increased household food production, higher rural wage rates and lower food prices benefiting poorer households:. Many of these changes can be attributed to the combined effects of the fertilizer subsidy programmes (both 2005/06 and 2006/07), the seed subsidy (which in 2006/7 also provided substantial amounts of more productive hybrid seed in addition to OPV) and widespread abundant, well distributed rainfall. However high maize prices in early 2008 are likely to have had a negative impact on people's perceptions of their well-being and will have seriously detracted from the benefits of the 2006/7 subsidy, and were not reported or expected when field work was conduced in May/June 2007.
- An increase over 2005/06 levels in private sector participation in the fertilizer programme: Private firms procured around 100,000 tonnes for SFFRFM and 6 companies sold a further 50,000 tonnes of subsidized fertilizer through their own retail outlets. Adding in non-programme commercial sales, brought the private sector to a total of just under 180,000 tonnes sold in 2006/07, still below 2004/5 sales of over 200,000 tonnes, but up by 11% from 2005/06 when the private sector was excluded from retail sales of subsidized inputs. Independent agrodealers did not participate in the fertilizer subsidy program.
- An increase over 2005/06 levels in private sector participation in the maize seed subsidy program: Not only did all of Malawi's seed suppliers participate at the procurement level but retail sales through both the fertilizer distributors' retail outlets and the participation of

[1] These estimates assume that all incremental fertiliser was applied to maize. A small proportion of incremental fertiliser is likely to have been applied to other crops.

independent agrodealers (who were excluded from the fertilizer program) improved access to both subsidized and unsubsidized seeds for many farmers.

The main determinants affecting the programme's impacts in relation to its costs and hence its effectiveness and efficiency in use of scarce government resources were:

- the extent to which subsidized fertilizer contributed to additional total fertilizer use rather than displacing commercial fertilizer purchases which farmers would have made anyway without the subsidy;
- the additional maize produced from the additional fertilizer applied to farmers' fields (maize-fertilizer response rate), which is affected by timeliness and method of application, maize variety, and rainfall;
- coupon targeting, which affects the degree of commercial fertilizer displacement, incremental maize output, programme impacts on maize prices and wage rates, and direct social protection benefits to poorer households;
- implementation design, which affects the degree to which the private sector is involved and whether the program contributes to or impedes competition and new entry, especially for currently under-served areas; and
- national and regional maize prices (affected by weather and a range of national, regional and international policy and market variables), and the extent to which additional maize supplies produced from the subsidy program reduced maize market prices below what they would have been without the subsidy and hence made grain more affordable to the majority of smallholder households that are purchasers of maize;

Results of an economic benefit-cost analysis using a range of assumptions about the values of the above mentioned determinants demonstrate the sensitivity of programme impacts to management and external conditions. The estimated benefit cost ratios ranged from 0.76 to 1.36. These estimates demonstrate that with good management the program can yield favorable economic returns. Although these results provide a basis for comparing the programme's rate of return with other alternative public investments, such comparisons are beyond the scope of the evaluation. Any use of the results for such comparisons should also take into account some of the more difficult to measure benefits of the AISP such as providing immediate social protection and stimulation of farm and non-farm growth – benefits that are not directly accounted for in results reported above.

Implementation of the programme does not appear to have had adverse effects on macroeconomic stability or on budgetary allocations to other sectors. The large expenditures and management demands of the programme do, however, appear to have some adverse impacts on the delivery of other services by the Ministry of Agriculture and Food Security.

The findings of the study suggest that there is a considerable potential to improve on the outcomes of the 2006/07 program. Implementing these improvements will ensure that the programme reaches its full potential not only in terms of better programme outcomes but also in terms of more efficient use of government resources. There are substantial dangers that without explicit action to improve effectiveness and control its costs the programme could become an unsustainable drain on resources, pulling down rather than promoting growth, food security and poverty reduction. These dangers are illustrated by the results of the benefit/cost analysis and are likely to be exacerbated by recent and projected increases in international fertiliser prices. The following areas for improvement are highlighted:

Programme objectives: A more comprehensive and consistent framework of objectives is needed to resolve apparent conflicting objectives and to allow appropriate achievement targets and budgetary allocations to be set for long and short term plans.

Targeting and displacement of commercial fertilizer purchases: National and household level estimates suggest that between 30 and 40 % of subsidized fertiliser purchases displaced commercial purchases; high displacement rates undermine the efficiency of the programme and its effectiveness in delivering developmental benefits. Household survey evidence of a positive correlation between subsidized fertilizer acquisition and household wealth, land holding, and male household heads indicates that district and within-community targeting in 2006/7 led to significant quantities of subsidised fertiliser going to less poor households. It also shows that subsidised fertiliser received by these households appeared to displace a large proportion of commercial purchases typically made by these households in the absence of a subsidy. Ensuring that subsidised inputs are targeted more effectively to the poorest half of the smallholder population is therefore one means (along with more timely and transparent programme implementation, which helps farmers better plan their commercial purchases) for reducing displacement, and hence raising the efficiency of government investments in promoting productivity, growth, food security, and reduction of hunger and poverty, indeed of all programme objectives. At the same time, it is recognised that the targeting of subsidized inputs to different groups or types of people is a difficult and sensitive issue. The implementation of the 2006/07 program and past experience with the TIPs illustrate the practical difficulties and costs of targeting. An alternative approach that could also be considered would be to provide a smaller subsidy to all households.

Agricultural sector and programme information needs: There are fundamental information gaps that prevent proper planning and management of the AISP and of agricultural and rural programmes. Discrepancies between MoAFS and NSO estimates of farm families and rural households are very disturbing, and reliable, rigorous information on smallholder production of major crops and of national stocks, flows and consumption of staples is critically important for agricultural and food security and market monitoring and policy.

Engagement of the private sector and timely transparent implementation: Although the private sector's market share increased over 2005/06, it has the capacity to supply much greater quantities. Allowing the private sector to supply a larger share of the market in the future would enable the government to reduce programme costs as well as enhance the long-term viability of the private sector. The exclusion of independent agrodealers from the fertilizer subsidy program undermines past investments in the development of the agro-dealer network, which was expected to increase competition in input markets and farmers' access to low cost inputs, particularly in under-served areas. Mechanisms need to be developed to take advantage of the potential of these small scale entrepreneurs, learning from the successful integration of the agrodealers into the seed subsidy program[2]. In addition, uncertainty about the AISP from year to year depresses incentives for both fertilizer suppliers and farmers to invest in fertilizer procurement in general, and often delays investments. Greater consistency, transparency and timeliness in AISP planning and implementation is needed from government, with private sector commitment to systems supporting integrity and performance in their engagement in the supply chain. This requires a commitment from all stakeholders to the development of a mutually beneficial 'transition strategy' for greater private sector involvement in input markets. This should start with a reduction of government involvement in markets that are already well served by the private sector and then move to the design of policies and programs that support private sector expansion to under-served areas and more effective use of the growing network of independent agrodealers.

Coordination with social protection policies and programmes: Linkages between the inputs subsidy voucher programme and safety nets need to be given greater attention and specific coordination mechanisms need to be established at different levels, with coordination in the central design of the subsidy and safety net programmes and coordination in local coupon allocation, distribution and redemption mechanisms.

[2] It is understood that there was substantial agro-dealer participation in the 2007/8 programme.

Coordination with other policies and programmes: There are strong complementarities between the AISP and other investments that support agricultural and rural development, notably roads, agricultural research and extension, and the greater stability of maize prices. It is important that adequate investments are made in these areas and that AISP costs are controlled and pruned so that it does not starve these other investments of resources.

Opportunities and Challenges. There are opportunities for improving the cost-effectiveness of the program and freeing up resources that can be used not only to buffer the program against the threat of rising fertilizer prices but also for other complementary investments in rural development to help Malawi's rural households rise out of poverty. As the GOM and its partners continue their reflection on the future of AISP in 2007/08 and beyond, it will be important to seek a balance between the needs of farmers and suppliers for policy predictability from year to year and the needs of the government to keep the program costs under control and ensure high rates of return on their investments in the subsidy. Nonetheless, changes in factors that the GOM cannot control (e.g., higher fertilizer prices, a wider range of maize prices, and the weather) have the potential to significantly change both the costs and economic and social protection benefits from those observed during the 2006/07 season; dramatic changes in external factors could severely challenge the GOM's ability to sustain the programme in the future. The extent to which the country is able to seize the opportunities presented by the AISP and channel the increased food security and rural incomes into engines of longer-term growth will be the ultimate sign of programme success.

Glossary of Acronyms and Terms

ADD	Agricultural Development Division
ADMARC	Agricultural Development and Marketing Corporation
AISAM	Agricultural Input Suppliers Association of Malawi
AISP	Agricultural Input Subsidy Programme
AISS	Agricultural Input Subsidy Survey
AU	African Union
Bomas	District administrative / commercial centres
CNFA	Citizens Network for Foreign Affairs
CPI	Consumer Price Index
DfID	Department for International Development
Dimba	Wetland cultivated in the dry season
EU	European Union
FEWSNET	Famine Early Warning System Network
FAO	Food and Agriculture Organization of the United Nations
Ganyu	hired casual labour
GDP	Gross Domestic Product
GOM	Government of Malawi
IHS2	Integrated Household Survey (2004)
IMF	International Monetary Fund
LU	Logistics Unit
MASAF	Malawi Social Action Fund
MK	Malawi Kwacha (MK140 to the US$)
MOAFS	Ministry of Agriculture and Food Security
MRFC	Malawi Rural Finance Company
MVAC	Malawi Vulnerability Action Committee
NASFAM	National Smallholder Farmers Association of Malawi
NEPAD	New Economic Partnership for African Development
NFRA	National Food Reserve Agency
NGO	Non-Governmental Organization
NPV	Net Present Value
NSO	National Statistical Office
OPV	Open pollinated varieties (of maize)
PRSP	Poverty Reduction Strategy Paper
RBM	Reserve Bank of Malawi
SFFRFM	Smallholder Farmers' Fertilizer Revolving Fund of Malawi
SGR	Strategic Grain Reserve
TIP	Targeted Inputs Program

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MALAWI 2006/7 AGRICULTURAL INPUT SUBSIDY EVALUATION
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1. Introduction

This report presents the main conclusions of an evaluation of the 2006/7 Agricultural Input Subsidy. The evaluation was conducted for the Ministry of Agriculture by a team from the School of Oriental and African Studies London (SOAS team members were initially within Imperial College London), Wadonda Consult , Michigan State University and the Overseas Development Institute, and was funded by DFID Malawi, USAID, and the Future Agricultures Consortium (with funding from DFID London). The main objectives of the evaluation are to

- Assess the impact and implementation of the GoM agricultural inputs subsidy and the programme of support (programme memorandum is attached) at the national level and differential impact on households at the local level.
- Provide lessons for future interventions in growth and social protection.

The evaluation addresses the major processes and factors that affect the impact of the input subsidy programme as set out in figure 1.1. At the heart of figure 1.1 is the implementation of the input subsidy programme (1). The scale of this and the way that it is done impact directly on coupon recipients (2a), on the input supply system (3) which is composed of private sector suppliers, ADMARC and SFFRFM, and on the macro-economy and its management (4). The livelihoods, activities and welfare of coupon recipients then affects relationships within rural communities and local and wider markets (for maize and ganyu) and this impacts upon non-recipients (2b). All of these components interact with each other and with wider factors in the environment, shown on the right hand side of the diagram. Another set of interactions of particular importance to this study are likely to arise between impacts of the input subsidy on the one hand and impacts of other (formal and informal) social protection measures.

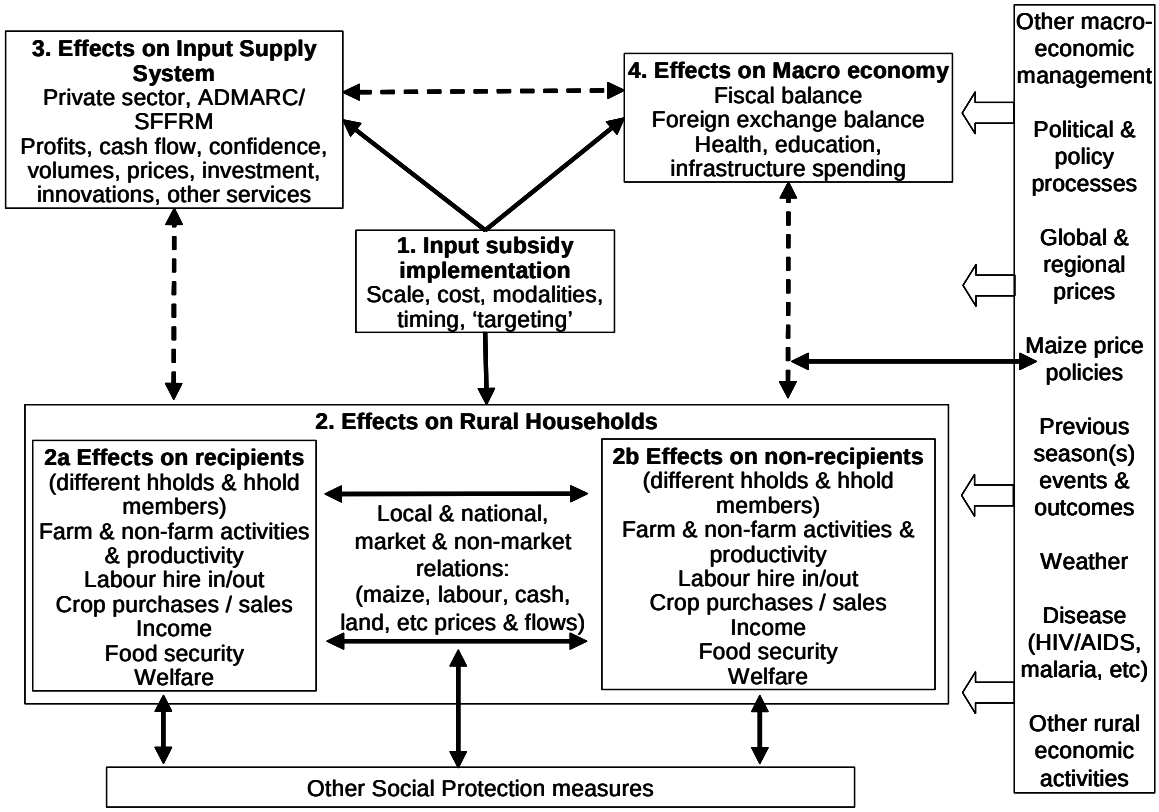


Figure 1.1 Analytical Framework for Agricultural Input Subsidy Evaluation

The evaluation has been implemented and managed in four modules related to the analytical framework set out in figure 1.1, and supported by cross cutting activities.

1. The Input subsidy implementation module investigated the scale, cost, modalities, timing and (in focus group discussions) targeting of input subsidy distribution. This module was addressed extensively in a substantial report presented in March 2007, updated in May 2007. The report included extensive recommendations for the implementation of future subsidy programmes. This report will present only a very brief summary of the main conclusions and recommendations from that report, but also contains a new section on access to coupons, drawing on household level survey data that was not available at the time of the interim report.

2. The Rural household impact module has involved collaboration with the National Statistical Office in its conduct of a household sample survey and analysis both of household survey data and of in-depth qualitative focus group discussions and semi-structured household interviews conducted by the team.

3. The Input supply system module addressed questions about the impact of the programme on the private sector. The March 2007 report focused on impacts at the supplier/importer level. The current report summarizes and updates those findings drawing on supplementary information provided by suppliers and also adds information on impacts at the retail level drawing on further analysis of a survey of retailers in six Districts.

4. The Macro-economy impact module examines questions about fiscal sustainability, budget performance, investment/ social protection trade-offs and impacts on and relations with crop price policies, market distortions and projected prices.

5. Cross cutting research activities have drawn on a variety of other information sources to augment information from the different modules.

The report is structured in 12 sections related to these modules. Following this introduction is a brief presentation in section 2 of background to the 2006/7 agricultural input subsidy programme. This draws heavily on and in places reproduces material from the interim report presented in March 2007, but is considered essential context for the remainder of the report. Section 3 provides a description of data sources and analytical methodologies used. Section 4 then summarises the implementation achievements of the 2006/7 subsidy (this topic was addressed extensively in the substantial report presented in March 2007, updated in May 2007 and this report presents only a summary of the main conclusions and recommendations from that report) and section 5 provides some general information on the 2006/7 season. Sections 6 to 11 provide the major information regarding the impact of the subsidy programme, broadly following the modular approach to the study, though recognising strong interactions between modules. Section 6 considers impacts on input use and on the input sectors, and section 7 examines issues around coupon distribution and factors affecting household access to coupons and subsidised inputs. Sections 8 to 10 then discuss impacts on production and on rural livelihoods and the rural economy, before section 11 briefly considers impacts on the macro economy. Section 12 concludes with a synthesis of the main findings and recommendations for future policy and for future investigations.

Readers familiar with the March 2007 report may not wish to read sections 2 and 4 of this report as they summarise material presented in greater detail in the March 2007 report.

Evaluation of the Agricultural Input Subsidy Programme (AISP) is a complex and challenging task as

- The programme is highly politicised due to its importance to the people of Malawi and its very large cost
- There are multiple stakeholders with a wide range of differing interests in different aspects of the programme

- There are multiple potential direct and indirect impacts of the AISP which interact with and are dependent upon other major policies, and these interactions occur at multiple levels and involve a variety of different logistical, market, livelihood, fiscal, social and political processes which are often highly variable, changing, imperfectly understood, and the subject of much debate
- There are likely to be dynamic impacts of the program that influence maize production and price levels in future years (e.g., the impacts of the input subsidy program have undoubtedly affected current maize prices, which influence real incomes, future price expectations and land and labour allocation decisions, and these in turn have wide ranging effects on economic activities and welfare)
- There are significant data and methodological difficulties in undertaking the analyses required to provide clear answers about the impact of the programme.

2. Background to the inputs subsidy programme

2.1 Agricultural, food security and input policies and performance to 2005

The importance of agriculture and of maize to the Malawian economy and to the livelihoods of most Malawian people is the critical backdrop to the AISP, together with the low agricultural and maize productivity, and associated high national and individual/household food insecurity[3]. Table 2.1 provides some key indicators of this, with large numbers of very poor people working on very small areas of land which are predominantly planted to maize. Continual cultivation of maize on the same land without addition of organic or inorganic fertilizers leads to low yields, and 'local' varieties of maize show a lower response to inorganic fertilizer (principally nitrogen) than hybrid and, to a lesser extent, composite or open pollinated varieties (OPVs). Low yields then lead to inability to afford the purchase of inputs. Purchase of inputs on credit is also not possible for most farmers because the costs of credit administration are too high, as are risks for both borrowers and lenders, and low volumes of input demand and poor infrastructure and high transport costs lead to high input costs and inhibit the development of input supply systems in less accessible areas. Highly variable maize prices (discussed below) add to the risks of input use (whether purchased with cash or credit).

There is a major dilemma in maize pricing. Higher maize prices are needed to make purchased input use more profitable, but only 10% of Malawian maize producers are net sellers of maize, while 60% are net buyers of maize (the vast majority of these are only buyers, not making any sales, see table2.2), and hence most people's livelihoods and food security are damaged by high maize prices High maize price variability damages both producers and consumers, as low prices present risks to producer investments in inputs by those producers who aim to produce a marketable surplus while high prices present risks to consumers (who include the majority of smallholders as noted above). Poor access to international and domestic markets (due in large part to historically low public investment in transport infrastructure), seasonal scarcities, and poor local market development (due to low and uncertain volumes, high costs of transport, uncertain government intervention) have led in the past to high intra- and inter- seasonal maize price variation, the latter further depressing market development. Risks of high maize prices encourage poor consumers to grow as much of their own staple food as possible, even at very low levels of productivity. At the same time there are limited higher-return income earning opportunities within or outside agriculture. Local markets for horticultural and livestock products and for local services are constrained by low incomes (vegetables accounted for 1% of food expenditure shares and 14% of smallholder households nationwide reported selling vegetable crops in 2004 (IHS2 data,

[3] Reasons for the high dependency on maize as opposed to other food crops are debated, but include dietary preferences, different crops' relative calorific yields per ha in different agro-ecologies, farmers' familiarity with the crop, and long standing strong government policies aimed at promoting maize production and input and crop marketing subsidies focused on maize.

Malawi Poverty and Vulnerability Analysis, 2006) . The development of smallholder involvement in export crops in Malawi remains relatively low, in part because of historical policy impediments, uncertain government support for private investment to promote export crops, and in part because of low public investment in infrastructure and other public goods to nurture the development of these markets (Buccola and McCandlish, 1999; Kherallah *et al.*, 2002; Brunetti, A. *et al.*, 1997a; Brunetti, A. *et al.*, 1997b).

Table 2.1: Background Information on Smallholder Agriculture

	North	Center	South	National
Rural population (% total pop)	10	38	40	88
Income and Poverty				
Median expenditure/capita (MK '000)	17	20.9	16.9	17.5
Poor households (% rural pop)	56	47	64	52
Ultra-poor households (% rural pop)	26	16	32	22
Nutrition and Food Security				
Mean rural daily per capita consumption (kcal)	2,253	2,482	2,210	2,332
Mean rural daily per capita consumption (kcal): poor	1,738	1,811	1,703	1,746
Incidence of stunting in children (% 6 mths - 5 years)	39.6	47.9	40.8	43.7
Incidence of underweight children (% 6 mths - 5 years)	16.1	20	17.2	18.3
Share of calories from own production	0.53	0.58	0.47	0.52
Median month 04/05 harvest own food exhausted (actual)*				September
Median month 05/06 harvest own food exhausted (est.)*				November
Suffered crop yield loss last 5 years (%)	NA	NA	NA	68.8
Suffered large rise in food prices last 5 years (%)	NA	NA	NA	79.2
Smallholder Agriculture				
Landholdings less than 0.5 ha /hh(%)	12.1	15.4	25.4	19.9
0.5 to 1.0 ha (%) /hh	19.3	25.2	28.7	26.3
1.0 to 2.0 ha (%) /hh	30.1	33.5	24.9	29
more than 2.0 ha /hh (%)	28.8	16.2	7.7	13.4
Crop cultivation				
Maize growers (%)	93	97	99	97
Local varieties (%)	38	55	62	56
Composite varieties (%)	5	6	7	7
Hybrid varieties (%)	58	67	59	55
Cassava growers (%)	45	11	24	21
Tobacco growers (%)	22	25	6	15
Fertilizer use (kg/ha)	32	45	24	34
Access to credit for food crop inputs (%)	2.5	4.2	3.0	3.4
Access to ag extension (%)	24	12	11	13
Farm households 2006 ('000) **	388	1,248	1,646	3,282
Rural households 2006 ('000) (inter-censal growth rates)	255	1,026	1,196	2,477

Source: IHS2 2003/4 survey except * (own calculations from NSO AWMS 2006) and ** (Ministry of Agriculture). Ministry of Agriculture estimates of % maize that is hybrid are much lower. Divergences in farm and rural household estimates are discussed later in section 7.1

Productivity and investment in productive activities is further constrained by people's poverty and by their vulnerability to a wide variety of (often related) shocks, particularly low crop yields (as a result of poor rainfall), sickness (with high rates of morbidity and mortality), high food

prices, and loss of income from employment or remittances. Women, who play a key role in agricultural production and rural livelihoods, tend to be particularly vulnerable to these shocks. Macro-economic conditions in recent years have also inhibited growth, with high real interest rates, high rates of inflation, and significant devaluations of the Kwacha (although macro-economic management has improved recently).

Table 2.2 Farm maize market position and wealth characteristics.

Household position with respect to the maize market 2006/07 season	% of total households in sample (n=2591)	Value of household assets (USD) 2007	
		mean	Median
Sold maize/did not buy (n=185)	7.1%	519.94	127.04
Bought maize and/or maize meal/did not sell (n=1461)	56.4%	211.77	42.04
Bought and sold – net seller (n=80)	3.1%	599.35	157.71
Bought and sold – net buyer (n=105)	4.1%	154.42	69.29
Bought and sold – net zero (n=9)	0.3%	348.18	45.64
Neither bought nor sold – autarkic (n=751)	29.0%	339.99	82.71
	100%		

Source: AISS household survey, 2007.

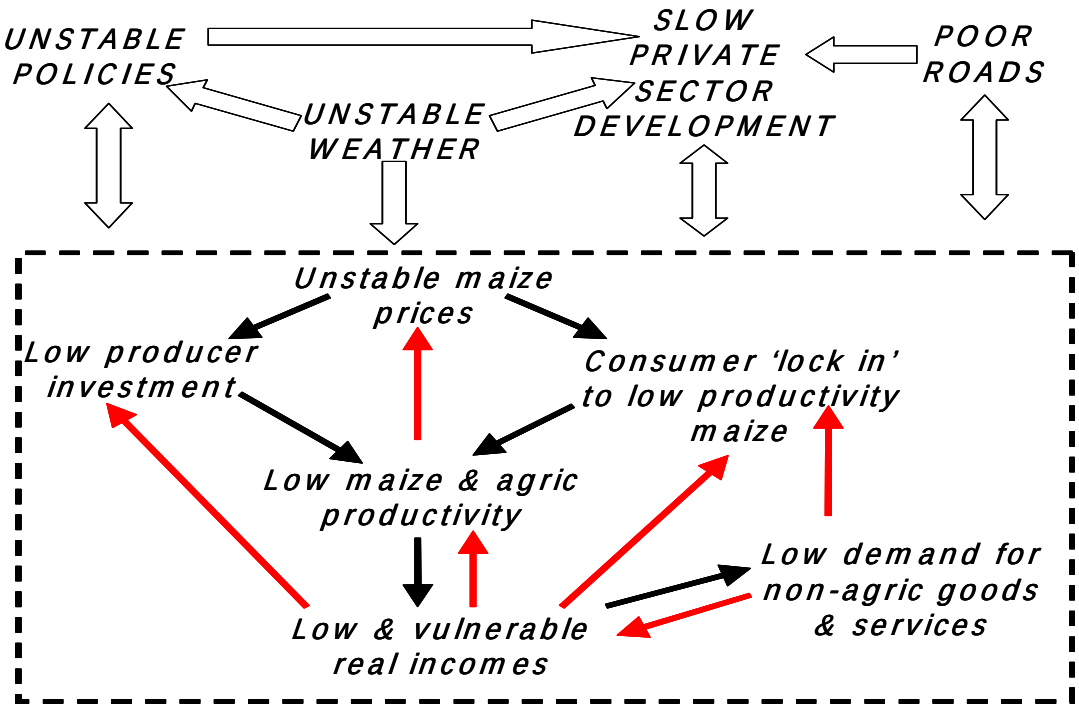
Agricultural, rural and national economic development are therefore constrained by a number of interacting poverty and productivity traps which constrain input and maize market development, investments in maize intensification, diversification out of maize into other agricultural and non-agricultural activities, the ability of (particularly poor) rural people to protect themselves from shocks, and wider local and national economic development. The result is a vicious circle of unstable maize prices inhibiting (a) net producers' investment in maize production, (b) net consumers' reliance on the market for maize purchases, and (c) poor consumers exits from low productivity maize cultivation. These in turn inhibit the growth of the non-farm economy. This vicious circle, illustrated in figure 2.1**,** is exacerbated by, among other things, unstable and changing input and maize marketing policies, weather instability, poor road infrastructure, and constrained private sector development. At the heart of this are household, local and national vulnerability and poverty traps.

Understanding of the nature, causes and relative importance of these problems varies (indeed elements of the analysis above are not universally accepted, nor is it suggested that this brief summary is a comprehensive account of the complex issues involved). As a result a wide variety of different policies, programmes, projects and other activities have been debated and implemented by different stakeholders (politicians, government ministries and agencies, NGOs, CBOs, commercial organizations, donors, rural people themselves) to address different aspects of these problems.

Input subsidy and maize market intervention policies have been a longstanding and major focus of government and donors. From the mid 70s to the early 90s government financed a universal fertilizer subsidy, subsidized smallholder credit and controlled maize prices through the activities of ADMARC and SACA. This system began to break down with partial market liberalization and cash flow difficulties in the late 80s/ early 90s, but then completely collapsed in the mid 90s as a result of the coincidence of widespread harvest failure (and credit default, in the absence of insurance), multi-party elections (undermining repayment), continuing pressure for and partial implementation of liberalization and structural adjustment policies

(constraining government expenditure), and substantial devaluation (raising local fertilizer prices).

Figure 2.1 Vicious Circle of the Low Productivity Maize Production Trap



Policy changes also included the liberalization of burley tobacco production (formerly restricted to estates), which led to widespread uptake of burley tobacco production by smallholders in the central and northern regions and a major cash injection with multipliers feeding through into the rest of the non-farm rural economy and the use of tobacco income to buy seed and fertilizer for maize production, and market development (Harrigan, 2003). However Harrigan also notes that while there were significant numbers of poorer smallholders with very limited land growing tobacco, tobacco began to crowd out maize on these farms. This led to fears of declines in maize production when devaluation of the Malawi Kwacha and the removal of input subsidies made use of fertilizer un-economic for surplus maize production.(see figure 2.6).

Within Malawi there was then a widespread perception that falling fertilizer support was leading to falling maize production and a food and political crisis, reflecting political pre-occupations with maize production and consumption. Government has, with mixed donor support, since 1998/99 reinstated a variety of interventions subsidizing maize fertilizer and seed access (principally starter pack, TIP, and APIP), with intermittent interventions in maize markets. A number of programmes have also promoted 'inputs for assets' where rural people work on (for example) community infrastructure schemes and are paid in kind with inputs (or with coupons with which they can obtain inputs).

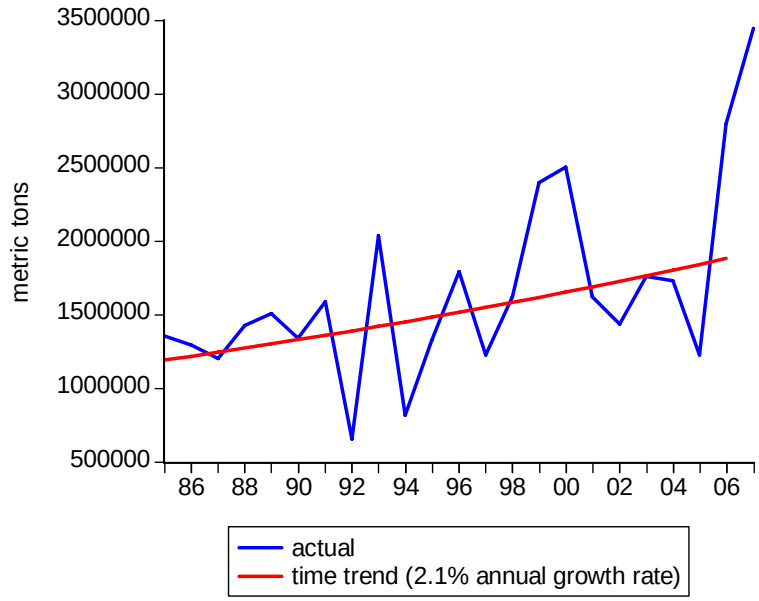
Analysis of the agricultural performance from the late 1990s is complicated by difficulties in separating out the effects of poor rainfall and of the different policy changes responding to the perceptions of an impending food crisis. Maize production, overall food production, and per capita food production growth all appear to have increased through the 1990s and into the 2000s (Figures 2.2 and 2.3), despite some years of low production and severe food shortages in the 2000s. Official Ministry of Agriculture estimates indicate that maize production rose at an annual rate of 2.1 percent per annum between 1990 and 2005. Major contributors to the reported growth in maize production between 1990 and 2000 are two years of very poor

rainfall in 1991/92 and 1992/93 and two years of good rainfall with universal distribution of small free fertiliser packs in 1998/9 and 1999/2000. According to FAO statistics, overall food production grew at a rate of 3.4% per year, while per capita production grew at 1.9% per year (Figure 2.3[4]). However, data on cassava production trends are notoriously unreliable and most likely lead to an overstatement of the trend growth in food production observed in Figure 2.3. Nevertheless, it is generally agreed that root crop production has increased in Malawi and has made some positive contribution to food production growth. Fertilizer use also has risen impressively through the 1990s (Figure 2.4).

There has also been increasing recognition of the potential role of private input distribution systems in the development of smallholder agriculture. From the mid 1990s private input suppliers took over an increasing share of the market from ADMARC and SFFRFM (parastatals responsible for importing and distributing fertilizers for smallholders) and by the end of the 1990s were responsible for over 70% of growing national fertilizer imports and for a large proportion of sales to smallholders. However in 2004 there were announcements that fertilizer would be subsidized and SFFRFM placed large orders for the purchase of 23:21 and urea. This created considerable uncertainty for private sector fertilizer importers and distributors and is widely believed to have led to farmers holding back fertilizer purchases. Following difficulties in procurement of urea by SFFRFM, government implemented instead another TIP programme, for 2 million households, while private sector fertilizer importers carried forward significant unsold stocks to the following season.

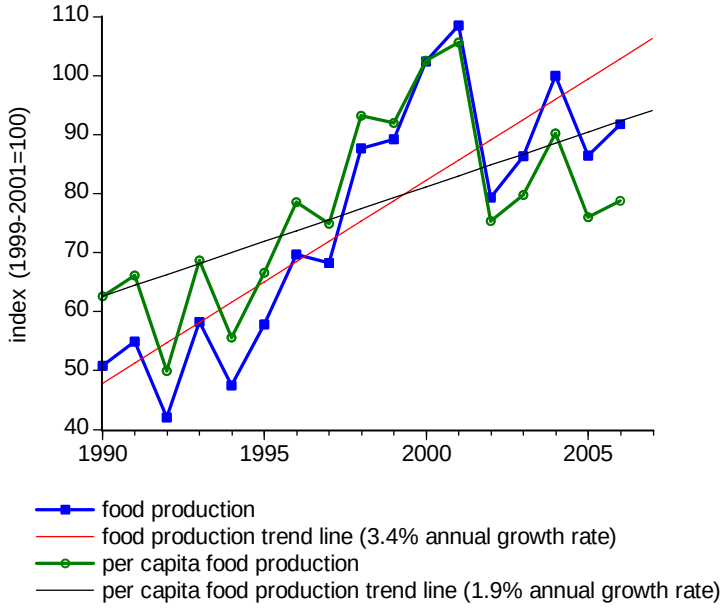
[4] There are apparent discrepancies between FAOStat figures and both Ministry of Agriculture Crop Estimates and NSO population growth estimates.

Figure 2.2 Trends in national maize production, Malawi, 1990-2007



Note: time trend computed from 1985 to 2006 (excluding the 2006/07 harvest).
Source: Ministry of Agriculture, Government of Malawi.

Figure 2.3. Trends in national food production, Malawi, 1990-2006



Note: trend estimates based on 1990 to 2006 harvest years (excluding 2007).
Source: FAOStat, http://faostat.fao.org/site/601/default.aspx

Table 2.3 Major pertinent events in Malawi from 1990/91

		Major Input Interventions	Maize Production (mt)	Real peak pre-harvest maize price (1990 prices)	Real min harvest price (1990 prices)
1990/91	On going structural adjustment & liberalisation promoted by donors	Approx 14,000 mt free* & Universal fertilizer subsidy,		0.44	0.29
1991/92	Widespread Southern Africa drought , low yields & with growing movement for mulitiparty democracy & elections, credit default & SACA collapse	Approx 62,000 mt free * & Universal fertilizer subsidy	657,000	0.33	0.32
1992/93		Approx 74,000 mt free * & Universal fertilizer subsidy	2,033,957	0.56	0.32
1993/94	Multi party elections. Election of President Muluzi. Drought conditions, low uptake of hybrid seeds.	Approx 6,000 mt free * & Universal fertilizer subsidy	818,999	0.38	0.32
1994/95		Approx 27,000 mt free * & Universal fertilizer subsidy	1,327,865	0.34	0.30
1995/96	Malawi Social Action Fund (MASAF) established in July 1995 to address community social needs following structural adjustment and liberalisation. Social and economic infrastructure (US$56 million over 3 years) including 188,000 public works jobs	Approx 24,000 mt free * & Universal fertilizer subsidy	1,793,461	1.14	0.34
1996/97	Removal of fertiliser subsidy with rapid devaluation led to soaring input prices, low production despite good rains	Removal of fertilizer subsidy	1,226,478	0.50	0.40
1997/98	1997/98 drought in Karonga Agricultural Development Division and floods in Shire Valley in 1997/98 season.	APIP (15,000 mt)	1,623,507	0.94	0.51
1998/99	MASAF 2 established from 1998 - 2003	Starter pack, APIP(67,000mt)	2,399,781	0.98	0.53
1999/00	Re-election of President Muluzi	Starter pack, APIP (68,000mt)	2,501,311	0.58	0.34
2000/01	Starter pack scaled back. Heavy March rains. Poor harvest, dry spells and floods in some areas, low input uptake.	TIP, APIP (27,000 mt)	1,619,091	0.40	0.38
2001/02	2001/02 season: early rains, late rains, dry spell in February & floods in the escarpment & lakeshore exacerbated by low input use	TIP, APIP (15,000 mt)	1,437,043	1.51	0.66
2002/03		Extended TIP, APIP (35,000 mt)	1,758,688	0.81	0.40
2003/04	Election of President Bingu Mutharika. MASAF 3 launched. Significant food aid sales	TIP, SPLIFA (22.000 mt)	1,733,125	0.73	0.49
2004/05	Political expectations of universal fertiliser subsidy did not materialise: late TIP distribution, poor March rains low production. Significant food aid sales	late TIP, SPLIFA (54,000 mt)	1,225,234	0.59	0.53
2005/06	Maize export ban.. Very high maize prices in growing season, some harvest price support. Fertilizer and maize seed subsidy through ADMARC/SFFRFM only..	Input subsidy (132,000 mt)	2,720,762	1.48	0.52
2006/07	Scaling up of agricultural input subsidy. Very low maize prices during growing season, continued export ban lifted end of Feb. Fertiliser and maize seed subsidy through ADMARC/SFFRFM and private sector.	Input subsidy, Assets for Inputs (total 179,000mt)	3,444,456	0.58	0.38

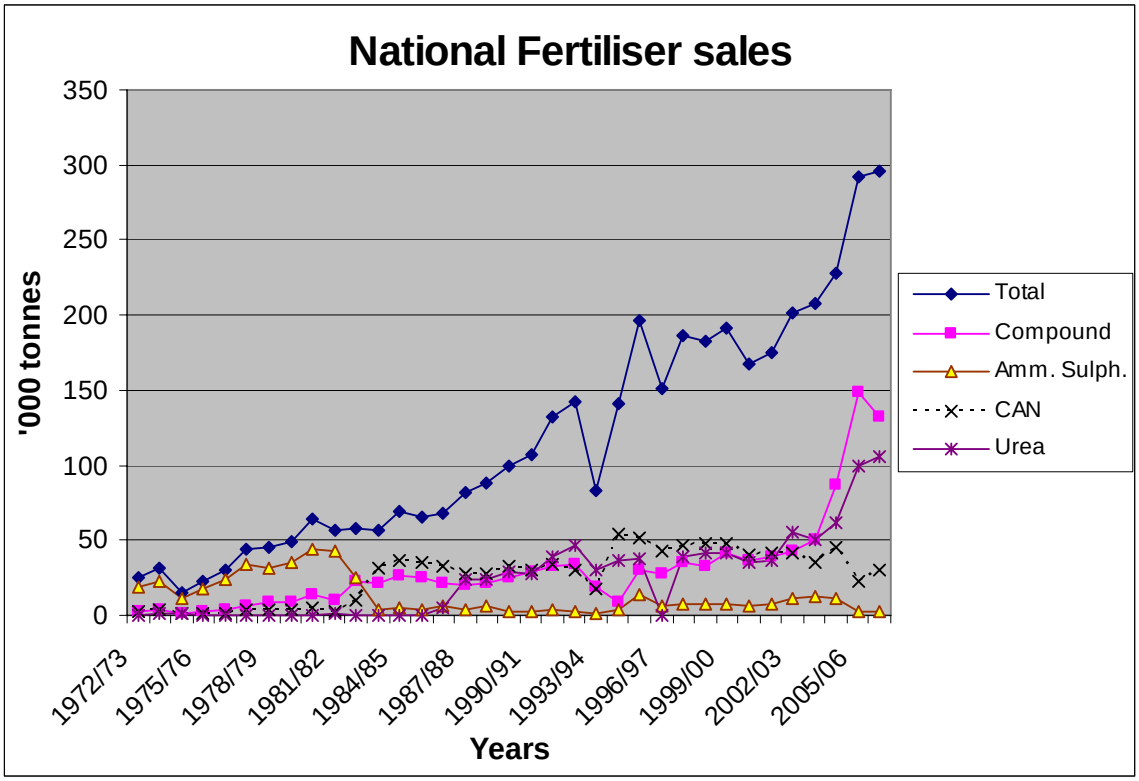
Prices: MoA Net average prices for sampled markets, real prices deflated by retail price index at 1990 prices; * Estimated from Carr, 1997, mostly due to defaulted loans

Recent years have also seen an increasing emphasis on social protection policies and interventions. From an agenda that initially focused on relatively small targeted programmes and large emergency responses to crises following poor agricultural seasons, social protection has increasingly become concerned with addressing chronic and seasonal hunger and with systemic vulnerability in rural livelihoods, and hence with maize production, access to inputs, and maize markets. Views on the relationship between social protection and agricultural development policy objectives and interventions have, however, differed among different donors, government agencies, and other stakeholders. This, together with political and economic changes in Malawi and changes in donor policies, has resulted in major year to year changes in input supply systems, and these have become a major source of uncertainty to all stakeholders. Pertinent major events and changes in policy are summarized in table 2.3**.**

2.2 Fertiliser sales in Malawi

A brief overview of the structure and evolution of the Malawi fertilizer industry was provided in the interim report in March 2007, and elements of this are summarised in section 7. It is necessary near the outset of this report, however, to present basic information on volumes and structure of fertiliser imports and sales. Figure 2.4 shows a striking trend of increasing fertiliser sales over the last 30 years[5], even without the dramatic increase reported for 2005/6 and 2006/7. Trend growth in fertilizer use was 6.0% per year from 1984/85 to 2004/05 .

Figure 2.4 National Fertiliser Sales, 1972/73-2006/7



[5] Sales up to 1991/2 are ADMARC smallholder sales reported by Conroy 1993, citing Darudec 1991: these exclude sales to estates, which are included in data for subsequent years. From 1992/3 total sales are reported, to 2004/5 from IFDC and in 2005/6 and 2006/7 from data compiled by David Kamchacha using data collection procedures similar to those used by IFDC, with some consistency adjustments using data from the Logistics Unit..

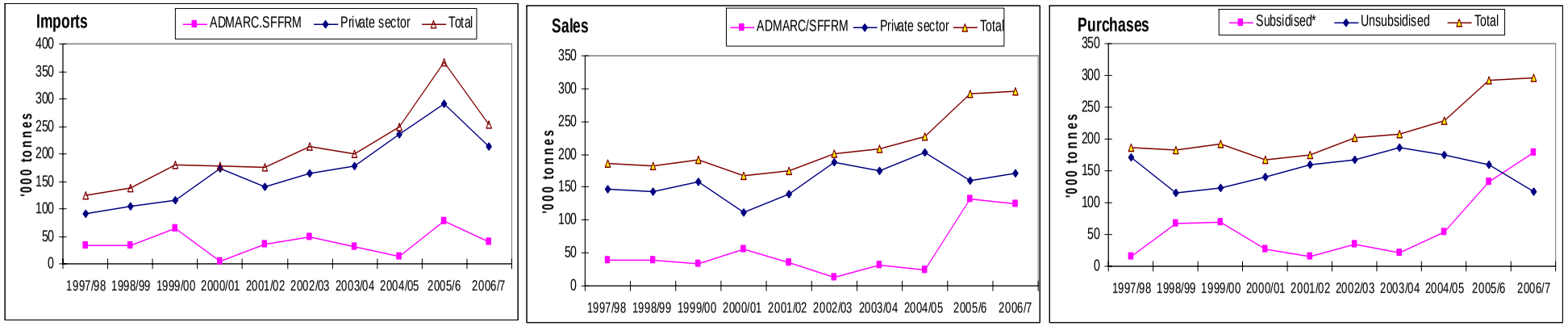
Table 2.4 Private and Public Sector Involvement in Fertiliser Imports, Sales and Purchases 1997/8 to 2006/7

	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/6	2006/7
					Metric tonnes					
Total Imports	123,926	137,776	179,652	178,213	174,613	213,778	200,311	249,543	367,188	253,907
Total sales	186,926	182,776	191,652	166,978	174,956	201,798	208,183	228,000	291,988	296,301
Importation by										
ADMARC.SFFRFM	32,772	33,265	64,350	5,012	0	48,461	N/A	13,699	77,000	39,207
Private sector	91,154	104,511	115,302	173,201	174,613	165,317	N/A	235,844	290,188	214,409
% Private sector	74%	76%	64%	97%	100%	77%	N/A	95%	79%	85%
Sales by										
ADMARC/SFFRFM	38,976	38,863	33,434	55,455	34,814	13,024	32,403	24,661	131,803	125,438
Private sector	147,950	143,913	158,218	111,523	140,142	188,774	175,780	203,339	160,185	170,863
% Private sector	79%	79%	83%	67%	80%	94%	84%	89%	55%	58%
Purchases by farmers										
Subsidised*	15,000	66,522	68,330	27,301	15,281	35,425	21,829	53,500	131,803	178,582
Unsubsidised	171,926	116,254	123,322	139,677	159,675	166,373	186,354	174,500	160,185	117,719
% unsubsidized	92%	64%	64%	84%	91%	82%	90%	77%	55%	40%

* Subsidised includes starter pack, TIP & APIP, but under-estimates NGO small project purchases. Assets for inputs included only for 2006/7 (3,893 MT)

Sources: IFDC data up to 2004/5, report compiled by David Kamchacha for 2005/6 and 2006/7

Figure 2.5 Private and Public Sector Involvement in Fertiliser Imports, Sales and Purchases 1997/8 to 2006/7



Another feature of change in the Malawi fertilizer industry has been the increasing involvement of the private sector. Up to the early 1990's only ADMARC was permitted to sell fertilizer (at a subsidy) to smallholder farmers while private importers supplied ADMARC and supplied commercial estates. With liberalization of the sector and the removal of the subsidy in the mid 1990s, the market opened up, and the private sector became increasingly involved. Table 2.4 shows the changing extent of private and public sector activity in the fertilizer market over the last 10 years, distinguishing between public and private sector activity at 3 different stages in the fertilizer market chain in Malawi – importation of fertilizer, distribution and sales of fertilizer to farmers, and purchase of fertilizer for on farm use. Data presented here for 2004/5, 2005/6 and 2006/7 differ from those presented in the interim report, following a more comprehensive return of fertiliser imports, purchases and sales by fertiliser importers and wholesalers. This has led to substantial increases in estimated imports and sales over these two years, above the estimates in the interim report.

A number of points of interest should be noted in table 2.4.and in figure 2.5. First, over the last 10 years the private sector has had the major share of both importation and sales of fertilizers, and, with the exception of 2006/7, private sector imports have been rising. The private sector has also had the major share of sales, though these declined in 2005/6 and 2006/7 with the large-scale subsidy programmes implemented largely through ADMARC and SFFRFM. A notable feature of the table is the trend of increasing fertilizer imports and an inverse correlation between quantities of fertilizer distributed by the parastatals and by the private sector. In terms of imports, the private sector has accounted for an increasing share of total imports over time, and the government has often relied on the private sector to import fertilizer used under subsidy programmes. Total sales from 1992/93 to 2004/5 are generally flat, with a rising trend from 2000/1. This, with large variations in the volumes of subsidized purchases from one year to the next, ,suggests that a significant proportion of subsidized sales displace commercial sales. If this is the case, and many in private sector believe this to be so, then it suggests that increases in overall fertilizer use as a result of subsidized sales are some way below the volumes subsidized. This very important issue for the subsidy programme is examined more extensively later in section 6. It should also be noted that the data on fertilizer sales are not as clear cut as the discussion above might suggest[6].

2.3 Constraints to smallholder fertiliser use in maize production

Constraints to smallholder fertiliser arise from two problems, profitability and affordability.

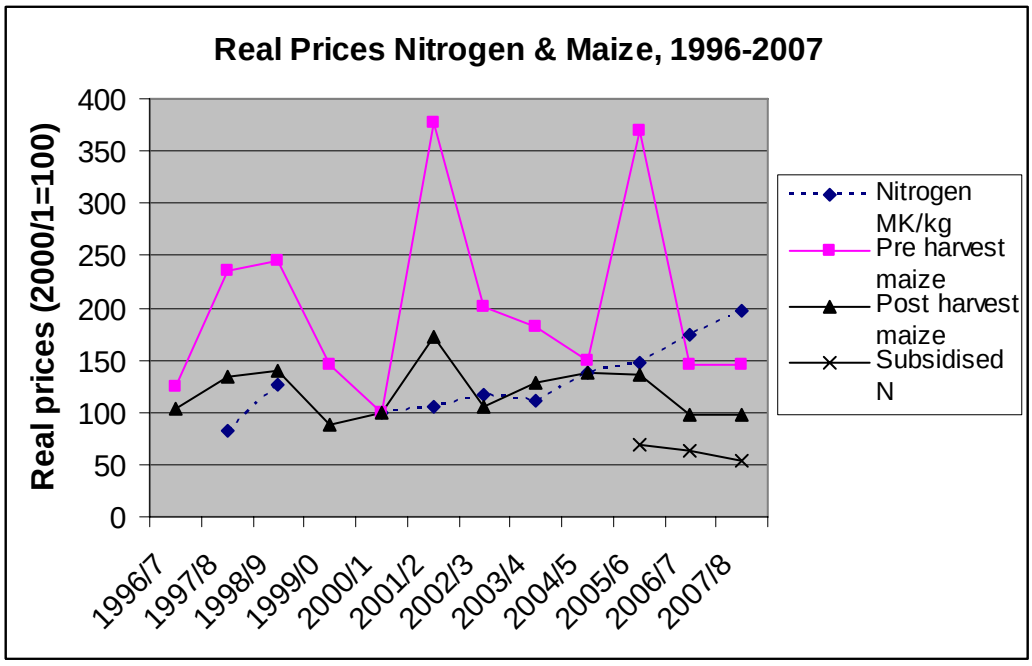
Profitability of fertiliser use is commonly considered in terms of the Value: Cost Ratio, or VCR, which compares the total value of extra output produced by a unit of fertiliser with its cost. The VCR depends upon the productivity of fertiliser (the amount of grain produced per unit of fertiliser nutrient) and the ratio of crop and fertiliser prices: $VCR = O/N * P_o/P_n$ (where O/N = units of output produced per unit of nutrient, P_o is the price of the output and P_n is the price of nutrient). A VCR greater than 1 is needed just for extra output to cover the cost of fertiliser needed to produce it, but other costs associated with fertiliser use may need a VCR some way above 1 for fertiliser use to be profitable: these other costs include extra costs of fertiliser finance and application; of harvesting, processing and transport of extra produce; and allowance for production and market risks. In developing countries it is generally considered that a VCR of 2 is the minimum required to make fertiliser use profitable (Morris et al, 2007), but higher ratios may be needed in risky environments. Applying this to maize production and taking nitrogen as the nutrient and a grain: N ratio of 15, the price of nitrogen must be no more 7.5 times the price of maize if the VCR is to be greater than 2.

Maize prices are highly variable in Malawi, both within and between seasons (see figures 5.2 and 5.3), and the price of fertilisers has been steadily rising in nominal terms (see figure 2.6). As a result, the VCR for maize has varied markedly in the last few years, as shown in figure 2.7,

[6] In the interim report a less complete dataset gathered from the fertiliser industry and triangulated against key informant interviews suggested much lower imports and sales in 2005/6 (estimated at 290,000 and 224,000 tonnes respectively compared with 367,000 and 292,000 reported above) and in 2006/7 (estimated at 209,000 and 259,000 tonnes respectively compared with 247,000 and 303,000 tonnes reported above).

depending upon whether peak pre-harvest prices or low post-harvest prices are used for pricing maize, and in the latter case it has generally been below 2, while in the former case it has generally but not always been above 2[7]. This analysis suggests that profitability of fertiliser use on maize is a constraint to its use on maize grown for sale at or near harvest. Where maize is grown for own consumption then it may be valued more highly, using peak post harvest prices and with VCRs greater than 2. Furthermore whereas considerations of risk may lead to a lower subjective valuation of VCRs when producing maize for sale, it may lead to a higher subjective valuation of VCRs when producing maize for own consumption (as farmers fear the effects of a bad year on maize purchase prices).

Figure 2.6 Nitrogen and Maize prices, 1996-2007

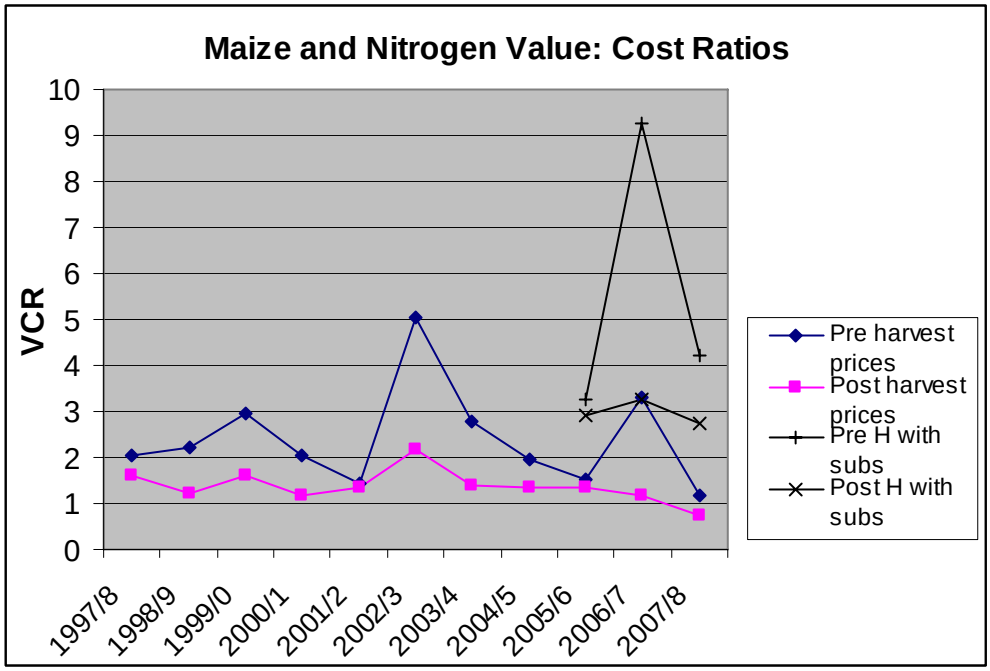


Affordability of fertiliser purchase depends upon the cost of fertilisers and farmers' access to short term working capital – in terms of savings, their ability to borrow, and costs of borrowing. Farm household liquidity is widely recognised to be a problem for poor farm households around the world with on the one hand a 'hungry gap' during the cropping period (when farmers need to invest labour, seed and other inputs in crop production while food stocks from the previous season are running low, and children are particularly susceptible to sickness) and on the other very high costs in borrowing and an absence of low cost input finance services. Hungry gap problems at the livelihood level are exacerbated by rural economy market effects (depressing wage rates and asset prices and raising food prices). These problems are widely recognised as very severe for poor rural households in Malawi, causing severe production and welfare problems in rural areas[8].

[7] Maize prices used in calculation of the VCRs in figure 2.6 are derived from retail market data: farmgate prices are likely to be lower, further depressing the VCR for post-harvest maize sales. Note that fertiliser prices have been compared with the previous season's maize prices to represent information available to farmers *ex ante*.

[8] Table 2.1 for example shows that the median month for maize stocks to run out is from September to November, and in 2003/4 one bag of fertiliser was around 10% of median per capita rural expenditure and over 20% of median per capita expenditure of the lowest expenditure quintile (calculated from NSO 2005 and 2003/4 season fertiliser prices from SFFRFM).

Figure 2.7 Maize/Nitrogen Value to Cost Ratios (VCRs), 1997-2007



Improving the *profitability* of fertiliser use in maize production requires lower fertiliser prices (as a result either of greater efficiency in fertiliser supply and reduction in transport costs for importation and distribution or of a subsidy), higher maize prices, or greater efficiency in the use of fertiliser (raising the grain output: N ratio)[9]. Changes to maize prices and improved efficiency of fertiliser use will not, however, improve the *affordability* of fertiliser for large numbers of poor rural households in Malawi. This requires very substantial reductions in fertiliser prices and/or the development of low cost and accessible financial services. The development of such financial services for fertiliser use in maize production requires that maize be profitable, that smallholders have other sources of cash income that can be used to can repay fertiliser loans when the majority of the maize they produce is for home consumption, and that very low cost systems are used for loan disbursement and recovery[10].

2.4 The 2005/6 Input Subsidy

In 2005/6, following a poor harvest in 2004/5 the government decided that it would implement a fertilizer subsidy to promote access to and use of fertilizers in both maize and tobacco production in order to increase agricultural productivity and food security. A full description of the programme was provided in the interim report. The subsidy was implemented through the distribution of coupons, in two stages, the first in proportion according to cropped maize and tobacco areas, although actual allocations per ha and per grower varied widely. Coupons were distributed to districts and TAs (traditional authorities) by the Ministry of Agriculture. TAs were supposed to allocate coupons between villages, to Village Development Committees, who were then supposed to identify recipients to receive coupons which they could then redeem, at a reduced cash price, for any of the four fertilizer types. There was considerable variation between areas in the criteria determining prioritization and selection of beneficiaries, numbers of people receiving coupons, and

[9] A ratio of 15 was used in the calculations for figure 2.6, but higher ratios (of 22 to 28) are possible with hybrid seed and good management on farmer demonstrations and trials (see table B2, Annex B).

[10] The size of loans needed for fertiliser purchase as compared to annual incomes (and hence very high gearing) also raises ethical issues unless loans are accompanied by effective insurance systems.

numbers of coupons received per recipient household, and the situation was complicated by the government issuing supplementary coupons, which tended to be issued in an ad hoc way late in the season. 6,000MT OPV maize seed were also offered for sale without coupons at a price of MK150/3kg as compared with a market price of MK500/3kg, although there are some reports that some of the OPV seed was of poor quality.

A total of 147,000 tonnes of fertilizer (or approximately 2.9 million 50kg bags) were to be subsidized in the scheme, with 55,000 tonnes each of 23:21 and urea for maize), and 22,000 tonnes and 15,000 tonnes of compound D and CAN respectively for tobacco. About 70,000 tonnes (48%) were supplied by private sector importers and the remaining 77,000 tonnes were imported by SFFRFM. All distribution of subsidised fertilizer and seed was by ADMARC and SFFRFM. Fertiliser deliveries were late to many areas as a result of late ordering of imports, and distribution priority was given to the south and centre where the rains started earlier. However distribution within regions was not always consistent and some areas received deliveries exceeding budgeted fertilizer sales, while others went short Sales of fertilizer were dependent upon both the distribution of fertilizers to unit markets in EPAs and farmers' holding of coupons to redeem fertilizer.

Holders of coupons were entitled to redeem coupons for fertilizer at the rate of 1 coupon and MK950 for one 50kg bag of 23:20 or urea, and at 1 coupon plus MK1,450 for one 50kg bag of Compound D or CAN. It appears that many coupons allocated (but not marked) as tobacco coupons may have been used to buy 'maize fertiliser'. Sales continued into January, and in different areas were limited either by a lack of fertilizer stock or by a lack of coupons. In the latter case supplementary coupons were used in some areas, but shortages of fertilizer in time for it to be useful meant that significant numbers of coupons were not used. ADMARC/SFFRFM report total subsidy sales of 131,803 tonnes, which would represent 2.62 million coupons. No information has been available on seed sales.

The programme is reported to have cost MK7.2 billion against a budget of MK5.1 billion. These are direct costs of purchase and distribution of fertilizer, net of sales receipts. They do not include overhead costs. Benefits from the subsidy need to be evaluated in terms of incremental fertiliser use on smallholder maize and tobacco and its direct and indirect impact on production and livelihoods.

In the interim report 2005/6 private sector sales were reported to be more than 50% lower than sales in the previous year, suggesting substantial displacement of commercial sales and hence incremental fertilizer use on maize as a result of the subsidy was estimated to be around 45,000 tonnes, considerably less than the subsidized sales of just under 110,000 tonnes of 'maize fertilisers'. Subsequent upward revision of 2005/6 private sales leads to a downward revision of estimated displacement and hence increased incremental fertilizer sales and maize production.

The widespread popularity of the programme suggests that it is perceived to have had a beneficial impact on people's livelihoods, and again these are discussed later in sections 5 and 7 of the report.

3. Data sources and analytical methods

As outlined earlier, the evaluation has been implemented and managed in four modules related to the analytical framework for investigating impact as set out earlier in the introduction, and supported by cross cutting activities. These four modules examined input subsidy implementation, rural household impacts, input supply system impacts and, briefly, macro economic impacts. Cross cutting research activities drew on a variety of other information sources to augment information from the modules above.

Information has been drawn from a wide range of sources in writing this report. Information on implementation of the programme is derived from Ministry of Agriculture data: information compiled by the Logistics Unit has been particularly important. Fertiliser and seed importers and sellers have also provided information, in key informant interviews and an initial data collection exercise in January and February, and also for a more systematic compilation of figures on

imports, sales, purchases and stocks conducted by David Kamchacha for the study, in the period June to August 2007.

Focus group discussions and key informant interviews were conducted in February 2007 in six districts (Rumphi, Mzimba, Kasungu, Lilongwe, Machinga and Blantyre), gathering information from a range of stakeholders involved in implementation of the programme and from rural people. At the same time a survey of 271 retail outlets was conducted in these districts (see Section 6).

Much of the analysis in this report is based on smallholder household survey data. The data is derived from two nationally-representative panel surveys, both implemented by the National Statistical Office (NSO) of the Government of Malawi. The Integrated Household Survey-2 (IHS-2) was conducted in 2004, enumerating over 11,000 households. The IHS-2 covered 2 crop seasons as some households' reported information on crop production and input use from the 2002/03 production season (a relatively good production year), while other households interviewed later in 2004 reported crop production and input use for the 2003/04 season (a moderate to good crop growing season in most areas).

In May/June 2007, the NSO re-interviewed 3,298 households in 175 enumeration areas in 28 districts, of whom roughly 3,100 were previously sampled and interviewed in the IHS-2 survey. We refer to this 2007 survey as the AISS. Households and enumeration areas within each district were selected randomly. After excluding households with missing information, obvious data errors, those stating that they farmed over 20 hectares of land, and those that could not be properly matched between the two surveys, the sample was reduced to 2,431 households. Information on community wide variables was also collected with a community questionnaire administered to key informants in each enumeration area.

Thus, final analysis is based on the balanced panel of 2,431 households in the smallholder sector that were jointly interviewed in 2006/07 and either 2002/03 or 2003/04. For 1,101 of these households, information on crop production and input use pertains to the 2002/03 and 2006/07 years. Information on the remaining 1,330 households pertains to the 2003/04 and 2006/07 years.

The AISS survey was designed to provide information by district and by major livelihood zone (as defined by {Malawi National Vulnerability Assessment Committee, 2005 #17). Details of the sample are provided in table 3.1. The sample design provides, with appropriate weightings, unbiased national and district estimates based on NSO estimates of rural population by district. These estimates (of just under 2.5 million households) are considerably below Ministry of Agriculture estimates of 3.3 million farm families. It should be noted that for some of the small livelihood zones the sample is too small to draw reliable conclusions (Misuku Hills, northern Karonga, central Karonga, Mzimba self sufficient and Pirilongwe Hills all had samples of less than 100 households (see table 3.1) from 5 or less enumeration areas. Urban, peri-urban and protected areas (national parks and reserves) were omitted from the sample.

There have unfortunately been considerable delays in the processing of the data from this survey. This report, and the analysis it contains, have therefore been forced to use data which have not been properly cleaned in that queries to NSO regarding large numbers of outliers or inconsistencies have not been properly checked back and corrected against data entries on questionnaire forms. This has reduced the sample size available for analysis and may also introduce bias. Particular problems have been encountered with data on crop areas and production. These problems appear to exist, to different degrees, in both the IHS2 and AISS data. The Evaluation Team put considerable effort into cross checking and cleaning the IHS2 data on crop areas and production while waiting for the AISS data, but time constraints have prevented the same effort in cleaning the AISS data. Difficulties arise from use of highly variable and poorly defined units for measuring field areas and crop production and also from apparent data entry slips with decimal points and coding of units. The poor quality of the AISS crop area and production data, and the late or non-delivery of cleaned data by the NSO means that regrettably it has not been possible to use any of the AISS crop area and production data in the analysis in this report. Other data collected in the IHS2 and/or in the AISS are inherently less prone to error, and the report therefore contains analysis of data on household composition; fertiliser coupon and input acquisition and use; assets; food security; subjective well being; and community variables.

Table 3.1 AISS Sample by district and main livelihood zones

District	*Sample* households
Chitipa	100
Karonga	98
Nkhata Bay	109
Rumphi	103
Mzimba	119
Kasungu	134
Nkhotakota	120
Ntchisi	120
Dowa	128
Salima	103
Lilongwe	137
Mchinji	120
Dedza	160
Ntcheu	139
Mangochi	172
Machinga	139
Zomba	157
Chiradzulu	120
Blantyre	126
Mwanza	109
Thyolo	148
Mulanje	140
Phalombe	120
Chikwawa	140
Nsanje	119
Balaka	118
Total	3298

Livelihood Zone	Sample households
Chitipa Maize and Millet	84
Misuku Hills	16
Northern Karonga	32
Central Karonga	34
Nkhata Bay Cassava	117
Western Rumphi and Mzimba	102
Mzimba Self-Sufficient	86
Northern Lakeshore	178
Kasungu-Lilongwe Plain	719
Rift Valley Escarpment	228
Southern Lakeshore	105
Border Productive Highlands	114
Shire Highlands	371
Pirilongwe Hills	77
Lake Chilwa - Phalombe Plain	357
Middle Shire	251
Lower Shire	259
Thyolo-Mulanje Tea Estates	168
Total	3,298

A variety of analytical techniques were used to investigate (a) the patterns and determinants of different households' access to subsidised fertiliser and (b) impact of the subsidy on different households and the rural economy. Summary tables of means, medians and cross tabulations are used to provide general contextual and comparative information. Information is presented on different topics by regions, districts, or livelihood zones (as defined by MVAC).

Relatively simple cross tabulations of access to coupons against household characteristics provide valuable information about what types of household in what areas received coupons and fertiliser and what they did with them. Probit analysis of AISS data was used to learn something about the determinants of different households' access to coupons, regressing receipt of subsidised fertiliser and, for recipient households, the amount of subsidised fertiliser received against a range of different area and household characteristics.

Impact of the subsidy on fertiliser use, taking account of possible displacement effects, was estimated in two ways. First, time series regressions of national commercial fertilizer use on national subsidized fertilizer purchases or receipt by farmers were used to estimate the degree of displacement and incremental fertilizer use from the distribution of an additional ton of subsidized fertilizer. Displacement and incremental use were also estimated at the household level from AISS data by comparing changes between 2004 and 2006/7 in commercial fertiliser purchases against purchases of subsidised fertilisers.

Impacts of the subsidy programme on rural livelihoods for different types of household were investigated using livelihood models. Cluster analysis was conducted to identify major livelihood types in each of the major livelihood zones identified by MVAC ({Malawi National Vulnerability Assessment Committee, 2005 #17). Models described in Dorward ({Dorward, 2003 #18;Dorward, 2006 #19}) were updated to 2003/4 prices and structural changes were introduced to fit them to the purpose of investigating subsidy impacts. Household characteristics for the different livelihood types identified by the cluster analysis for the two largest livelihood zones (Kasungu-Lilongwe Plain and Shire Highlands Zone) were then introduced to allow simulation of the direct effects for different household types of access to subsidised coupons. Wider effects on the local rural economy (on maize prices and ganyu wages) were then investigated by simulating aggregated effects of subsidy access on different household / livelihood types (again using methods described in Dorward, A.R., 2003; Dorward, A.R., 2006).

Work on the IHS2 data set has highlighted a particular issue that does not appear to have been recognised in published analysis of IHS2 data, problems arising from the phased sampling of different enumeration areas. While the IHS2 sample design should provide unbiased district estimates of household expenditure and poverty rates, analysis of the determinants of household welfare should take account of the timing of household interviews. Substantial variation is observed in estimated poverty rates for enumeration areas sampled at different times of year. It should also be noted that crop area and production data apply to the 2002/3 season for households interviewed earlier in the enumeration programme and to the 2003/4 season for households interviewed later in the enumeration programme.

In addition to the household survey, further key informant interviews and focus group discussions were held in six districts in July. These covered issues of household access and use of coupons and inputs and of livelihood and community change. Focus group discussions encouraged participants to identify different types of household in the community and to discuss the ways that the subsidy programme impacted on these different household types. A broadly similar classification was found across the different districts, as shown in table 3.2.

Table 3.2 Household / livelihood classification from focus group discussions

Group	Characteristics
Group one Ochita bwino / opeza bwino 'well to do'	Eat three meals a day, including sugar with their morning porridge. Produce surplus at harvest, are able to sell crops. Do not have to enter market for staple food. Have many pieces of land – both owned and rented Can afford unsubsidised fertiliser, apply both urea and NPK. Have different livestock including cattle for ploughing (and can therefore use manure) They have a lot of assets at their homes – cars, clothes Have good housing with iron sheets They employ people for ganyu. Children attend good secondary schools Use new technologies – e.g. Sasakawa.
Group two Opeza bwino pangono / woyeserako Slightly above average	Harvests last until January in a bad year or May in a good year. At least until end of rainy season. They have about two large pieces of land and may rent another. Employ at least one person for ganyu. They do not use animal power as own few or no cattle. Have goats or chickens They can buy small quantities of fertiliser but benefit from subsidised. Some household assets – e.g. bicycle, iron sheets. Eat twice in a day. They wear clean clothes Relatives working in town so may receive remittances Children attend primary school and sometimes secondary school Try to use technology – e.g. Sasakawa Diverse range of crops, some intercropping.
Group three Ovutika The poor	Food stocks are variable and last until between August and January. Own one large piece of land and cannot afford to rent more. Grow more than one crop on the same land. Depend on ganyu, especially to get cash or food. Cannot afford unsubsidised inputs. Few or no livestock. May have some chickens. No animal power. Eat one meal per day, sometimes no meals. Have very few, often dirty, clothes. No household assets e.g. bicycle. Houses are in poor condition – unburnt bricks and grass roof. Sometimes children do not attend school because they lack good clothing and food.
Group Four Ovutikitsitsa / wosoweratu The poorest	Harvests are very poor sometimes they do not harvest at all i.e. they eat all the maize when green. Have a small piece of land. Often plant only maize. Main / only source of income is ganyu. No livestock or animal power. Few or no household assets. Cannot afford subsidised inputs unless share with other households. Eat one meal / day and often go the entire day without eating anything. Wear torn and dirty clothes. Children do not attend school. Some are vulnerable like the elderly, orphans and sick that lack assistance. Houses are in very poor condition.

4. Planned and actual implementation of the 2006/7 agricultural input subsidy

Following a widespread public and government perception of broadly successful outcomes from the 2005/6 input subsidy programme, there was a general consensus that the programme should be repeated in 2006/7, despite concerns about different aspects of the programme among agricultural input suppliers and opposition parties. Programme design was modified to reflect lessons learnt and to recognize the interests of some stakeholders who were keen to contribute to and participate in the programme. Important changes from the 2005/6 programme involved greater involvement of donors and the private sector. The March 2007 report describes in some detail the ways in which the implementation systems for fertilizer and seed distribution were developed and the final systems for coupon allocation and distribution, input procurement and distribution, and coupon redemption/ input purchase.

4.1 Programme objectives and stakeholders

As will be discussed later, a major issue in the evaluation of the 2006/7 AISP concerns clarification of its objectives, of the means by which they will be achieved, of the likely period of time over which it should be implemented, and of conditions which would allow it to be terminated.

There is broad agreement that the objective of the programme is to improve land and labour productivity and production of both food and cash crops by smallholder farmers with heavy cash constraints that preclude their purchase of inputs, to promote economic growth and reduce vulnerability to food insecurity, hunger and poverty. A further objective emphasised by some is promotion of the development of the private sector agro dealer (input) network. These objectives are consistent with the National Agricultural Policy Framework (2006) overall objectives and purposes, and with results and strategies concerned with sustainable management and use of natural resources (2), increased smallholder productivity of food and cash crops (8), and promotion of agribusinesses (11).

Within this broad agreement, however, there are differing understandings about the mechanisms by which the programme will promote increased food security and reduced hunger. Thus if food security is defined primarily in terms of national food self sufficiency, then the programme should concentrate on promoting fertiliser use among those smallholder farmers who will use it to the greatest effect – able bodied farmers with land and labour but who would not buy unsubsidised fertiliser. However, as Sen and others have emphasized, it is possible to achieve national food self-sufficiency while a large proportion of households remain food insecure. Therefore, if food security is perhaps more appropriately seen as improved household food self sufficiency (as outlined in the Agricultural Communications Branch leaflet distributed throughout the country) then the programme should concentrate on promoting fertiliser use among smallholder farmers who are most food insecure and who could not otherwise afford to buy fertilizer. These households may or may not end up using the fertilizer themselves, but even if they sell it to others, they are better off for having the cash from the sale of fertilizer, with better food security through increased ability to purchase food even if their food self-sufficiency is not changed.

Different understandings of 'food security' and of programme objectives arise partly because of the large variety of stakeholders with interests in and influence on the development and implementation of the programme. Each stakeholder may have different long and short term objectives relating to the interests of the organisations they are members of, their professional training and interests, and their personal (for example social or financial) interests. Different professional and cultural backgrounds and interests of individuals and of organizations tend to encourage differing understandings of and emphasis on different technical, social, and economic processes and achievements. Programme objectives need to be clarified and, with programme implementation, need to seek to provide incentives to different stakeholders to work together in ways that will support the most efficient and effective achievement of the programme's wider objectives. Measures are also needed to limit the opportunities and incentives for large scale opportunism, either resulting from single instances on a large scale (such as in fertilizer

importation), or from many smaller scale instances (such as misappropriation in coupon distribution or in input sales at selling points).

A difficulty in evaluating the input subsidy programme is the way that some of the different programme objectives work at cross purposes. For example, it is sometimes suggested that households that might use fertilizer to make the greatest contribution to marketed maize output and national self-sufficiency may be those with relatively high purchasing power. However these households may be willing and able to purchase inputs without a subsidy, so that subsidies to these households may be more likely to displace commercial fertilizer purchases and thus add relatively little to national maize production or marketed output (this question is examined empirically later in section 6). They are also likely to be households facing a relatively low risk of food insecurity. On the other hand, there are concerns in some quarters that providing fertilizer to the poorest and most food insecure strata of households (who would not otherwise be able to afford fertiliser) would be unwise because they may not be able to use fertilizer efficiently. These concerns lie behind the targeting criteria suggesting that the 2006/07 fertilizer subsidies should be targeted to households that were in the middle income groups -- neither the poorest nor the best off.

4.2 Programme Development

The 2006/6 programme design built heavily on experience from the 2005/6 programme. It was proposed to use a similar distribution matrix system for allocating coupons as in 2005/6 ('taking into account the agricultural practices of the districts') and to continue to use local government and Village Development Committees (VDCs) to distribute coupons, but to strengthen the distribution to reduce instances of misallocation of coupons by introducing mechanisms to increase the transparency of the system, to increase the involvement of government and civil society representatives, and to issue clearer instructions on the system.

From April 2006 there were intensive discussions involving Government, donors and private sector importers and distributors as regards the development of systems for implementing the programme. There was considerable concern among some donors and among private sector companies that a repetition of the 2005/6 system using only ADMARC and SFFRFM for fertilizer distribution would further damage the private sector. This led to discussions between Government (Ministry of Finance and Ministry of Agriculture), donors and private companies. The private sector, through recently established fertilizer and seed supplier associations, put forward proposals for coupons to have a fixed value which farmers could use to obtain a fixed discount when buying fertiliser or other inputs at private sector outlets or at ADMARC or SFFRFM depots. Under this system inputs sold through private sector outlets would be procured and distributed by the private sector while ADMARC and SFFRFM would be required to sell at prices that covered their full costs, including overheads.

Government recognised the potential benefits from private sector involvement (from increased coverage of selling points to reduce congestion, the promotion of agribusiness, and utilization of its ability to source stocks), but expressed concerns about (a) the risks of large unsold ADMARC stocks if the private sector made significant sales and (b) the quality of inputs (particularly seeds). Government was also concerned that farmers in remote areas, with higher transport and distribution costs, would be disadvantaged by variable prices for inputs and that only reputable and well established private companies with experience and investments in retail outlets could be relied upon to implement the system.

To enable these concerns to be addressed, DFID offered financial support for (a) the financing and administration costs of unsold Government fertiliser stock, (b) the management of coupon and input distribution by the Logistics Unit and the maize seed component of the input subsidy programme, and (c) technical quality monitoring of seed and fertilizer stocks. DFID's proposals were to enable agreement on private sector involvement in fertilizer and seed distribution. For fertilizers, 'bona fide' private input dealers with existing outlets would, with ADMARC and SFFRFM outlets, be able to redeem coupons from farmers for fixed farmer payments and claim back a subsidy amount per coupon which varied according to the location of the outlet and associated transport costs. Reliance on the private sector reduced the need for ADMARC/ SFFRFM to

purchase and store fertilizers. A more liberalised subsidy procedure for maize seed was agreed, which eventually led to a system where farmers could exchange a seed coupon for a seed pack and without any need for cash. Different suppliers offered different pack sizes of OPV and hybrid fertilisers (2kg of hybrid seed or 2 or 3 kg of OPV seed, depending on supplier costs). The seed system introduced an element of farmer choice, with competition between suppliers, and all seeds sold by ADMARC/SFFRFM were obtained through consignments rather than purchases.

These agreements allowed progress with financing of the programme, a financing agreement with Stanbic Bank (whereby the bank would buy unsold fertiliser stocks from the Government at the end of the season but at the same time the Government would undertake to buy these stocks back for the next season at the same price), and development of coupon and fertilizer distribution, monitoring and control systems and schedules involving the Logistics Unit, colour coded printing of coupons (in triplicate with security features), and restricted invitations for transportation tenders.

By the end of August fertiliser deliveries to SFFRFM depots began but there were still outstanding questions regarding (a) contracts for private distribution of subsidized fertilizer, (b) the system for seed sales, and (c) donor funding for the seed component. Contracts for private distribution of subsidized fertilizer required agreement on the mark-ups to cover distribution costs (for transport, handling and storage) in each district. These were worked out at an average 10% mark up on the cost of all fertilizers delivered to each of the regional SFFRFM depots. Agreement on this and on the limited number of bona fide and established input suppliers which could participate delayed the award of contracts until mid November, when the rains started in some areas. Contracts were limited initially to four firms, with two further firms participating later.

It was also agreed that only a limited number of larger and more established seed sellers would be permitted to put forward expressions of interest to participate within AISAM and Rurmark (the two associations of independent outlets, some of which are very small). There were also delays in agreement to a Ministry stipulation that claims for coupon redemption would only be accepted from approved seed suppliers (not from seed distributors) as this was expected to lead to major costs in processing of coupons by distributors and then again by seed suppliers and to cash flow problems arising from consequent payment delays.

Donor funding for the seed programme was finalized in late November, and the first tranche of DFID finance released as this had been held up by being conditional on the signing of contracts between government and private distributors. DFID funding was subsequently extended to cover unanticipated maize fertilizer transport costs, with some of this being funded from savings on the cost of the Stanbic Bank facility for repurchasing fertilisers, as it became apparent that this would not be necessary[11].

4.3 Programme implementation

We consider programme implementation in terms of coupon allocation and distribution to rural areas, input procurement and distribution, and coupon redemption for inputs.

4.3.1 Coupon allocation and distribution

As in 2005/6, coupons were initially allocated to each district according to a distribution matrix constructed by the Ministry of Agriculture with initial district allocations of 'maize fertilizer' and seed coupons proportional to the maize area in the districts, with subsequent adjustment between districts within each region to reflect perceptions of relative strength of demand in the 2005/6 subsidy programme and then division of coupons between EPAs in each district in proportion to each EPA's maize hectarage. A similar process but related to tobacco areas in each district was followed for constructing the distribution matrix for allocation of coupons of D Compound and CAN intended for tobacco. A total of 2.6 million Urea and NPK coupons, 400,000 D Compound and CAN coupons and just under 2 million seed coupons were issued under the initial or base

[11] This was decided when it became apparent that actual subsidised fertiliser sales exceeded planned sales. The Government did, nevertheless, have some fertiliser stocks to carry forward, and used its own (not DFID) funds to finance use of the Stanbic facility to store these stocks.

allocation. The March 2007 report points out that although this system led to a base allocation that provided roughly equal allocations of fertilizer per ha of crop grown between regions, there were wide differences in allocations per ha between districts within regions, and differences in population density between regions meant that allocations per household were much lower in the south (where poverty is greatest) than in the Centre and North.

As in 2005/6, there was then a second issue of supplementary coupons, with definite information on 1 million NPK and Urea coupons (in equal quantities) and some evidence of further allocations of an unknown quantity issued beyond that. The first allocation of supplementary coupons went to Districts which complained because they had received lower base allocations than in 2005/6. A few southern region districts with base coupon allocations higher in 2006/7 than in 2005/6 received substantial numbers of supplementary coupons. The Northern and Southern Regions both received significantly more supplementary coupons than the central region. This had the effect of substantialy increasing the coupon allocations per ha and per maize grower in the North as compared with the centre and, to a lesser extent, the south. There are of course household food security, productivity, equity, political and practical targeting implications of the regional aspects of this distribution, which will be discussed at the end of the report.

The 2005/6 district allocations were an important factor in both the base and supplementary coupon allocations for 2006/7, and it is clear from focus group discussions, key informant interviews, press reports and anecdotal evidence that 2005/6 coupon allocations also strongly affected people's expectations for the 2006/7 programme, particularly from November to early January. Base allocation, supplementary allocation and the proportion of coupons subsequently redeemed for fertilizer were all greater in 2006/7 than in 2005/6. Further details of coupon allocation are provided in the March 2007 report.

Distribution of the 'base coupons' was intended to follow well documented procedures. Packs of coupon books were parceled up for each EPA in each district, and serial numbers recorded, before dispatch to the Chief Executive of each district. Written instructions had been widely distributed on how coupon distribution should be administered within districts, involving the formation of district, area, and village committees in accordance with standard Local Government structures. Instructions set out the ToR and membership of each committee (with representative at different levels from local government, agricultural extension staff, political leaders, traditional leaders, religious leaders, the police, NGOs and farmers). ToR varied between the committees at different levels but included, as appropriate at different levels, civic education; monitoring and reporting on the delivery and distribution of inputs; stamping out malpractices; review, supervision or implementation of beneficiary identification and sales; recommending the opening and closing of selling points; communication of technical information about input use.

In each village a specific input subsidy programme committee was also supposed to identify beneficiaries, who were supposed to be 'full time smallholder farmers who cannot afford to purchase one or two bags of fertiliser at prevailing commercial prices, as determined by local leaders in their areas'. Guidelines also specified that coupons should be issued to identified farmers 'just before they go to a market point to purchase inputs, to minimize chances of abusing them'.

Key informant interviews, information from community questionnaires and anecdotal evidence suggests that a wide variety of different procedures was followed in allocating and distributing coupons within districts. The involvement of the DDC and VDC was an almost universal feature, but in Mzimba there was only one committee level under the DDC, organizing bulk transport of fertilizers for farmers. The extent of involvement of the TAs in the process varied, and was strongest in the central region where there were reports of TAs subverting the process in various ways (involvement of TAs was reported in 62% of sampled EAs in the central region, as compared with 36% and 0% of EAs in the southern and northern regions respectively). Supplementary coupons were then distributed through the District Agricultural Development Office with TAs and traditional leaders supplying beneficiary names and agricultural extension staff distributing the coupons. In some areas there was disappointment and initial suspicion as a result of smaller numbers of base coupons as compared with the previous year. Targeting criteria reported also varied markedly between districts, with for example civil servants expressly excluded or included in

different districts, and with different emphases put on farmers' inability to otherwise afford fertilizer purchase. Further information on targeting is presented issues in section 7.2.

4.3.2 Input procurement and distribution

Subsidized fertilizers were procured and distributed through two channels: through ADMARC and SFFRFM depots and through private retailers.

The bulk of the fertilizers sold under the programme were distributed by ADMARC and SFFRFM, through a programme of procurement into three SFFRFM depots located in Blantyre, Lilongwe and Mzuzu. SFFRFM requested tenders in April 2006 but this was cancelled with a new request for tenders the following month. These contracts were awarded in August, with SFFRFM winning a contract to supply a little over a third of the total amount required by government for the subsidy programme, with mainly local suppliers/ bidders picking up the balance. With time it became clear that some suppliers would not be able to meet their delivery schedules, and other suppliers picked up shortfalls. These adjustments appear to have led to some cost increases for government, with average prices at the depots rising from approximately $440 to $454 per tonne.

Fertilizers at depots were then uplifted to the ADMARC and SFFRFM unit markets for sale to farmers. This followed a detailed allocation plan drawn up by the Logistics Unit, which also contracted transporters and coordinated transport. Problems included slow staffing and opening of ADMARC markets, related in part to delays and short falls in government's payments for these activities, and poor roads, particularly to more remote areas after the rains had started.

The private companies awarded contracts were responsible for procuring and distributing fertilizers sold through their own retail outlets. Delays in agreeing systems and finalizing contracts inevitably slowed stocking, but how far late stocking delayed actual input disbursement is not clear, given delays in issuing of coupons to farmers and in contract finalization. Only 4 firms were awarded contracts to begin with, but this was later expanded to six firms

Seed procurement and distribution was handled entirely by the private sector from stocks of seed produced in Malawi in 2005/6. A limited number of seed suppliers worked through a much larger number of distributors. By the end of November suppliers had distributed considerably more than expected subsidy programme requirements.

Total quantities of inputs sold under the programme are shown in table 4.1, which gives a breakdown of total sales of the five inputs by region and by sales channel. Exceeding the original fertiliser sales target by 16% was made possible by both the issue of supplementary coupons and by the holding by private retailers of extra fertilizer stocks above those originally procured for the programme.. The overall improved performance against input sales targets as compared with 2005/6 may be attributed to a number of factors: experience gained by Government, ADMARC and SFFRFM from the 2005/6 programme; the involvement of the Logistics Unit in coupon and fertilizer distribution; financial support from donors for some elements of the programme; and the involvement of the private sector in retail sales. ADMARC and SFFRFM sales accounted for 72% of fertilizer sales in the national programme, with private retailers accounting for 28%. The ADMARC/ SFFRFM share is higher in the Southern region (84%) than in the Central and Northern Regions (65% and 66% respectively). A similar pattern is observed for maize seed sales, though the retailer share is considerably higher for seeds than fertilizer, ADMARC/SFFRFM accounting for 43% of seed sales nationally (with 51% in the Southern region and 38% in the Central and Northern regions).

Table 4.1 Input Subsidy Programme Sales

(MT, from coupon redemption for seed and for retailer fertiliser sales: ADMARC/SFFRFM from stock records)

	FERTILISERS					MAIZE SEEDS		
	NPK	Urea	CAN	D Comp	Total	Hybrid	OPV	Total
ADMARC/SFFRFM sales (from stock records)								
NR	8,175	8,097	2,325	2,115	20,712			
CR	21,984	25,297	3,187	4,468	54,937			
SR	23,797	24,169	952	870	49,788			
Total	53,956	57,564	6,464	7,453	125,437			
Private distributor sales (from coupon returns)								
NR	4,258	5,124	666	640	10,688			
CR	12,560	11,097	3,370	2,105	29,132			
SR	4,151	4,279	517	484	9,432			
Total	20,969	20,500	4,553	3,229	49,251			
Total sales						MAIZE SEEDS		
						Hybrid	OPV	Total
NR	12,433	13,221	2,991	2,755	31,399	343	195	538
CR	34,544	36,394	6,557	6,573	84,069	1,295	739	2,033
SR	27,948	28,449	1,469	1,354	59,220	1,129	796	1,926
Total	74,925	78,064	11,017	10,682	174,688	2,767	1,757	4,524
Original target	65,000	65,000	10,000	10,000	150,000			1,999,985 (vouchers)
Total sales % target	115%	120%	110%	107%	116%			91%

Seed sales from coupon recovery, rounding error on OPV total

It should be noted that in some districts ADMARC/SFFRFM sales and private retailer coupon redemptions significantly exceeded coupon issues, leading to sales/coupon redemptions of 105% of allocated coupons in the central region as a whole. This is associated with the existence of further unreported supplementary coupons as described earlier. The Logistics Unit Final Report stated that an unspecified number of coupons with serial numbers outside any known range of issued coupons have been submitted for redemption and referred to the Ministry of Agriculture. This is a serious matter which needs proper investigation.

A total of 1,825,566 maize seed coupons were redeemed of which 76% were for hybrid seed. Total seed sales under the programme amounted to 4,524 tonnes, with 2,767 tonnes of hybrid seed and 1,757 tonnes of OPV seed.

4.3.3 Coupon redemption

Fertiliser coupon redemption by farmers required them to take a coupon to a participating supplier and submit the original coupon plus MK950 to be supplied with the input specified on the coupon. Input sellers were instructed that they should accept only original coupons (the second copy was to stay with the farmer) with serial numbers for the district where they are situated[12]. Coupons were then to be attached to the duplicate cash receipts for the sale, collated and sorted by serial number within each outlet and forwarded to the district headquarters (for government outlets) or national office (for distributor outlets), which subsequently submitted claims to the Logistics Unit for verification and payment processing. For seed sales farmers exchanged vouchers for the

[12] Qualitative evidence suggests that this was a problem for some households – particularly when there was significant congestion in their own district and / or a neighbouring district centre was closer.

desired bag of seed (no cash payment was required). Retailers had to submit vouchers plus the cash sales receipt to one of the six participating seed suppliers (Monsanto, Panaar, Pioneer, SeedCo, Funwe, and Demeter), who then had to sort them and submit invoices to the Logistics Unit. Seed vouchers were often submitted in a two-step process with AISAM acting as a consolidator for the agrodealers and the major distributors (e.g., Rab, Farmers' World, Agora) consolidating vouchers for their branch outlets. ADMARC and SFFRFM were supposed to follow the same procedures for submitting redeemed coupons but did not depend on this system for payment for the fertilizer, and consequently their return of fertilizer coupons was very slow.

4.4 Communications

The United Nations Development Programme (UNDP) funded the provision of a communication expert to advise the government on a comprehensive communication strategy covering all elements of the media and targeting key stakeholders including Parliament, Government, civil society, the private sector, extension workers and communities.

The main objective of the communication programme was to achieve food self sufficiency by equipping staff and farming communities with knowledge and skills in recommended maize production and storage technologies and sustainable group mobilisation strategies. The communication programme largely focused on the promotion of the Sasakawa method of maize planting using hybrid and OPV maize seeds with a cluster-green belt concept. Only a few activities directly dealt with issues regarding the processes of the fertilizer subsidy: the Agricultural Communication Branch (ACB) contributed to the content of the booklet that was used for briefing stakeholders, in English, Chichewa and Chitumbuka. Following a press release, briefing sessions were conducted in October 2006, with participants including members of District Assemblies, Members of Parliament, traditional leaders, officer-in-charge of the Police, district representatives of ADMARC and SFFRFM and District Agriculture Development Officers. The communication programme also produced 4.4 million leaflets and 1,600 posters as IEC materials for the fertilizer subsidy. It was weak in providing information on the processes of the input subsidy and in public relations management, given the controversy and malpractices that were reported on the implementation of the subsidy. Limited press releases were issued, but most did not help to clarify the objectives and the implementation modalities of the subsidy programme.

4.5 Programme Cost

Financial costs of the 2006/7 programme to government and donors are shown in table 4.2 estimated at MK10.34 billion net of the MK950 per bag paid by farmers to redeem fertiliser coupons at ADMARC and SFFRFM retail markets. The major burden of the subsidy (MK9.01) falls on the government and the analysis shows over-expenditure of MK1.8 billion above the MK7.2 billion approved in the 2006/07 national budget (this represented 43% of the Ministry of Agriculture annual budget). This excludes government costs in taking up the Stanbic Bank finance arrangement (although transport of fertilisers from unit markets to depots is included). The additional costs are largely attributed to the provision of extra coupons that entailed supply of more fertilizers than planned. Some stakeholders have also argued that the transport rates for distributing the fertilizers from SFFRFM depots to parastatal markets were about MK4/tonne-kilometre above what could have been offered on non-donor procurement. The total expenses financed by donors amount to MK1.33 billion.

The major cost of the programme was for the supply of fertilisers. The parastatals distributed about 72% of the fertilizers at a cost of MK9.33 billion including transport, handling and storage costs (although the handling costs are likely to be understated as ADMARC and SFFRFM received less than approved amounts from the government to cover planned handling and storage and will have drawn on other resources to cover this). Final costs of fertilisers delivered into the depots in Blantyre, Lilongwe and Mzuzu averaged MK 63,621 or $454 per tonne, with cost once delivered at

unit markets averaging $490 per tonne. [13]Private sector costs per tonne sold are also $490, with a total cost of MK2.44 billion.[14]

Cost of seed supply amounted to MK0.73 billion. Other programme costs include financing of the Districts to support coupon distribution, cost of the Logistics Unit, fertilizer and seed coupon production, communication, input quality control, monitoring and evaluation, and the Stanbic Bank buy-back arrangement. These costs amount to just over 2% of the net cost of the subsidy. However the programme suffered from limited operational support to implementing agencies from central government as agencies were generally required to draw on existing resources to implement the programme. As a result total costs of the programme are greater than the costs stated above, and resource constraints may have affected the efficiency in the delivery of services, principally in the operation of markets by ADMARC/SFFRFM and in the distribution of coupons within districts. With regard to the former, funding constraints are reported to have led to delays in recruitment of staff to operate markets and hence delays in opening of markets and difficulties in market operations, as will be discussed later. However late remittance of funds from farmers received by ADMARC and SFFRFM back to government has also been problematic.

With respect to coupon distribution within the districts, delayed and inadequate funding contributed to delayed and inadequate sensitization and use by district assemblies of funds from their normal operating budgets at the expense of other planned activities, in order to implement the subsidy programme.

Table 4.2 reports only financial costs borne by government and donors. Wider economic or social costs of the programme are set out in section 8 and annex B.

[13] Average parastatal cost is calculated as cost per unit procured by ADMARC/SFFRFM, not cost per unit sold.

[14] It is not possible to draw conclusions about the relative costs of parastatal and private sector operations as ADMARC / SFFRFM storage and handling costs and overheads are likely to be understated, these are not necessarily the lowest prices that the private sector would be prepared to accept, and most of the private sector retail outlets are in more accessible areas compared to the retail market outlets for parastatals (although ADMARC/SFFRFM had a higher proportion of sales than retailers in the Southern Region, where costs to depot are lower than costs to depot in the North). (their costs to depot in the central region are only slightly higher than those in the south).

Table 4.2 Cost and financing of the 2006/07 input subsidy (Malawi Kwacha)

Description	Final Costs (Estimates)	Source of Funding	
		Donors	Government
Parastatal Fertilizers			
Supplies	8,562,896,991	-	8,562,896,991
Transport	665,729,605	405,000,000	260,729,605
Handling and storage	105,000,000	-	105,000,000
Sub-total	***9,333,626,596***	***405,000,000***	***8,928,626,596***
Private Retail Fertilizers			
Supplies and Distribution	2,440,668,665	-	2,440,668,665
Seeds			
Supplies + Retail Margin	731,592,800	731,592,800	-
Other Costs			
District Financing	27,262,192	-	27,262,192
Logistic Unit	51,537,656	51,537,656	-
Coupon Production	15,036,385	13,743,966	1,292,419
Communications	28,444,360	28,444,360	-
Input Quality Monitoring	6,319,075	6,319,075	-
Monitoring & Evaluation	40,500,000	40,500,000	-
Stanbic Bank Finance Fees	54,250,000	54,250,000	-
Sub-total	223,349,668	194,795,057	28,554,611
Grand Total	**12,729,237,729**	**1,331,387,857**	**11,397,849,872**
Sales Revenue ADMARC/SFFRFM			
MK950 Sales Revenue *	2,383,303,000	-	2,383,303,000
Net Cost of Subsidy	**10,345,934,729**	**1,331,387,857**	**9,014,546,872**
Funding Sources			
Malawi Government		-	7,200,000,000
DFID/EU/Norway seeds		800,000,000	-
DFID transport		405,000,000	-
UNDP communications		35,000,000	-
DFID TA		137,700,000	-
DFID Finance Premium		378,000,000	-
Total Available Funds		**1,755,700,000**	**7,200,000,000**
Surplus/(Deficit)		**424,312,143**	**-1,814,546,872**

Note: * Budgeted. based on sales, no information currently available on funds deposited by ADMARC/ SFFRFM
Source: Logistics Unit, DFID, GOM and UNDP

5. The 2006/7 season

Before considering different aspects of programme impacts (on the input sector and on rural people's livelihoods within the rural economy) it is important to consider events and conditions in the 2006/7 season as important context for those impacts. This section therefore provides information from diverse sources on these contextual changes.

The major points to note about the 2006/7 season are (a) conditions that arose as a result of it following a good harvest in 2005/6 (the result of a combination of good rains and the 2005/6

subsidy) and (b) the generally good weather conditions experienced in 2006/7[15]. In this section we focus principally on discussion of conditions resulting from the good harvest in 2005/6, and we begin by briefly detailing information on the weather conditions and production estimates across different years.

5.1 Crop production and rainfall

The 2006/07 season marked the second year of the implementation of the AISP on maize and tobacco production. 2005/6, the first year of the AISP implementation, had already shown large increases in estimated production of most crops over the poor year of 2004/5, but notably of maize, as a result of better weather and fertiliser availability (see table 5.1[16]). Maize production in the 2005/6 year was reckoned at the time to have been a record maize crop for Malawi, and then estimates for 2006/7 showed a substantial further increase again (maize crop production estimates for earlier years are provided in table 2.2)

Table 5.1 Crop Production Estimates and Rainfall in 2004/5, 2005/06 and 2006/07 Seasons

	2004/05		2005/06		2006/07		Change 2005/6 to 2006/7(%)	
Crops	Production (MT)	Yield (MT/HA)	Production (MT)	Yield (MT/HA)	Production (MT)	Yield (MT/HA)	Production	Yield
Maize	1,225,234	0.81	2,576,716	1.59	3,444,456	2.04	33.7	28.5
Cassava	2,197,640	14.30	2,863,212	17.32	3,296,127	18.84	15.1	8.8
Rice	41,270	0.84	92,449	1.77	112,185	1.65	21.3	-6.8
Pulses	209,492	0.39	343,898	0.62	415,551	0.69	20.8	10.4
Groundnuts	141,078	0.57	204,123	0.84	273,757	1.02	34.1	21.7
Tobacco	93,598	0.66	121,570	0.89	111,421	0.94	-8.3	5.4
Cotton	50,363	0.57	58,553	0.94	63,290	1.04	8.1	10.9
Wheat	1,730	0.87	2,011	1.21	4,505	2.26	124	86.4
Sorghum	18,175	0.27	54,307	0.77	63,594	0.86	17.1	11.6
Millet	15,970	0.39	27,295	0.66	32,251	0.72	18.2	9.2
Sunflower	2,672	0.36	5,453	-	5,920	0.79	8.6	-
Paprika	1,218	0.28	2,175	-	1,917	0.45	-11.9	-
Sweet Potatoes	1,081,463	8.38	1,802,685	13.67	2,337,354	15.52	29.7	13.5
Irish Potatoes	404,420	11.41	477,537	13.29	594,667	14.79	24.5	11.3
Rainfall index (expected yield given season's rainfall as % of yield expected with optimal rainfall)								
% local maize		58%		87%		100%		15.1
% hybrid maize		72%		84%		98%		17.5

Source: Crop estimates from MoAFS; Rainfall index calculated from data supplied by J.Syroka.

The 2006/07 AISP was scaled up by 38,000 metric tones of fertilizers. Fortunately, the 2006/07 season was blessed with good rains in most parts of the country. The good rains combined with access to fertilizers and improved seeds under the AISP resulted in increased estimated harvests in the 2006/07 season for all major crops in Malawi, particularly for maize as shown in Table 5.1. Generally, production of all major crops, except for tobacco and paprika were estimated to have increased between 2005/06 and 2006/07 seasons. Similarly, yields were estimated to have

[15] Heavy rains caused flooding and crop losses in some areas.

[16] Although the Ministry of Agriculture national crop estimates data are the most widely used estimates of national crop production, crop areas and yields, there are significant discrepancies between these estimates and maize production, area and yield estimates from the IHS2. It should be noted that the rainfall index does not take account of problems from too much rainfall or cloud cover.

increased, with the exception of rice. The national maize production was estimated at 3.44 million metric tones in the 2006/07 season. This represents an increase of 0.86 billion metric tones (34% increase) over the estimated production in the 2005/06 season. Maize yields were estimated to have increased from 1.6 metric tones per hectare to 2.0 metric tones per hectare. According to FEWS NET, 2007, a number of indicators suggest that the food security situation in 2007/8 is generally good, and that although maize prices in late 2007 rose above those prevailing in the previous season, this is because of active buying by traders, associated with exports to Zimbabwe, not shortages of supply. Government has repeatedly confirmed that it holds adequate stocks of maize, despite reports of local shortages in ADMARC markets and further maize price increases. However exports of around 300,000 tonnes out of an estimated increased national production of just under 900,000 tonnes should not lead to higher prices: the recent price increases do lead to questions about the extent of the increase of the 2006/7 maize harvest, and about how much the input subsidy increased yields and how much increases in yield were the result of good weather.

The data from the qualitative fieldwork (interviews with key informants, focus groups and individual programme beneficiaries and non-beneficiaries) provide further insights into the 2006/7 season. They also enable us to understand how the 2005/6 season and coupon distribution affected the fortunes of both beneficiaries and non-beneficiaries in 2006/7. Some of the qualitative data on yields and production should be treated cautiously as interviewees were not randomly sampled and sampling may have been biased towards coupon beneficiaries. Differences or corroboration between information obtained from the household survey, community questionnaires and the qualitative field work are noted where relevant.

In most districts a good harvest was reported in both 2005/6 and 2006/7, with knock-on effects for the wider rural economy (see Section 9 on Livelihoods and Rural Economy Impacts). Households in all well-being groups were reported to have made significant improvements in yields from 2004/5 as a result of good and timely rains and because of access to cheaper fertiliser through the coupon system.

In February 2007 in Rumphi and Lilongwe, for example, many people still had food stocks from the 2005/6 harvest and many people were confident that these would last until July. In comparison, in 04/05 stocks ran out in November or December when there had been no fertiliser subsidy[17]. Because many more households had maize stocks during the 2006/7 cropping season, demand for ganyu increased whilst supply decreased. People whose maize stocks had run out did ganyu for significantly higher wages than in previous years (ganyu wages are discussed below), or else they depended on kin relations and received transfers from relatives.

There are some notable exceptions to the general pattern of improved production in 2005/6 and 2006/7. Some of the exceptions were less serious and affected only certain crops. For example, in Kasungu, there was a dry spell before maize had tasselled. In Mzimba, groundnut production was negatively affected by the level of rain late in the season whilst cassava production was affected by pests. In Rumphi, pests affected bean production. However in these districts the impacts were geographically patchy and limited to only one of a range of crops. In all cases, production was significantly higher in 2005/6 and 2006/7 than in previous years.

[17] As will be discussed in section 5.5, survey data do not show substantial differences between these years in times when people reported food stocks running out.

Box 5.1 Maize and rice replanting in response to flooding in Chikwawa

Women indicated that flooding washed away the crops before they had reached maturity and all the categories of households were affected. The participants indicated that after the floods some people replanted maize in the fields and those who had rice fields went ahead to cultivate rice. Some maize was replaced to cultivate rice. The maize that was replanted has not yet matured and it is in different stages because of the different times at which planting took place. As for those that planted rice, some of them have already started harvesting. Those who have rice are exchanging it with maize. For a bag of 50kg maize one has to pay 50kg of rice and this is happening at Mapelera market which is at the East bank and other areas within the district.

In the last two growing seasons (2005/06 and 2006/07), people in this community did not harvest anything because of floods. People have to do ganyu to get money for food. In 2004/05, people did not harvest much because of lack of rainfall, most people just harvested food for one month only.

In terms of food security, I can tell you that this year, I am in a big problem. All my maize was washed away with water and now I have tried to replant but the maize is not doing that well due to too much sunlight (Case Study Respondent, Chikwawa)

A more serious challenge to the general pattern of improved production and yields was flooding, which was found in a number of districts. In Dedza, Karonga, Chikwawa and Ntcheu in particular there was flooding after planting. In the worst cases crops were washed away, elsewhere there was washing out of fertiliser. The impacts were greater on the poor and poorest households (categories 3 and 4). The richest households replanted rice to exchange at harvest for maize but poorer households replanted maize which took much longer to harvest (Box 5.1). The floods were reported to have significantly reduced the impact of the fertiliser subsidy on poor households. In Chikwawa, however, households with *kumtunda* land away from the Shire River were able to use fertiliser and were less affected by washing out. Further north, in Ntcheu and Karonga, the impacts of heavy rains were geographically patchy - some households were affected and others were not. Despite heavy rains and some loss of crops, in Karonga, food stocks were reported to be lasting longer for the third season running.

Qualitative field work reports of reduced drought but some flooding and improved food availability are corroborated by analysis of community questionnaires. These show very low incidence of drought in 2006/7 apart from some reports in Mzimba and the Lower Shire, but higher reports of flooding in parts of Mzimba, the northern lakeshore, southern lakeshore, the Shire highlands, and the Lower Shire. Analysis of community questionnaire results also shows a median response of 'better' regarding questions about changes in household and market availability of staple foods and nutritional status of children, with a mean score of 3.7, 4.0 and 3.5 on each of these variables (where scores ranged from 1 for 'much worse' to 3 for 'about the same' to 5 for 'much better'). Perceptions of improved household and particularly market availability of staples were greatest in the south and least in the north. In some livelihood zones household food availability was not perceived to have improved and indeed to have got worse compared with three years ago (most notably Lower Shire but also Mzimba self sufficient, Western Rumphi/ Mzimba and Southern Lakeshore) but market availability of staples and to a lesser extent nutritional status of children were almost universally reckoned to have improved.

5.2 Maize prices

A major consequence of the much greater maize production in 2005/6 as compared with 2004/5 was much lower prices through the 2006/7 season as compared with the 2005/6 season, as reflected in the community questionnaire results reported above regarding market availability of staples.

Change in maize prices was an issue that came up strongly in the focus group discussions, as regards prices both before and after the 2006/7 harvest. In most locations maize prices were reported to be lower than during the same period last season. In Karonga the price of maize was

K150 compared to K250 per pail at the same period (July) in the previous season. There respondents noted that the price of maize was already lower in 2006 because there was a lot maize. In Dedza in July maize was K18 / kg compared to K25 / kg in July 2006.

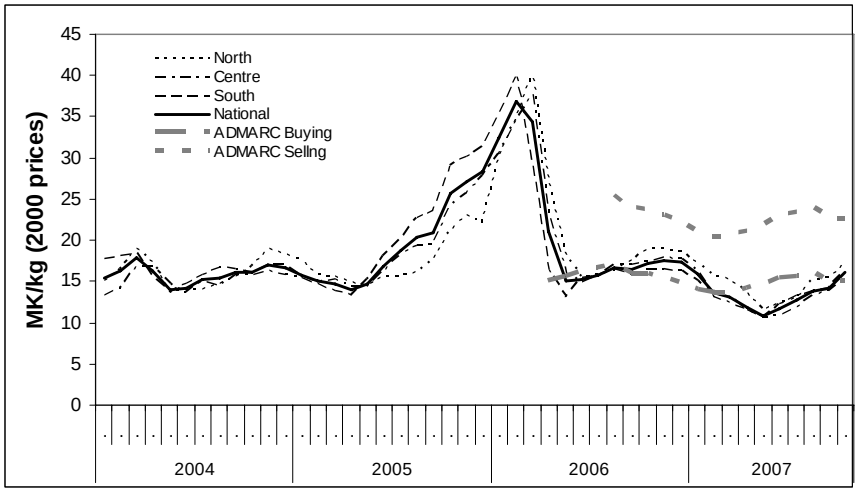
In Chikwawa changes in prices were geographically patchy. Some respondents said prices were higher than in 2006 because of washing out. Others had experienced good harvests and in those areas maize prices had fallen – from K300 in July 2006 to K100 in July 2007 for a medium basin.

In Ntcheu a major impact of lower maize prices was reported as less theft: people could afford to buy maize and were not forced to steal it in order to eat. The greatest difference in price was in Rumphi (where respondents compared February 2007 with February 2006) where there had been a six-fold descent from K1,500 / pail in 2006 to K250 / pail in 2007. Comparisons between locations at different times of the year suggest that there is still significant seasonality in prices. This is supported by maize prices reported by key informants in the community questionnaire, with median maize buying prices ranging from 25MK/kg in December 2006 to 10Mk/kg in 12.5 MK/kg in May 2007.

Figure 5.1 shows changes in maize prices from the beginning of 2004 in terms of real maize prices in selected markets by region, with a comparison of these with ADMARC buying and selling prices. The very high prices in the 2005/6 season (following the poor 2004/5 harvest) are very evident, It is also noticeable that real price levels and variation in 2006/7 (following the record 2005/6 harvest) were not very different from the 2004/5 season. Low prices in 2004/5 despite a lower estimated 2003/4 harvest (of 1.7 million tonnes as compared with the 2.6 million tonne estimates for the 2005/6 season harvest) are explained by effective imports of food aid to avoid price rises (FEWS NET, 2004).

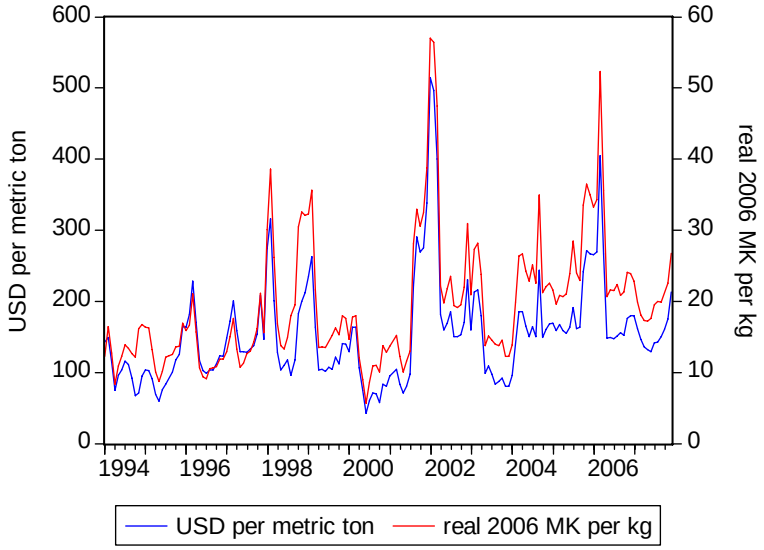
Figures 5.2 and 5.3 place 2007 prices in the context of real maize prices over the past 14 years. The graphs show clearly the extremely high variation in maize prices, with very high prices occurring for short , but very damaging, periods after a production shortfall. These have sometimes risen above import parity prices, usually associated with government failures in managing stocks or imports or in promoting imports by the private sector. Similarly very low prices have been associated with government or donor interventions (for example low prices followed the starter pack programmes in 1998/99 and particularly 1999/2000, while government and donor food aid imports depressed prices in 2003/4 and to a lesser extent in 2004/5).

Figure 5.1 Real maize prices 2004-7



Source: calculated from MoAFS market price data and NSO CPI

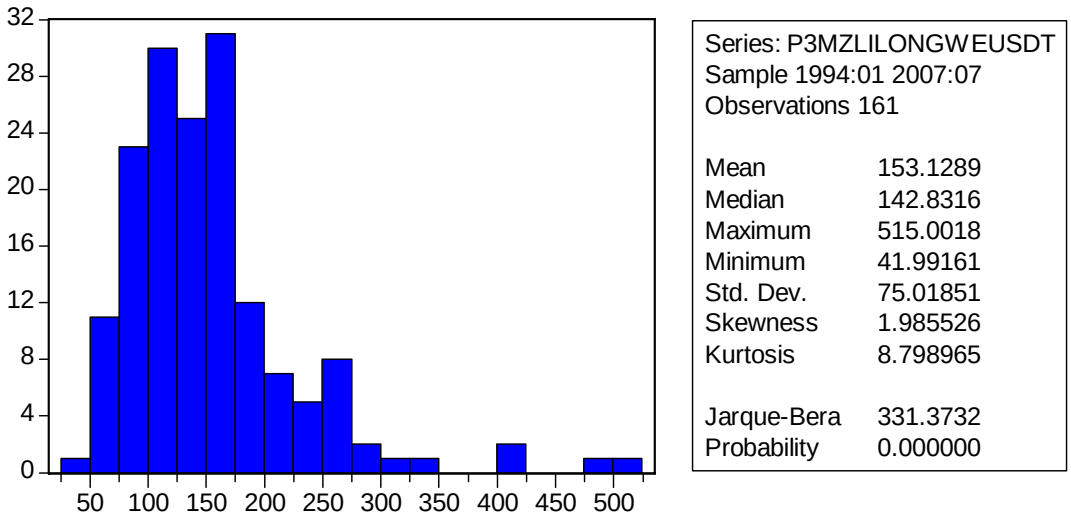
Figure 5.2 Lilongwe monthly maize retail prices, January 1994 to December 2007.



Source: FEWSNet

Figure 5.3 Lilongwe monthly retail maize price histogram 1995-2007

(horizontal axis=USD per ton, vertical axis = frequency of months)



Source: FEWSNet

5.3 Ganyu (casual labour) wage rates

A strong theme in this report is that increased maize production and access to food can reduce poor people's need to hire out labour to earn ganyu income to meet short term cash and food needs, and at the same time increase the ability of some households to hire in ganyu labour for farm and/or non-farm work. At the same time higher real incomes should lead to increased demand for locally produced services. Both demand and supply for ganyu are affected, with a

tightening of the market (from reduced supply of labour into the market and increased demand) and hence an increase in wages[18]. The combination of falling maize prices and rising ganyu wages has the potential to raise real incomes of the poor that usually engage in ganyu employment.

Daily ganyu wage rates were estimated from household survey for 2005/6 and 2006/7 by dividing total income from ganyu by the number of ganyu days worked. Median wage rates received rose from MK100 per day to MK133 per day across the two years. Households were also asked if they had hired ganyu labour for crop production in 2006/7, and the median wage rate reported from dividing total payment by days worked was MK150 per day. The median wage rate reported in the community questionnaire was also MK150 per day (with some variation between areas and between months with ganyu rates tending to be highest in the North and lowest in the Centre, and higher in December and May than in March).

Evidence on ganyu rates was also gathered in focus group discussions and key informant interviews. In some places the payment of ganyu is still done in food – particularly cassava tubers or maize, and in these cases it has not been possible to find evidence of whether payment increased or decreased.

In areas with flooding, the price of ganyu tasks has not changed. For example in Karonga, weeding remained at K10 / 10m ridge. In parts of Dedza it was reported that labourers were setting prices:

> *Apart from having an increase in production input subsidy programme has affected 'ganyu' activities. Since people who had access to coupons had enough food they were not looking for 'ganyu' activities they always look for to buy food. Since there was a drop in the number of people looking for 'ganyu', ganyu' payments became higher. The low demand for 'ganyu' has given those doing 'ganyu' an opportunity to charge the 'ganyu' employers on what should be their payment for the work they do. In times when there is hunger there are a lot of people looking for 'ganyu' and 'ganyu' employers decide what to give people who work for them.*

In Chikwawa, the ganyu rate had increased in some areas but not others, due to flooding. Of most interest there was the fact that the weeding rate on the Ilovu sugar estate had increased from K200-250 to K250-300 per day.

In Ntcheu rates had also increased. Weeding increased from K1,500-2,000 per acre up to K2,500-3,000 per acre. Increases in harvesting were less – from K80 up to K100 / day. However, the same arguments were being made that labourers were setting prices:

> *People who rely more on employing ganyu to work in their fields have been affected by reduced demand for 'ganyu'. The reduced demand of ganyu on the other hand has affected payments and who set the charges. People usually do 'ganyu' to get food and few people are doing ganyu to buy other household needs. The respondents said 'ganyu' employees are the ones deciding on how much they should be paid and these charges have gone up due to less demand for 'ganyu'*

There is also anecdotal evidence of increase ganyu rates from commercial farmers who report difficulties in obtaining hired labour and the need to pay higher wage rates. FEWS NET, 2007 reported that in November 2007 there was reduced search for employment by ganyu labour and that farmers wishing to hire labour report increased scarcity and cost of hired labour. A two to three fold increase in nominal wage rates is reported in some areas (from MK1,400/ha to MK3,600/ha).

[18] It should be noted that the terminology of 'demand for ganyu' is sometimes confusing as this can refer to the demand for hiring ganyu labour (by buyers of labour) or (colloquially) to the demand for opportunities to earn income from ganyu (by suppliers of labour). This report will use 'demand for ganyu' to refer to the demand to buy labour, except in quotations from respondents using the term in the colloquial sense .

5.4 Poverty incidence

Falling maize prices, rising ganyu wage rates and increased subsistence production in the 2005/6 season would all be expected to raise real incomes of the poor, the majority of whom produce some food, buy some food and hire out labour. NSO poverty incidence estimates presented in Table 5.2 suggests that poverty levels have indeed been declining since 2004[19]. Substantial falls in poverty incidence are estimated between 2005 and 2006, with the proportion of people who are poor declining from 50% in 2005 to 45% in 2006. Similarly, the proportion of people who are ultra-poor is estimated to have fallen by 4 percentage points from 21% in 2005 to 17% in 2006. These falls in poverty and ultrapoverty rates are found across rural areas and across the three regions, but are much lower in urban areas.

Table 5.2 Trends in Poverty in Malawi, 2004-8

Geographic Area	Proportion Poor (%)			Proportion Ultra-poor (%)		
	IHS2 2004	WMS 2005	WMS 2006	IHS2 2004	WMS 2005	WMS 2006
Malawi	52	50	45	22	21	17
Urban	25	24	25	8	8	6
Rural	56	53	47	24	23	19
Northern Region	56	51	46	26	21	17
Central Region	47	46	40	16	16	12
Southern Region	64	60	55	32	30	25

Source: NSO (2007) Welfare Monitoring Survey 2006

5.5 Food security

The qualitative reports of improved food availability and security during the 2006/7 season (following the 2005/6 harvest) are supported to only a limited extent by survey data on household reports of food status in the past one month and one year (see table 5.3). Overall 38% and 51% of households reported that they had inadequate food consumption over the past 1 month and 12 months, respectively (as compared with 57% reporting inadequate food consumption over the previous 12 months in 2004 (NSO, 2005)). There are variations with respect to zones, with about 63% in the Lower Shire zone experiencing inadequate food consumption in the past 12 months.

[19] Estimates are derived using a model-based prediction of household characteristics in the Welfare Monitoring Survey (WMS) conducted in the post harvest periods in 2005 and 2006. It is not clear how far the model takes account of seasonal issues in the original estimation of IHS2 poverty rates, and it should be noted that the 2004/5 harvest was poor and followed by rapidly rising food prices.

Table 5.3 AISP Sample – Status of Household Food Consumption 2006/7

Characteristics/ Zone	Household Food Consumption over past 1 Month			Household Food Consumption over past 12 Months		
	Less than Adequate	Just Adequate	More than Adequate	Less than Adequate	Just Adequate	More than Adequate
All	38	51	10	50	42	8
Livelihood Zone						
Chitipa Maize & Millet	44	55	2	41	51	9
Misuku Hills	43	57	-	7	86	7
Northern Karonga	61	33	6	44	39	17
Central Karonga	58	35	8	54	46	-
Nkhata Bay Cassava	35	59	6	43	49	8
Western Rumphi & Mzimba	35	60	5	54	46	1
Mzimba self-sufficient	52	43	5	44	50	6
Northern Lakeshore	40	44	16	51	45	4
Kasungu Lilongwe Plain	38	48	14	51	36	12
Rift Valley Escapement	27	59	13	39	47	14
Southern Lakeshore	40	45	15	48	40	13
Border Productive Highlands	37	58	6	47	50	3
Shire Highlands	39	53	8	47	43	10
Pirilongwe Hills	26	70	4	45	53	2
Lake Chilwa - Phalombe Plain	45	45	10	52	43	5
Middle Shire	37	51	12	50	44	6
Lower Shire	54	35	10	60	30	9
Thyolo Mulanje Tea Estates	20	69	10	59	39	2

Analysis of households' reports of the month in which their own stocks of maize ran out (following the poor 2004/5 harvest and good 2005/6 harvest year) and were expected to run out (following the 2006/7 harvest), yielded very little difference between years. It is not clear why this is the case.

5.6 Welfare

Table 5.4 presents households' subjective assessment of their welfare by livelihood zone based on the AISP sample. It reports the mean ranking of welfare on the ordinal scale from 1 defined as very poor to 6 defined as very rich. Overall, there has been a small but significant increase in the mean ranking of welfare from 1.94 in 2004 to 2.10 in 2007 (an 8% increase) with all livelihood zones except the Lower Shire report an improvement. However most households continue to put themselves in the second step of the poverty ladder.

Table 5.4 AISP Sample – Subjective Assessment of Welfare

Livelihood Zone	Subjective Welfare Own Poverty 2007 (Mean Ranking)l	Subjective Welfare Own Poverty 2004 (Mean Ranking)
Chitipa Maize & Millet	2.50	2.00
Misuku Hills	2.29	1.86
Northern Karonga	2.39	2.17
Central Karonga	2.23	1.58
Nkhata Bay Cassava	2.45	2.06
Western Rumphi & Mzimba	2.04	1.72
Mzimba self-sufficient	2.31	2.14
Northern Lakeshore	2.20	2.15
Kasungu Lilongwe Plain	2.12	1.94
Rift Valley Escapement	2.11	1.93
Southern Lakeshore	1.97	1.95
Border Productive Highlands	2.21	2.04
Shire Highlands	2.08	1.95
Pirilongwe Hills	2.32	2.20
Lake Chilwa - Phalombe Plain	1.98	1.93
Middle Shire	2.05	1.91
Lower Shire	1.80	1.86
Thyolo Mulanje Tea Estates	1.84	1.64
All	2.10	1.94

Note: The ordinal scale for subjective welfare evaluation ranges from 1 (very poor) to 6 (very rich).

Households' reported 'overall satisfaction with life' in 2007 was also computed. Results are not shown as there was very little change in the average score from scores reported in the IHS2 in 2004. In the IHS2, 23% of households were satisfied or very satisfied with life compared with 25% in the AISP. However the proportion of very unsatisfied households has increased from 25% in 2004 to 33% in 2007, while the proportion of unsatisfied households has fallen from 39% in 2004 to 33% in 2007.

Finally we examine households' reported experience of shocks in the period leading up to the IHS2 survey in 2004 on the one hand and prior to the AISS in May/June 2007. Tables 5.5 and 5.6 show the proportion of households reporting that they were affected by different shocks in the three years prior to interview in 2004 (in table 5.5) and in the three years prior to interview in 2007 (in table 5.6). Both periods covered had included years of major price shocks, but these did not feature as strongly in responses in 2007. In the 2007 survey two extra categories of shock or stress were added to the list about which respondents were asked ('lower crop yields due to poor soil fertility' and 'reduced ganyu opportunities'). Both of these featured strongly in household responses. It should be noted that table 5.6 records household reports of shocks up May/June 2007 and therefore does not reflect household perceptions following the high maize prices in early 2008.

Table 5.5: Proportion rural households severely affected by different shocks, 2000 to 2004

Shock	% rural households affected
Large rise in price of food	79.2
Lower crop yields due to drought or floods	68.8
Illness or accident of household member	48.1
Large fall in sale prices for crops	42.5
Death of other family member of household	42.1
Livestock died or stolen	37.1
Crop disease or crop pests	26.3
Household business failure non-agricultural	22.1
Theft	20.2
Birth in the household	12.2
Dwelling damaged or destroyed	11.2
Break-up of the household	10.4
Death of working member of household	9.6
Loss of salaried employment or non-payment of salary	7.8
End of regular assistance aid or remittances	7.7
Other	5.6
Death of household head	5

Adapted from National Statistical Office, 2005, p136

Table 5.6: Proportion rural households severely affected by different shocks and stresses, 2005 to 2007

Shock	% rural households affected
Lower crop yields due to poor soil fertility	33.3%
Short acute illness/ accident of H member	24.3%
Lower crop yields due to drought or floods	23.3%
Large rise in price of food	19.9%
Livestock died or were stolen	18.6%
Crop disease of crop pests	13.0%
Reduced ganyu opportunities	11.3%
Theft	11.2%
Increased expenditure demand	7.3%
Large fall in sales prices for crops	7.2%
Death of household member	5.5%
Dwelling damaged, destroyed	5.3%
Chronic illness, disability	4.9%
Household business failure, non-agr	4.9%
Birth in the household	4.0%
Breakup of the household	3.1%
Other	2.2%
Marriage/other social events	1.8%
End of regular assistance, aid or remittances from outside household	1.5%
Loss of salaried employment or non-payment of salaries	1.4%

Source: Agricultural Inputs Subsidy Survey, 2007

6. Impacts on the input sector

This section considers the impact of the subsidy programme on the input sector. A brief description first of the size and structure of the sector and second of the methods used to assess it precede analysis of sales, and discussion of displacement effects, business confidence, and supplier views on the programme.

6.1 Size and structure of the input sector

Figures 6.1 and 6.2 show the salient structural characteristics of the fertilizer and seed sectors, identifying the key actors involved during the past few years and the vertical and horizontal relationships among them. At the procurement level, there are a dozen actors in the fertilizer sector and half that many for seed. At the retail level, many of the same actors are present in both the seed and fertilizer diagrams.

In addition to the business enterprises, there are a number of associations. The Fertilizer Association and the Seed Trade Association are recently created professional organizations for each input sector. Each association's aim is to improve professionalism in the sector and represent their members in policy discussions with the GOM. The CNFA/RUMARK and AISAM networks of agrodealers are the result of donor-funded projects created to build a more vibrant private sector supply system. These networks focus on the retail level, offering business management and product training (both organizations), credit guarantees (CNFA only), and periodic reports on market conditions (both) for agrodealers selling fertilizer, seed, or agricultural chemicals. The NASFAM network of farmer cooperatives supplies inputs to members on a strictly commercial basis, but member cooperatives also benefit from donor funding that provides training and business management support.

As shown earlier in table 2.4, government participation in the market—at both procurement and distribution levels—has been highly variable from year to year, depending on decisions about input support programs. A strength of the government network is its ownership of 56 SFFRFM depots (up from 28 in 2005/06) and 666 ADMARC market units throughout the country (ADMARC reported 362 permanent depots in 2001), which serve as welcome input distribution or sales points for many farmers who are not served adequately by the private sector.

Figure 6.1 Structure of the Malawi Fertiliser Industry

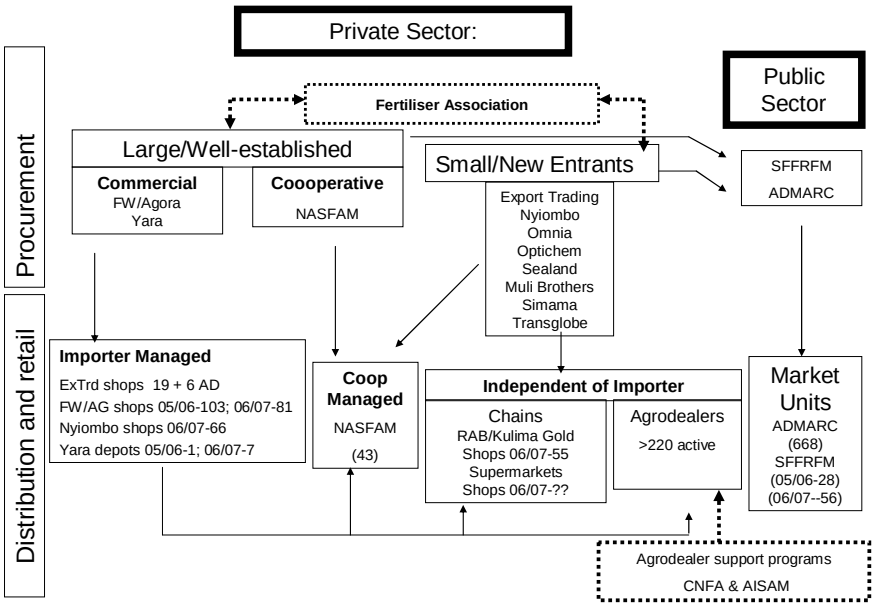
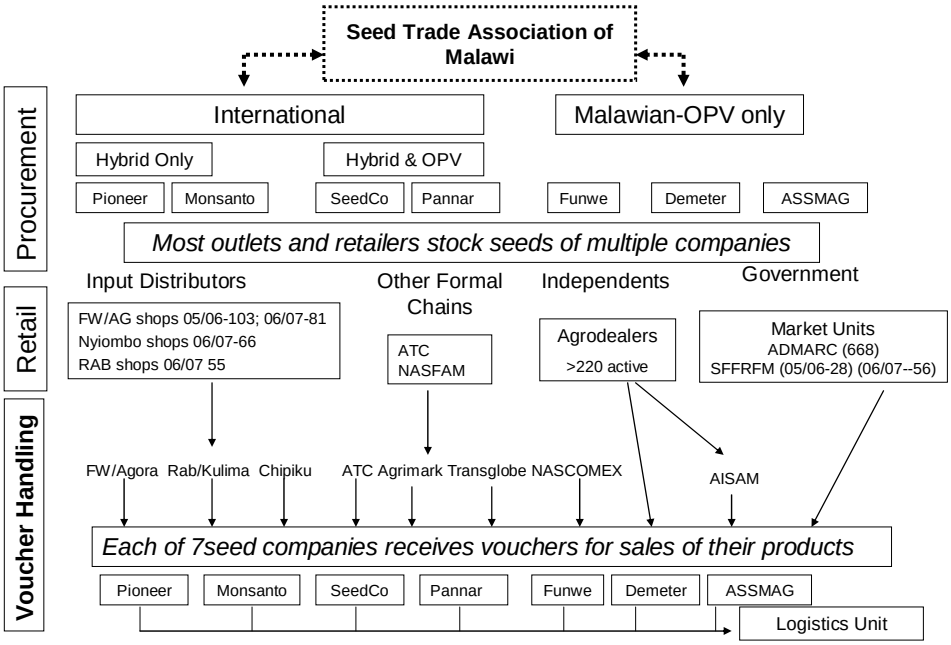


Figure 6.2 Structure of the Malawi Seed Industry



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6.2 Methods used in assessing impacts on the input supply sector

Information used in the analyses of input sector impacts comes from (1) past reports on Malawi's input sector; (2) key informant interviews with almost all fertilizer importers, major seed producers and importers, administrators of ADMARC and SFFRFM, government officials, and representatives of input supplier organizations; (3) a survey of 271 retail outlets; and (4) analysis of household survey data on fertilizer acquisition patterns.

The sampling method for the retailer study was shaped by the time and resources available. An effort was made to select districts where both maize and tobacco were grown. For each region, one district represents relatively dense input supply (large number of retailers per area and population) and the second less dense coverage (fewer retailers and longer distances for farmers to travel). The sampling frame was developed using lists of retail shops available from the Logistics Unit (LU) (for the major distributors and government outlets) and lists of agrodealers provided by CNFA and AISAM. While this sample does not permit us to generalize the results to all districts in the country, it does provide a snapshot of impacts these six important districts.

Table 6.1 provides some general population and cropping information on the six districts, the number of retail outlets per district identified in the initial sampling frame, the number of outlets recommended for sampling, the final sample size, and a qualitative indicator of the density of the retailer coverage by district. As a general rule of thumb, we over-sampled agrodealers because they tend to be a very heterogeneous group[20] and under-sampled ADMARC/SFFRFM outlets because they tend to be more homogeneous given their centralized management structure.

Once in the field, we learned that the retail sector in these six districts was very fluid: a number of shops on the agrodealer lists could not be found or were not selling inputs in 2006/07 while many

[20] Over-sampling heterogeneous groups helps to get a better picture of general tendencies within the group whereas too few observations increases the risk of selecting atypical cases that may result in an inaccurate picture of the overall group's characteristics.

new shops were identified.[21] Of the 271 retailers interviewed, 262 were selling maize seed in 2006/07 and 217 were selling fertilizer; all had sold either maize seed or fertilizer at some time during the previous three years.

Table 6.1 Geographic distribution of retailers surveyed

Region	District	Sampling Frame (outlets)	Proposed vs. actual sample size	Retailer Density	District population	Population density per sq. km*	Percent crop area in Maize & Tobacco
North	Mzimba	132	50 / 50	High	524,014	from 25-50 in se to 50-100 in w;	M: 50-75% T: 10-25%
	Rumphi	44	29 / 41	Low	128,360	50-100	M: 50-75% T: 10-25%
Center	Kasungu	78	50 / 50	Medium	480,659	50-100	M50-75% T 10-25% n.; 5-10% s.
	Lilongwe	140	50 / 50	High	905,889**	200-400	M: 50-75% T: 10-25% nw
South	Blantyre	51	51 /38	High	307,344**	400-800	M:50-75%
	Machinga	52	52 /42	Low	369,614	2/3 of area 50-100; 1/3 100-200	M:25-50% with some 50-75% in n.

*Excluding national park areas. **Rural population.

Source: Compiled from sample data and the Malawi Atlas of Social Statistics (IFPRI, 2002).

Most of our analyses look at the impacts by region and/or type of actor, with a focus on the following groups:

- Importers with distribution networks (e.g., Farmers World/Agora, RAB[22], Export Trading, Nyiombo)
- Importers with small or no distribution networks (e.g., Yara, Optichem, Optima, Sealand, Simama, Muli Brothers)
- Farmer cooperatives (NASFAM affiliates and a few independent cooperatives)
- Independent agro-dealers
- Government distributors, with occasional import activity (ADMARC/SFFRFM)

The analytical framework presented in Figure 1.1 identified the following factors as potential indicators of the subsector's performance: volumes supplied and sold, profits, cash flow, confidence of the actors in the future, investments, innovations, and the development of new services.

We focus on an analysis of trends in sales by different actors over the past three years, with the objective of finding out which actors have experienced increasing/decreasing sales and their views about the factors driving these changes (subsidy, climate, local programs/projects, changes in personal situations, government policies, etc.). Patterns of entry and exit to the sector are also assessed. To examine the issue of displacement of commercial sales by subsidized sales we use two approaches: analysis of trends in aggregate fertilizer sales through commercial and subsidized channels and analysis of household survey data on sources of fertilizer (subsidized

[21] This raises the question of whether there is a need for some type of registration or licensing system that would be able to track information on the number and location of functioning input suppliers.

[22] Strictly speaking, RAB does not import but orders through others such as Yara. Given its extensive network of retail outlets it fits better in this category than elsewhere.

versus commercial purchases) and category of farmer (based on assets), comparing patterns in 2002/2003, 2003/04, and 2006/07.

As collecting quantitative information on profits across several years was not feasible, we used information on perceptions about trends in profits from importers/distributors and retailers and combined this with information offered about the reasons for these changes to see how far the changes are attributed to the subsidy program. We have also collected information about the impact of the subsidy program on costs and cash flow. This information does not speak directly to the issue of profit; but it helps us to understand the incentives and disincentives for importers, distributors, and retailers to participate should the program continue.

We assess confidence in the system with information about investments and the entry and exit of different actors during the recent past. Actors were also asked to identify the current and potential benefits of the program to themselves, to others in the input sector, to farmers, and to Malawian citizens in general.

Open-ended questions about the advisability of continuing the subsidy program and recommendations for improving it have contributed insights relevant to all of the key indicators mentioned above.

6.3 Input supply and sales analysis in a context of growing competition

A key issue for the private sector is whether this year's subsidy program helped existing actors to get back on the path of increasing imports and sales that they had been experiencing before they were excluded from the 2005/06 subsidy program. A related issue is understanding trends in competition (number of actors in a particular market) as this is often a sign of improving or declining health of a sector. These questions need to be addressed separately at the procurement and the retail levels because the subsidy program affected these levels differently.

Table 2.4 represents our best estimate of aggregate national fertilizer sales disaggregated by type of supplier (government or private sector) and type of sale (subsidized or commercial) for the period 1997/98 through 2006/07.

The data in the table end on March 31, 2007. As observed in section 2, they show a decline in imports of fertilisers to levels below those of 2003/04, due in part to private sector carry over stocks associated with non-participation in the 2005/06 subsidy program. Private sector sales increased approximately 11% from 2005/06 to 2006/07, but represented only 87% of levels attained in 2003/04.

During follow-up contacts in November 2007, several suppliers noted an uptake in commercial purchases of fertilizer after March 2007 as tobacco farmers prepared for the 2007/08 season. Apparently, an increase in tobacco auction prices in 2007 has stimulated demand for tobacco fertilizer and a willingness on the part of farmers to make cash purchases before the details of the 2007/08 subsidy program are finalized. This is viewed by some suppliers as the first significant uptake in commercial fertilizer sales since 2003/04. This uptake illustrates the important link between output market prices, production incentives, farmers' financial liquidity, and fertilizer demand.

While acknowledging the post-season growth in commercial sales, suppliers argue that their share of the primary market in 2006/07 was too small (less than 60% compared with 80 to 90% in earlier years). Supplier explanations for the low level of commercial sales include:

- delays in getting the subsidy program designed and implemented caused farmers to delay commercial purchases that would normally have been made in June, July, and August;
- when details of the subsidy became known and farmers learned they would not receive as much subsidized fertilizer as anticipated, it was too late to arrange for credit;
- the large share of fertilizer purchased by the government for direct sales through ADMARC and SFFRFM and delays in signing contracts to permit private sector participation in the voucher program reduced incentives to import stocks beyond those needed to meet the subsidy distribution;

- farmers used subsidized fertilizer in lieu of rather than in addition to their normal purchases.

All of these points relate to program implementation and can be addressed through improved planning and better donor, government, and private sector coordination, although point 4, the issue of subsidized fertilizer displacing commercial sales, is a potentially serious weakness in the entire concept of a fertilizer subsidy program if it is happening on a large scale. We therefore postpone discussion of this to section 6.3.

To examine the impact of the subsidy program at the retail level we use three years of sales data (2004/05-2006/07) for a subset of 128 private sector retail outlets (60 distributors and 68 agrodealers) located in the six districts covered by the retailer survey. Analysis of these data suggests that the impacts of the subsidy program on sales volumes were mixed (Table 6.2).[23] As a group, the distributor chains had higher sales in 2006/07 than in 2004/05 (70% increase in volume). Despite the aggregate increase in sales volume, one-third of distributor outlets had a decline in sales from 2004/05 to 2006/07. Among the distributors, the outlets for the smaller distributor chains were more likely to have increased sales over earlier levels than the larger chains, suggesting that the smaller chains may be increasing their market share. However sales volumes of these retailers were also strongly influenced by their participation in the subsidy programme in 2006/7.The negative impact of the subsidy on sales in 2005/6 is very evident.

By contrast, the agrodealers as a group suffered setbacks in 2006/07 with aggregate sales for the group declining and 35% of individual shops experiencing a drop in sales[24]. Twenty-six percent of this group had no fertilizer sales. Of those not selling, problems of credit and supply were cited by 60% as the reason, while the subsidy program was mentioned by 40%. Of those selling, only 2 agrodealers participated in the voucher program (indirectly, in collaboration with one of the distributors). For all 68 agrodealers reporting sales data, the aggregate sales in 2006/07 represented only 12% of 2004/05 sales.

Table 6.2. Fertilizer sales trends for a subset of retail shops 2004/05 to 2006/07

Type of Retailer	No. of shops	Sales (tons)			06/07 sales as a percent of 04/05 sales	Percent of shops with declining sales	Geographic distribution of shops with declining sales
		04/05	05/06	06-07			
Distributor outlet	60	13,718	7,293	23,273	170	33	90% in Center
Agrodealers							
All	68	14,343	8,666	1,788	12*	35	46% Center 42% South
Those with sales in 04/05	32	14,343	8,287	1,087	8	75	46% Center 42% South
Those with no sales in 04/05	36	0	379	701	--	--	--

*Includes those with no sales in 2004/05, making the 2006/07 numbers a larger share of earlier volumes.

Given the number of established agrodealers not selling in 2006/07, there was a surprising number of new agrodealers setting up shop. Of the subset reporting fertilizer sales trends,18% began selling inputs in 2006 and another 28% began in either 2004 or 2005. Many agrodealers who sell fertilizers (70%) cater to farmers wanting to purchase units smaller than the standard 50 kg bag. This market differentiation contributes strongly to survival as these agrodealers are not in

[23] Many agrodealers were not able to provide quantitative data on their sales trends for the previous three years, so those covered in this subset of retailers interviewed may be biased towards those with better management and record keeping skills. Data for the distributor shops covered come primarily from the head offices.

[24] Comments in this paragraph refer to only the 68 agrodealers who provided sales trends data.

direct competition with ADMARC and the distributor outlets, which seldom sell small packs. Another factor contributing to agrodealer survival is that many of these shops are diversified, selling other inputs (53%) and non-inputs (46% sell groceries and 23% sell hardware). Unlike ADMARC/SFFRFM, most distributors and cooperatives are also diversified into these other products, but inputs represent a larger share of their profits. Agrodealers and cooperatives exhibited a statistically significant lower share of profits from inputs (60% and 73%, respectively) than did ADMARC/SFFRFM (97%) and distributor outlets (77%).

There was some regional variation in the prevalence of shops with declining sales. Retailers in the Central Region were more likely than others to have declining sales over time while those in the North were more likely to have increasing sales. These differences were confirmed by analysis of quantitative data for the subsample reporting on sales trends (128 retailers) as well as through analysis of qualitative responses (271 retailers) concerning the direction and magnitude of changes in sales from year to year between 2004/05 and 2006/07. The higher prevalence of shops with declining trends in the Central Region may be due to market saturation. The Kasungu District in the Central Region exhibits the highest density of outlets measured in terms of the average number of competitors cited by retailers interviewed. The sample average across all districts was 3.8 competitors, but the Kasungu average was 5.5, with Mzimba close behind at 5.2. Some retailers in Kasungu reported as many as 19 competitors selling inputs in their sales area; in Mzimba the maximum reported was 12.

We also examined the level of competition reported for the different types of business structures finding a highly significant difference in the average number of competitors reported by government outlets (only 1.8) versus agrodealers (5). This finding confirms that ADMARC/SFFRFM outlets are more likely to be serving remote locations than others and that the emerging agrodealers are tending toward concentration rather than extension into under-served locations. Distributor shops and cooperatives were in the middle with an average of 4 and 2.7 competitors, respectively. Although on average ADMARC/SFFRFM shops have fewer competitors, we note that 4 government shops interviewed were located in areas with 6 to 10 competitors and 42 shops were located in areas with 1-5 competitors. Over time, it may be in the GOM interests to begin reducing their presence in markets that have adequate private sector coverage so they can concentrate on providing better service to the more remote areas that are not easily served by the private sector.

In terms of the dynamics of competition among retailers, 60% felt that their competition had increased in the recent past, 29% saw no change, and 10% saw a decline. Respondents in Rumphi were more likely to cite a decline (a problem in a zone that already has relatively low coverage) and Blantyre respondents were more likely to cite a lack of change. Agrodealers were the ones who contributed most to the changing patterns, representing a large share of the establishments moving both in and out of the sector.

The key difference between the seed and the fertilizer program was the more flexible nature of the seed voucher, which permitted a greater variety of retailers to participate and a greater variety of seed products to be sold. Suppliers of hybrid seed began strong promotional campaigns using the voucher program as a means of helping farmers to experiment with hybrids. Seed suppliers in general were very proactive in supplying both OPV and hybrids to a wide variety of outlets, often competing to get stocks into ADMARC and SFFRFM shops where they anticipated heavy traffic that would stimulate sales of their products. Agrodealers were not neglected, with many benefiting from supplier credit (sometimes covered by a CNFA guarantee). Producers and distributors of hybrids felt that the flexible seed voucher had a very positive impact on their sales and represented an improvement over earlier government programs that have tended to favor OPVs.

Of 178 retailers responding to qualitative questions about maize seed sales trends, 66% reported moderate to large increases in sales over 2005/06 when ADMARC had a monopoly on distribution of subsidized quantities of OPV. By contrast, a much smaller share (20%) reported moderate to large declines. Participation in the sales growth was greatest for retailers in the formal distribution networks such as RAB, FW/Agora (93% reporting increases) and cooperatives (77% reporting such increases). Results for agrodealers were less favourable with 55% reporting increases but 32% reporting declines. This may be due to the low share (only 27%) of agrodealers interviewed

who participated directly in the voucher program (albeit, this percent is significantly higher than the 5% of agrodealers selling fertilizer in 2006/07 who participated). Of those retailers reporting increases in seed sales, 72% attributed this to the subsidy program. Few mentioned access to credit as a reason, illustrating perhaps that credit is less of a constraint for agrodealers selling seeds than for those selling fertilizers.

Suppliers interviewed in the seed sector did not raise the issue of vouchers displacing normal retail sales. At the retail level, 25% of those able to separate commercial and voucher sales stated that voucher sales represented less than 75% of sales while 37% said vouchers accounted for 100% of sales. If we remove ADMARC/SFFRFM from that last calculation, however, only 19% reported 100% sales due to vouchers, suggesting that the commercial outlets did do a varied business in both cash and vouchers. Evidence that farmers redeeming seed vouchers bought more than the 400 MK bag of seed when redeeming their voucher is relatively weak; 56% of retailers said this never happened and an additional 21% said it happened in fewer than 10% of cases where a seed voucher was redeemed.

In sum, most seed sector participants interviewed at the supplier and the retail levels were very pleased with the voucher system in terms of its impact on their sales volumes. Vouchers appear to have given hybrid sales a particularly good boost. Shares of vouchers submitted for hybrids were 78% in the North and the Center and 73% in the South. Vouchers processed by the LU show that hybrids accounted for 61% of the 4524 total tonnes of subsidized seed sales. Increased demand for hybrids, which are more fertilizer responsive than other maize varieties, could be the trigger that gets commercial demand for fertilizer moving in a positive direction again. Such a scenario, however, would require policies and investments to keep maize demand and prices at a level that provides adequate incentives to intensify production. The importance of the output price in shaping fertilizer demand was noted above in the discussion of post-season tobacco fertilizer purchases.

6.4 Fertilizer Displacement

We examine two types of displacement caused by the subsidy. In section 6.6 we consider the extent to which the subsidy sales through ADMARC and SFFRFM lead to a reduction (displacement) of sales through private sector supplier (supplier displacement). In this section we consider the extent to which total subsidy disbursement leads to incremental use of fertiliser and seed use. This, together with the way the inputs were distributed, has a major influence on the impact of the programme on the input sector and on rural people's crop production, and hence on the welfare of different groups of farmers and consumers.

There are considerable difficulties in estimating the incremental input use resulting from the subsidy, as while the intention of the subsidy is to make inputs available to farmers who would not otherwise use them, and thereby to increase productivity, it is very difficult to ensure that all subsidised inputs go to such farmers, and, as noted earlier, key informants in the fertiliser industry believe that there is substantial 'displacement' of commercial fertiliser sales by subsidised sales. This directly reduces the production and welfare impacts of the programme as there are no incremental production benefits from subsidised fertiliser that is displacing commercial sales (and this has implications for wider market and welfare impacts). Income gains for farmers are also reduced (to the value of the subsidy which would normally be less than the net gains from incremental fertiliser use). It can also have an adverse effect on the fertiliser industry by reducing commercial sales and hence the viability of commercial distribution channels (primarily the agro-dealers) that are not also involved in sales of subsidised fertilisers (in other words it can lead to supplier displacement, which we examine separately later in section 6.6).

Estimation of the proportions of subsidised inputs that are displacing unsubsidised sales on the one hand and leading to incremental input use on the other requires an estimation of what commercial input sales would have been in the absence of the subsidy. The development of this "counter-factual" estimate is hindered by constant changes in the Malawian input system during the last few years and inconsistent sources of information on input use and sales. The task is complicated further by (a) the potential for the subsidy to cause switches in fertiliser use between farmers, crops and fertiliser types (so that, for example, subsidies may lead some farmers to

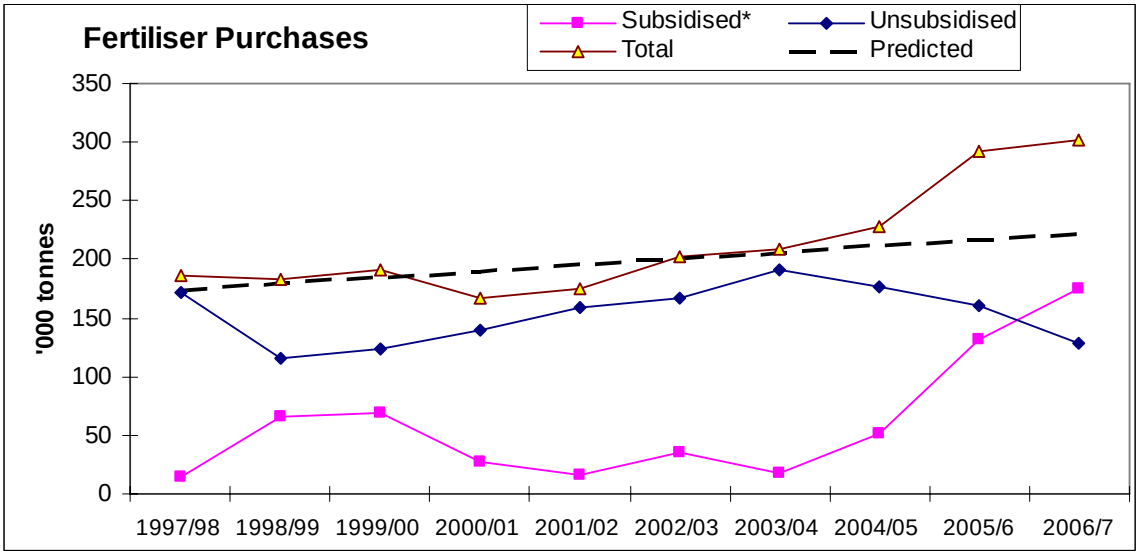
reduce of one type of fertiliser use on a particular crop while other farmers increase their use of another type of fertiliser on the same or different crops) and (b) likely effects of price falls depressing fertiliser demand (and such reduced demand may appear to be the result of displacement by subsidy sales).

The extent of displacement and incremental input use is investigated by (a) formal examination of recent national trends in commercial, subsidised and total sales of inputs; (b) analysis of changes in input use by farmers in the household survey; and (c) discussion with stakeholders with different perspectives and interests in the industry. Particular attention is given to the question of displacement and incremental use of subsidised fertilisers as fertilizers are the major cost item in the input subsidy programme and displacement effects are considered by some observers to be very significant.

6.4.1 Estimates of incremental fertiliser sales from national sales data

Figure 6.3. presents information on subsidized and unsubsidized sales of all fertilisers, with a trend line estimated by regressing total sales from 1997/98 to 2004/5 against time. 2005/6 and 2006/7 were excluded from the regression because in those two years there was both a significant subsidy, and a sharp increase in total fertilizer sales. Sales in 2006/7 are 99,000 tonnes above the trend line.

Figure 6.3 Total fertilisers acquired by farmers, subsidized and unsubsidised sales



Source: see Table 2.4

The regression estimation of the trend line suggests that over the period 1997/98 to 2004/5 total sales were relatively stable with a slight upward trend. This stability prevailed despite some quite large subsidy programmes (for example the starter pack programmes in 1998/99 and 1999/2000), suggesting that there was significant displacement.

The extent and nature of displacement were investigated further by examining the relationship between unsubsidized sales and subsidized sales, to test the hypothesis that unsubsidized sales are strongly affected by subsidy sales. In determining the effect of subsidised sales on unsubsidised sales it would be desirable to account for the effects of other variables on unsubsidised sales. These might include fertiliser prices, crop prices, income per capita, and variables representing the density of sale outlets. Unfortunately this is not possible due to (a) lack of data for some variables and (b) the very short data series (due to structural change in the mid 1990's) and hence limited degrees of freedom.

The analysis was conducted initially for all fertilisers. Unsubsidised sales were regressed against a time variable and linear and quadratic functions of subsidised sales, for both 1997/98 to 2006/7 and 1997/98 to 2004/5 (the latter attempting to investigate the relationship with Starter Pack /TIP subsidies but without the larger 2005/6 and 2006/7 subsidies). In each case the primary objective was to estimate a base figure for what unsubsidised sales would be without any subsidised sales (we call this counterfactual the 'natural level of commercial sales'), but the general relationship between subsidised and unsubsidised sales is also of interest.

Significant negative coefficients (indicating that subsidies reduce commercial sales) were found between subsidized and unsubsidized sales (p=0.02 to 0.04), and significant positive coefficients between time and unsubsidized sales (p=0.006 to 0.07). Estimates of displacement % from the estimated equation coefficients varied around a mid point of about 50%.

The different regression models' estimates of the natural level of commercial sales for 2006/7 are consistent at around 215,000 tonnes. Another factor that needs to be taken into account in estimating the natural level of commercial sales are the effects of fertiliser price increases and low tobacco prices. For the 2005/6 season there was an approximate 20% rise in fertiliser prices, and this can be expected to have led to reduced demand in 2005/6 and 2006/7 for commercial sales, with a fall in natural level of commercial sales. There is no empirical information on the size of this fall in demand. Demand for fertiliser for maize production could be expected to be relatively inelastic. If elasticity of demand is taken to be 0.5 this would mean a 20% rise in price would lead to a 10% fall in commercial sales in the absence of any subsidy. Demand for tobacco fertilisers, on the other hand, would be expected to be more elastic, and might also have been depressed in 2006/7 by low tobacco prices in 2005/6. This suggests that it might be appropriate to conduct separate analysis of subsidised 'maize fertilisers' and 'tobacco fertilisers'.

There had been no significant subsidy of 'tobacco fertilisers' prior to the 2005/6 subsidy, and regression analysis of sales of CAN and D Compound against time from 1997/8 to 2004/5 indicated only a weak (P=0.15) negative relationship between unsubsidised sales and time. Estimates of displacement were therefore calculated using both regression estimates and the simple average of sales over the period 1997/8 to 2004/5. The substantial 'maize fertiliser' subsidies in the past allowed regression analysis of the relationship between unsubsidised sales, time and subsidised sales. Weak negative coefficients (indicating that subsidies reduce commercial sales) were found between subsidized and unsubsidized sales (p=0.36), and weak positive coefficients between time and unsubsidized sales (p=0.52). Analysis of sales over the period 1997/8 to 2006/7 yielded slightly better results, with p=0.05 for the positive relationship between unsubsidised sales and time and p=0.34 for the negative relationship between unsubsidised and subsidised sales. Simple estimates of displacement % from the estimated equation coefficients were 45% over the period 1997/8 to 2004/5 and 18% for the period 1997/8 to 2006/7.

Table 6.3 Estimates of Displacement and Incremental Fertiliser Sales, 2005/6 and 2006/7

	Subsidy	Natural' commercial sales				Actual	Displaced	
		regression	price effect		final	commercial	commercial	Incremental
		estimate	%	estimate	estimate	sales	sales	sales
2005/6								
All fertilisers	131,803	207,000	10%	20,700	186,300	160,185	26,115	105,688
	% of subsidised sales						*20%*	*80%*
Maize	108,986	82,780	0%	0	82,780	79,860	2,919	106,067
	% of subsidised sales						*3%*	*97%*
Tobacco	22,014	53,000	10%	5,300	47,700	25,846	21,854	160
	% of subsidised sales						*99%*	*1%*
Maize & Tob	131,000	135,780	*3.9%*	5,300	130,480	105,706	24,773	106,227
	% of subsidised sales						*19%*	*81%*
2006/7								
All fertilisers	178,582	215,000	10%	21,500	193,500	117,719	75,781	102,801
	% of subsidised sales						*42%*	*58%*
Maize	152,989	88,000	0%	0	88,000	57,203	30,797	122,192
	% of subsidised sales						*20%*	*80%*
Tobacco	25,592	53,000	15%	7,950	45,050	22,150	22,900	2,692
	% of subsidised sales						*89%*	*11%*
Maize & Tob	178,581	141,000	*5.6%*	7,950	133,050	79,353	53,697	124,884
	% of subsidised sales						*30%*	*70%*

Table 6.3 shows estimates of 2005/6 and 2006/7 displaced and incremental sales for different categories of fertiliser, using estimates of 'natural commercial sales' (the counterfactual commercial sales if there were no subsidies, estimated from the regression analysis) and then deducting an allowance for reduced demand as a result of fertiliser and tobacco price changes. Displacement and incremental use rates are expressed as a % of subsidy. It should be noted that the estimated displacements are below those estimated in March 2007, due to (a) upward revision of both natural commercial sales and of total fertiliser sales and (b) separate analysis of maize and tobacco fertiliser sales, with (implicitly) greater allowance for a price effect leading to a fall in other fertiliser sales outside smallholder agriculture. Separate analysis of maize and tobacco fertiliser sales is, however, likely to lead to some under-estimation of displacement since subsidised maize (or tobacco) fertilisers can substitute for other fertilisers[25]. It appears that displacement has increased from 2005/6 to 2006/7.

6.4.2 Estimates of incremental fertiliser sales from household survey data

To further investigate the issue of incremental input use resulting from the 2006/07 subsidy program, we used national household survey data. We first computed mean household fertilizer acquired from subsidized and unsubsidized sources in 2002/03 and 2003/04, as reported by households interviewed in these two seasons in the IHS2, carried out by NSO in 2004. We then computed subsidized and unsubsidized fertilizer use in 2006/07 for these same households, as

[25] Analysis of changes in sales of other fertilisers (ie not maize or tobacco fertilisers) suggests that sales in 2005/6 and 2006/7 fell by a little more than would be expected from the price effects estimated for tobacco in table 6.3, which in turn suggests that there may be some but limited displacement across different fertiliser types. However estimates are sensitive to the treatment of an apparent outlier of high non-maize / non-tobacco fertiliser sales in 2004/5 (if this is ignored then estimated displacement across fertiliser types is very low).

reported in the Agricultural Inputs Supplementary Survey (AISS) also carried out by NSO, in 2007. By examining differences in fertilizer use patterns of the 2,431 households interviewed in both these surveys, it is possible to determine the net increase in subsidized, unsubsidized, and total fertilizer use between the 2002/03 and 2006/07 surveys (for the 1,101 households interviewed in 2002/03) and between the 2003/04 and 2006/07 surveys (for the 1,330 households interviewed in 2003/04).

In the 2002/03 and 2003/04 seasons, 45.6% and 36.5% of the maize growing households surveyed nationwide purchased commercial fertilizer. Mean amounts purchased over the nationwide sample were 80.9 kgs of fertilizer per household in 2002/03 and 50.9 kgs per household in 2003/04. These estimates count both users and non-users; application rates among users were more than double these nationwide estimates. In these years, the TIPS program distributed roughly 35,000 tonnes and 22,000 tonnes of free fertilizer in 2002/03 and 2003/04, respectively.

During the 2006/07 crop season, the percentage of smallholder households purchasing fertilizer on commercial terms declined to 15.6%, with mean amounts of 14.8 kgs of fertilizer purchased per household. Overall fertilizer use increased markedly, due to the size of the AISP programme. The proportion of households using fertilizer nationwide rose to 65.7% in 2006/07, most of which was acquired through the subsidy program. Mean fertilizer acquired by smallholder households from all sources in 2006/07 was 78.8 kgs per household, of which 64.0 kgs per household was through AISP.

As shown in Figures 6.4a and 6.4b, many households received subsidized fertilizer in 2006/07, represented by the dots to the right of zero on the horizontal axis. The large majority of these households are below zero on the vertical axis, meaning that their purchases of unsubsidized fertilizer declined between the base years and the 2006/07 season. The negative slope of -0.49 (comparing 2002/03 with 2006/07) and -0.62 (comparing 2003/04 with 2006/07) indicate that an additional ton of fertilizer distributed under the subsidy program appears to have displaced commercial purchases by as much as 490 kgs and 620 kgs. This represents an incremental fertilizer use of 51% and 38% of subsidised fertiliser, depending on the year. However these estimates do not take account of possible effects of falling tobacco prices and rising fertiliser prices, as was done in the analysis summarized in Table 6.3. Taking account of these effects should reduce the estimated displacement and raise estimates of incremental fertilizer use as a result of the subsidy.

To investigate possible effects of fertiliser and tobacco price changes on unsubsidised fertiliser purchases, we conducted separate comparisons of changes in IHS2/ AISP fertiliser purchases for households who received some subsidised fertiliser and households who received no fertiliser, assuming that changes in fertiliser for households who received no subsidy were not due to displacement. This then allowed us to separate displacement and price effects for households who did receive subsidised fertilisers[26]. This analysis led to an estimated displacement rate of 34% when comparing 2002/3 IHS2 and 2006/7 AISP purchases, and an estimated displacement rate of 48% when comparing 2003/4 IHS2 and 2006/7 AISP purchases. This represents an incremental fertilizer use of 66% and 52% of subsidised fertiliser, depending on the year. These incremental rates are considerably higher than those estimated without taking account of price effects (51% and 38%), but are lower than those estimated using national data (averaging 70% across all fertilisers).

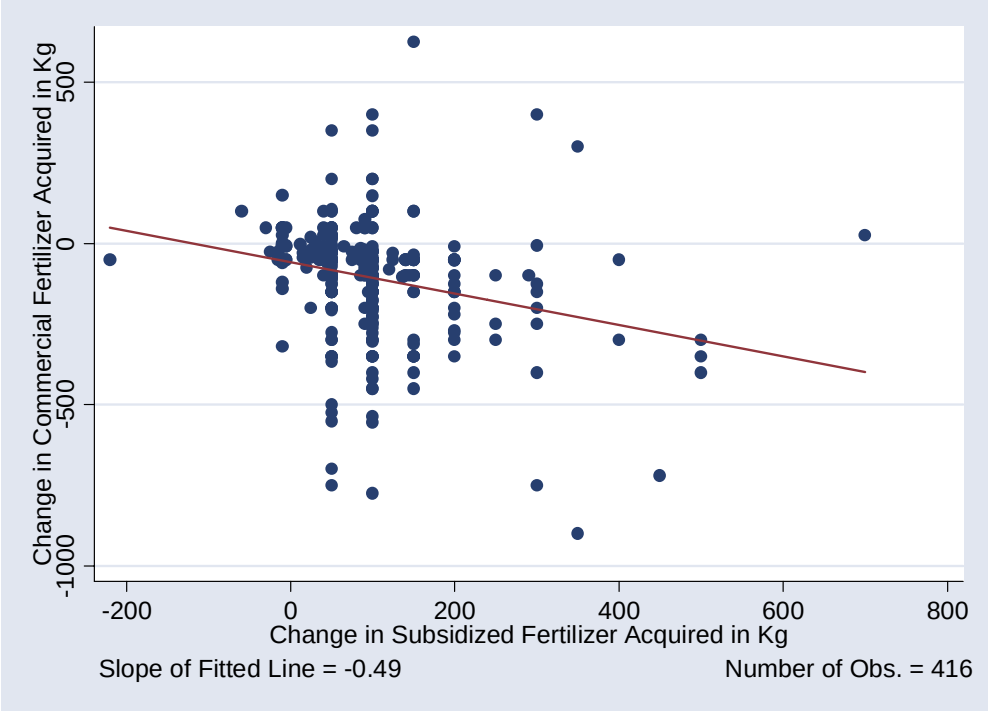
It is also possible that the fertilizer purchasing behaviour of households after expecting to receive or receiving subsidized fertilizer may differ according to their ability to purchase fertiliser (we would

[26] This assumes that for households who did not receive any subsidised fertiliser all changes in fertiliser purchases are unconnected with the subsidy. This may not be the case, as some households who did not receive the subsidy may have reduced their unsubsidised fertiliser purchases in the expectation that they would get subsidised fertiliser, even if they were subsequently disappointed and received none. It is also not easy to tease out the difference between subsidised and unsubsidised fertiliser if farmers are sharing subsidised fertilisers, reselling them, and purchasing them from others.

expect poorer credit constrained unable to afford fertiliser to use the subsidy to buy fertiliser that they would otherwise be unable to afford, whereas less poor households who can afford to and would buy fertiliser without a subsidy might be expected to use the subsidy to purchase fertiliser that they would have purchased anyway). To investigate this, households were disaggregated according to their (IHS-2) initial levels of (a) wealth and (b) landholding size. We ranked all households from high to low according to (a) the value of their assets and (b) their landholding size, and then in divided the sample into three equal groups, or "terciles" according to the asset or land holding. Incremental fertilizer use was then computed for each asset tercile and each land tercile.

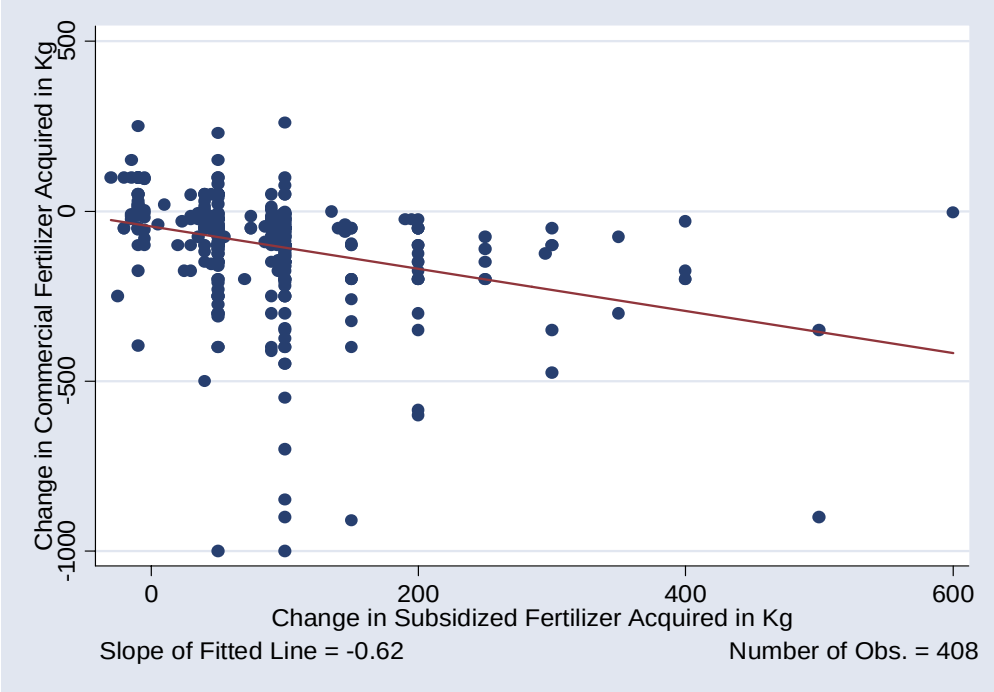
Findings indicate that incremental fertilizer use resulting from receipt of subsidized fertilizer is higher for households in the bottom asset tercile than for households in the top asset tercile. Incremental fertilizer use (after allowing for price and other non-displacement effects as described above) is estimated as around 75% for the poorest tercile, declining to 60% for households in the middle tercile and 42% for households in the top asset tercile.

Figure 6.4a Changes in subsidized and unsubsidized (commercial) fertilizer acquisition, 2002/03 vs. 2006/07.



note; each point represents a farm household surveyed in both 2002/03 and 2006/07 who acquired fertilizer from either commercial or subsidized sources in either year.

Figure 6.4b Changes in subsidized and unsubsidized (commercial) fertilizer acquisition, 2003/04 vs. 2006/07.



note; each point represents a farm household surveyed in both 2003/04 and 2006/07 who acquired fertilizer from either commercial or subsidized sources in either year.

6.4.3 Conclusions on incremental fertiliser sales

The regression analysis of national fertiliser sales and of survey data give us estimates of displacement and incremental fertiliser use, of between 30 and 40% displacement and 70 to 60% incremental use. Observations of higher displacement among less poor farmers are supported by information from key informants. While the extent of displacement is of very great importance to the impact of the subsidy programme, there are a number of possible causes of displacement. Thus although the survey results suggest that displacement is higher among less poor farmers, it is not known how far this is an inherent feature of the subsidy and how far it may have been caused by uncertainty regarding the subsidy (and reduced commercial purchases in the hope of greater subsidised purchases). Similarly it has been difficult to isolate the effects of low tobacco prices depressing purchases of fertiliser for use on tobacco. With regard to the latter it was noted earlier that there are reports of increased sales of fertiliser for 2007/8 tobacco production, stimulated by the higher tobacco prices received for the 2006/7 crop. Comparison of estimates of 2005/6 and 2006/7 displacement rates and the observation that displacement rates are higher among less poor households both suggest that increasing volumes of subsidised fertilisers may lead to higher displacement rates unless there is careful and effective targeting of subsidised fertilisers on farmers who would not otherwise be able to afford fertiliser purchases. However the regression analysis did not provide any evidence for increasing displacement with increasing volumes of fertiliser subsidies.

It is shown later that high rates of displacement can be a key factor in reducing the effectiveness of the programme in meeting its objectives, and it must therefore be a critical objective in programme design and implementation to bring these rates down as far as possible. This may be achieved by a variety of measures which are discussed in the final recommendations. The analysis in this section, however, suggests that better targeting of fertiliser coupons to households who cannot otherwise afford to purchase fertilisers is one important means of lowering displacement rates. This issue is discussed later in the report.

6.5 Observations on incremental seed sales

We have not been able to assess seed displacement quantitatively at the national level due to inadequate trends data on maize seed sales for all the major distributors. One supplier, however, reported a 52% increase in seed sales over 2005/06 levels with only 40% of the firm's sales having been supported by vouchers.

In addition, qualitative assessments of trends in hybrid sales from some of the major suppliers have been very positive, suggesting that in the case of hybrids there has not been a great deal of displacement. First of all, 67% of retailers interviewed report that overall sales of OPV and hybrid maize seed increased between 2005/06 and 2006/07. More distributor outlets (93%) participated in this upward trend than cooperatives (77%) and agrodealers (55%). Second, 73% of seed coupons were redeemed for hybrids—an encouraging sign given that historically, hybrid maize has generally represented less than 30% of area cultivated (average of 32% from 1995/6-1999/00 per the Malawi Atlas of Social Statistics published by IFPRI). Third, the mean percent of voucher sales in total maize seed sales for retailers interviewed was 83% (95% confidence interval of 79-87%) compared to 92% for fertilizer sales (95% confidence interval of 90-95%), suggesting a stronger commercial market for seed than for fertilizer. This could be a function of the more limited quantities of seed made available through the voucher (enough for 0.1 to 0.2 ha of land) compared to fertilizer (enough for about 0.5 ha of land if a household receives two coupons). Agrodealers had a slightly lower share of sales by voucher (77%) than distributors (80%), cooperatives (87%), and ADMARC/SFFRFM (88%) (p=.10). There was not a statistically significant difference in share of sales by voucher across regions and districts.

Estimates of new hybrid customers are also high—one firm reported that 300,000 farmers had tried their hybrid seed for the first time in 2006/07. By November 2007, farmers were requesting these seeds by name for the 2007/08 season, even before the vouchers had been distributed; with sales for 2007/08 far exceeding those at the same point in time in 2006/07.

6.6 Retail supplier displacement

Whereas fertilizer displacement (the impact of subsidised sales on unsubsidised sales) as discussed above has a major impact on the impact of the subsidy on incremental production and (as will be discussed later) hence on livelihoods and growth, retail supplier displacement (the impact of the subsidy programme on private sector retail sales) has a major impact on private sector profitability and development. The subsidy programme affects private sector retail sales in two ways, first in the impact of subsidy sales on total sales, and second in the impact of subsidy sales channels on the private sector share of total retail sales. In 2005/6 there was a big increase in subsidy sales over previous years but the private sector was excluded from retail sales. In 2006/7 some private sector companies were able to participate in retail sales of subsidized fertilisers.

Simple regression of private sector sales on parastatal sales and time over the period 1997/98 to 2004/5 shows a significant negative relationship between private sector sales and parastatal sales, suggesting that parastatal sales in 2005/6 and 2006/7 led to 32% and 26% reductions in private sector sales respectively, as compared with what private sector sales would have been in the absence of both the subsidy and parastatal sales.

6.7 Costs, cash-flow, and profits

The interim evaluation report in March 2007 identified a number of characteristics of the 2006/07 input subsidy program that contributed to increased costs for suppliers:

(1) Cancellation and lack of transparency with tenders that resulted in wasted time by suppliers and delayed program implementation;
(2) Late announcement and implementation of the subsidy program that increased procurement and transportation costs;
(3) Need to hire extra sales personnel because input distribution was concentrated in a short period of time;
(4) Complex and time-consuming voucher redemption process (particularly for seed)

(5) Increased costs of capital when vouchers were not redeemed before credit became due.

Follow-up contacts with suppliers in November 2007, confirmed that transport costs, the costs of processing seed vouchers, and slow payment on vouchers remained key concerns throughout the 2006/07 program. The transport cost calculations are currently under discussion for the 2007/08 season and continue to be a problem. In addition, suppliers are already expressing concern that the 2007/08 program is getting underway late and may result in supply shortages.

The transport cost issue concerns high overall costs due to program induced supply bottlenecks as well as lack of transport incentives to serve remote areas. It is the general view of suppliers that the GOM's failure to get the program in place early leads to transport bottlenecks and heavy demands on the trucking system by both GOM and commercial importers/suppliers during a very short period of time. Given the larger volumes moved by the government, the GOM is thought to be in a position to negotiate the transport price. The perception of the private sector is that the GOM is failing to negotiate favourable prices, paying as much as 50% more than the average annual prices paid by the industry in general. This leaves the private sector little option but to pay the same high prices. While there is general agreement that voucher reimbursement rates for 2006/07 covered the transport costs, many suppliers feel that they were unnecessarily high, raising the overall cost of the subsidy program as well as commercial fertilizer sales.

A related transport cost issue is the uniform price set for transport reimbursement per district. First of all, the uniform price is set using historical data rather than projections. According to suppliers, recent fuel price increases (diesel was up about 16% in the recent past) are not being factored in. Second, the uniform price for the entire district discourages the commercial sector from developing a more extensive distribution network capable of serving the more remote zones.

Although we have not updated the fertilizer cost build-ups for Malawi done by IFDC with 2003 data, one supplier has suggested that supplier profit margins are declining from about 10% 5 years ago to approximately 4% at present due to increased procurement and transport costs. Although a 4% return is more in line with returns to fertilizer procurement worldwide, it is low for high-risk environments with substantial policy instability such as that found in Malawi. If this decline continues, it may encourage some actors to switch to other more lucrative activities and reduce the competition needed to ensure efficiency in the sector. If, however, input demand continues to rise and policies remain stable, suppliers may find that the 4% returns are an adequate incentive to continue investment in the sector.

Three suppliers provided estimates of seed voucher processing costs. One estimate covered only labour and stationery costs and was approximately 1 MKW per voucher. The other estimates were in the range of 10-12 MK per voucher (approximately 3% of the value of the voucher sale) and appear to have included costs in addition to the labour and stationery (perhaps extended financing, etc.). A particular challenge concerns seed placed on consignment at ADMARC facilities because ADMARC was slow in submitting seed vouchers for processing. Interviews with a few ADMARC offices suggested that the major constraint was computer capacity and personnel. One office visited had one computer and one agent to enter the data for the entire ADMARC division. When asked if he needed more help, the manager replied: No. Normally our agents don't have enough work so it is good that they will have something to keep them busy for a while. This response shows evidence of not seeing the bigger picture in terms of problems posed for the private sector.[27] Delayed payment has major implications for supplier cash-flow and finance costs. Already in January, the typical three-month credit period for some seed suppliers had been exceeded. Some vouchers had not been paid a full two months after submission to the Logistics Unit. We have received reports of voucher payments for both seed and fertilizer still being made in June and July of 2007. The slow payment for seed appears to be the result of complex bookkeeping required because of the involvement of multiple donors with different requirements

[27] Slow voucher submission by ADMARC for fertilizer is less of a problem than for the private sector because most of the fertilizer sold at government outlets was paid for in advance by the government. Seeds, however, were all on consignment leaving the supplier covering the financing.

for documentation and payment authorization. For fertilizer, the issue appears to be one of liquidity given that more vouchers were distributed than initially planned.

6.8 Confidence in the sector

Although supplier confidence at the procurement and retail levels was at an all time low in 2005/06, there was a rebound of confidence in 2006/07 that continues at the beginning of the 2007/08 campaign. Most actors are cautiously optimistic about the future. Improvements in GOM-private sector-donor dialogue are expected to reduce policy uncertainty in the future. New actors have been entering the sector and existing actors are expanding their networks. Competition at the importer/procurement level is high relative to many other African countries (approximately a dozen actors), with evidence that some of the newer actors are increasing their market share and expanding their distribution networks. While the arrival of new entrants makes the "old guard" a bit nervous about the potential for substandard products to enter the system and less experienced tender winners to default on delivery, the competition should push all in the sector to improve performance. There is also evidence of investment in the sector above and beyond the minimum required to survive (e.g., development of new products, funding for agronomic trials to develop more efficient and profitable fertilizer recommendations). This investment will remain timid until there is a clear medium-term program developed that promises policy stability with a fertilizer program that is acceptable to all stakeholders.

Follow-up contacts with suppliers in November 2007 revealed that several are planning to open new outlets in the near future: an expansion of 40 distributor shops was mentioned for both seed and fertilizer sales, and one seed firm mentioned having already placed seed in 11 more outlets this year than last year. Further development of seed supplier-agrodealer partnerships appears likely through continued support from AISAM, which credits the subsidy program for having made possible this positive supplier-agrodealer collaboration. To date there does not seem to be any concrete plan for linking agrodealers to fertilizer suppliers, but the agrodealer support associations (CNFA and AISAM) are looking for mechanisms to permit greater agrodealer participation in the fertilizer voucher program than was possible in 2006/07.

A recent evaluation of 56 CNFA-affiliated shops (Citizens network for Foreign Affairs (CNFA), 2007) found that 82% of the shop owners anticipated growth in their business (all inputs combined) this coming year through the opening of bigger shops, the possibility of participating in the subsidy programme and their efforts to attract new customers. Those who did not anticipate growth mentioned the subsidy programme and rising prices of commodities as the reasons as well as inadequate financing. About 70% of all respondents expressed fear of dismal business performance if they were left out of the subsidy programme for the coming year, but the response did not specify if they needed to be included in both the seed and the fertilizer programs or if inclusion in the seed program, as in 2006/07, would be adequate.

Despite the upbeat CNFA assessment, many agrodealers are not doing well. The CNFA survey was to have covered 100 randomly selected CNFA members but only 56 of those 100 were found to be actively selling inputs. Some agrodealers simply do not have the knowledge and skills needed to market inputs effectively and should probably exit the sector. Others do have the skills, but capital is constraining. CNFA is actively working to address these capital constraints through their program to guarantee a part of supplier credit offered to agrodealers in their network; the expectation is that supplier credits to agrodealers will increase during the coming season, turning around the trends shown in table 6.4.

Table 6.4 CNFA Guaranteed Loan Volumes from Input Suppliers to Independent Agro-Dealers

Loan Volume Indicators	YEAR				
	2002/3	2003/4	2004/5	2005/6	2006/7
Number of companies with guarantees	4	8	6	3	3
Number of credit guarantees approved (input suppliers)	42	50	44	21	24
Value of guarantees (MK million)	1.01	5.82	5.49	3.03	2.60
Value of sales supported by guarantee (MK million)	2.00	10.35	22.03	5.92	9.86

It is also useful to look at the confidence that other actors have in the input supply sector. Clearly there was a major breakdown in government confidence in the private sector that began in 2004/05 and reached its zenith in 2005/06. Interviews with key informants in the government suggest that the private sector has been able to restore some of that confidence with their performance in 2006/7. It is clear, however, that there continue to be high ranking civil servants in the government who remain very sceptical of the private sector and believe government can do a better job. Given political sensitivities, concerns about being able to respond in emergencies, and limited private sector reach to remote areas, the Government still has some legitimate reasons for promoting public/private partnerships in the input sector rather than turning full responsibility for both input procurement and distribution over to the private sector. Given the relatively high level of competition in the procurement sector and evidence of good private sector performance in procurement *when the government places orders on time and maintains a stable policy environment,* there appears to be little justification for the government to intervene directly in international procurement of fertilizer supplies. Although we have been unable to get full data on the costs of government fertilizer procurement and distribution (e.g., administrative costs borne by the government associated with the use of government personnel and warehouse facilities), there is no evidence available suggesting that government is able to import fertilizers in a more timely and cost effective manner than the private sector. On the other hand, the private sector's relatively weak performance in distributing to the remote areas that are now served uniquely by ADMARC makes it is difficult to envision an entirely private sector distribution system. This reality was recognized by most suppliers and retailers interviewed: only a very few said they thought ADMARC should be replaced entirely by the private sector. As noted above, ADMARC/SFFRFM shops interviewed for the retailer survey had significantly lower numbers of competitors on average than other types of retailers, suggesting that they are located in under-served areas. The challenge is to develop a vision of what a public/private partnership should look like in 5, 10, and 15 years and work toward that vision jointly. Are there markets that are becoming saturated and no longer need government outlets? Are there markets with such low demand and difficult access that the private sector cannot profitably serve them? Continued dialogue on this issue should build further confidence among all the actors.

6.9 Supplier views on key strengths and weaknesses of the subsidy program

Suppliers and retailers were asked to identify strengths and weaknesses of the 2006/07 voucher program. Box 6.1 lists a selection of the most commonly mentioned strengths and weaknesses, drawing primarily on information gathered from importers, some of whom were involved in retailing subsidised fertilisers.

Box 6.1 Supplier views on strengths and weaknesses of the voucher program

Strengths	Weaknesses
• *Very efficient Logistics Unit operations* • *Private sector was empowered* • *Constructive government, donor, private sector dialogue began* • *Use of government infrastructure to complement private sector* • *Payment for fertilizer vouchers was timely, at least at the beginning* • *Seed program left choice to farmers* • *Seed program presented marketing opportunity to private sector* • *Poor farmers were helped* • *Most input suppliers and retailers had better sales this year than last year*	• *VERY late design and implementation* • *Poor tendering process (started early but then canceled); second round lacked transparency* • *Poor voucher design led to fraud and vouchers not honored by Logistics Unit* • *Low redemption value for fertilizer vouchers (especially for remote locations)* • *MK rather than US$ redemption value increases supplier risk* • *Slow voucher processing by ADMARC/SFFRFM jeopardizes cash flow for seed sector* • *Weak institutions for monitoring product quality* • *Information campaign gave too much attention to fertilizer and did not provide clear understanding of who should get vouchers* • *In some cases voucher sales are simply replacing commercial sales rather than adding to them.*

Table 6.5. summarizes information obtained from the retailer interviews about the prevalence and magnitude of some of the typical problems encountered by them. The table reveals that all problems but one were more prevalent with the fertilizer program than the seed program. The magnitude of the problem is reported as the average number of days or times the problem occurred, averaging over only those who reported the problem. We tested for statistically significant differences in these averages by type of retailer and by region (significant differences are described in the notes to the table).

Despite the implementation weaknesses most actors believe that the general concept of an input subsidy administered through the use of vouchers redeemable by both public and private input shops is a good one. Very few respondents to the retailer survey (10%) suggested that the program be ended or that the government go back to one of the earlier models (TIP, Starter Pack). Reasons for not wanting to continue with the voucher program included corruption, a perception that few were benefiting, and its having had a negative impact on their sales. Those wanting to continue the program offered a wide variety of reasons that are difficult to summarize; the most common included:

- It assists the poor (27%)
- It promotes hybrids (8%)
- It assists small farmers (7%)
- It reduces hunger and increases yields (6% each)
- It increases business (5%)

Table 6.5 Prevalence and magnitude of voucher implementation problems

Problem	Retailers affected (%)		Mean number of days problem encountered by type of retailer							
	Seed	Fertilizer	Seed				Fertilizer[a]			
			Dis	Gov	Coop	AD	Dis	Gov	Coop	AD
Entirely out of stocks	31	50	10	32	9	12[b]	10	23	22	3
Out of stocks for a specific product requested	65	72	17	31	31	23[c]	11	20	17	6
Long lines	54	74	20	15	24	15	24	18	31	1
			Mean number of times problem occurred by type of retailer							
			Dis	Gov	Coop	AD	Dis	Gov	Coop	AD
Wrong copy of coupon	70	78	31	20	51[d]	11	23	30	95	53
Falsified coupon	15	25	3	16	5	4				
More than authorized number of coupons	30	30	35	20	14	23	25	16	18	1
Coupon for wrong district	39	44	15	33	32	9	11	8	15	1

Compiled from survey data for 271 retailers in two districts of each of the three regions; only those participating in the voucher program are included.

Notes:

(a) Only 3 agrodealers participated in the fertilizer voucher program so statistical comparisons across groups of retailers were not attempted.

(b) Government outlets had a statistically significant higher number of days when seed stocks were completely out than all other types of retailers.

(c) The Southern Region had a statistically significant lower occurrence of this problem than the North.

(d) Cooperatives had a statistically significant higher number of cases with the wrong copy of the coupon being presented than did the government and the agrodealers. The agrodealers had statistically fewer problems than the distributors.

There were strong views expressed by retailers about the inadequacy of the coupon distribution program and what could be done to improve it. Only 9% suggested that the distribution system continue as it was conducted in 2006/07. Fifty-five percent of retailers suggested that different actors than were involved in 2006/07 needed to be given the responsibility for coupon distribution in the future, but there was no consensus concerning the appropriate actors. Among the various suggestions, different actors in the government agricultural services were mentioned most frequently (29% of the time); other suggestions ranged from religious leaders to farmers clubs to committees or workers formed especially for the voucher program. In addition to the suggestions on whom to involve, there were strong opinions on whom to exclude (25% of responses), with chiefs or village heads and TAs topping this list. . These findings were supported by respondents in the focus group discussions and case study interviews. Others (13%) offered suggestions on improving the rules about coupon allocation. Again, there was little consensus, with some proposing coupons for all, others wanting coupons only for the poor, others insisting that coupons go only to those with the financial resources to use them, and yet others asking for a universal subsidy. About 11% offered suggestions on what could be done to reduce fraud, with suggestions ranging from distribute vouchers door to door, put names on them, distribute original copies only, and pre-register recipients. About 5% of respondents mentioned the need to improve timing, with a general consensus that coupons needed to be distributed before the rains.

In response to a question about what could be done to improve the physical supply of inputs, the most common responses were better timing (28%) and better mix of products (13%). Some thought the system was ok as is (11%) and 12% offered no suggestion.

At the procurement level, suppliers supported the voucher program, but continued to stress that stability in the broad design and implementation characteristics of the program is much more important to their performance than the type of program itself. Stability in the program characteristics over several years should reduce the amount of annual planning and consultation needed, ensure early announcements of tenders, and enable efficient, low-cost procurement.

Common recommendations for addressing the weaknesses in the 2006/7 program offered by informants at the procurement and supply level include:

- Using the more flexible seed voucher approach for both seed and fertilizer;
- Improving voucher distribution so that it is earlier (June/July when cash is available from sales of other crops) and the control is in the hands of agricultural staff and Village Development Committees;
- Reducing ADMARC/SFFRFM share of the market (in a reasoned and predictable manner) and using saved resources to improve the quality of their services;
- Monitoring product quality (and increasing sanctions for violations) through joint action by professional organizations and government;
- Expanding the agrodealer network while insisting on registration to maintain quality controls;
- Sustaining maize prices through programs that will increase price stability (including research and incentives for development of maize processing industries).

7. Access to and use of coupons and inputs

The overall impact of the subsidy programme on production, food security and wider income and development is dependent not only on the volume of subsidised inputs sold, but also on who has access to them and how they are used. This section of the report addresses these issues using information from focus group discussions and the household survey. We begin by considering survey estimates of coupon distribution, and then move on to consider access and targeting; the timing of coupon distribution and input sales; availability of inputs; and the nature, extent and effects of irregularities.

7.1 Total coupons received

Total coupon disbursement and inputs sales as reported by the Logisitics Unit were reported earlier. We now compare these figures with estimates from the household survey.

Table 7.1 Reported Fertiliser Coupon Receipts by Region

	Coupons received per hhold			Total Coupons Received ('000)					
				with NSO/MVAC population est.			with MoA population est.		
	Urea & 23:20	CAN & D Comp.	Total fert.	Urea & 23:20	CAN & D Comp.	Total fert	Urea & 23:20	CAN & D Comp.	Total fert
Northern region	1.21	0.08	1.29	307	21	328	468	32	500
Central region	0.96	0.14	1.10	985	144	1,128	1,197	175	1,372
Southern Region	0.84	0.04	0.88	1,005	46	1,051	1,384	63	1,448
National	0.93	0.09	1.01	2,296	211	2,508	3,043	279	3,323
Lower 95% confidence limit	0.86	0.05	0.93	2,119	114	2,284	2,808	151	3,027
Upper 95% confidence limit	0.99	0.12	1.10	2,473	308	2,731	3,277	408	3,619

Source: AISS, 2007. Excludes coupon allocation in peri-urban areas.

Table 7.2 Total Household Estimates, Fertiliser Coupon Allocations and Estimated Coupon Redemptions by Region ('000)

	Rural / farm hholds ('000)				Coupon receipts	
	NSO/ MVAC	MoAFS	% diff-erence	Total distributed by MOA ('000)	Estimate from NSO/MVAC hh as % MoAFS distribution	Estimate from MoAFS hh as % MoAFS distribution
Northern region	255	388	52%	628	52%	80%
Central region	1,026	1,248	22%	1,675	67%	82%
Southern Region	1,196	1,646	38%	1,192	88%	121%
National	2,477	3,282	33%	3,482	72%	95%

Note: Coupon allocations exclude unaccounted supplementary coupons
Source: Calculated from data supplied by MoAFS and MVAC

The left hand side of Table 7.1 shows the coupons received per rural household estimated from the AISS. These estimates can then be multiplied by the estimated number of farm families to calculate total coupons received by region and nationally. This is shown on the right hand side of the table. However a difficulty arises as a result of substantial differences between rural population estimates used by the National Statistical Office and MVAC on the one hand and by the Ministry of Agriculture on the other.

The NSO/MVAC estimates of the total number of rural households are based on census population estimates and growth projections derived from intercensal growth rates. Ministry of Agriculture figures are derived from farmer registrations by agricultural field staff. There are very substantial differences between the two figures: the NSO/MVAC estimates just under 2.48 million rural families outside peri-urban and urban and protected areas in 2006 while the Ministry of Agriculture estimate is just over 3.28 million farm families (see table 7.2). The right hand side of table 7.1 therefore shows total regional and national coupon receipts in two sets, one calculated with NSO/MVAC population estimates and the other calculated with Ministry of Agriculture estimates. These are substantially different.

Table 7.2 shows the differences in population estimate by region in together with the total number of coupons distributed by the Ministry of Agriculture, shown first in '000 coupons and then as a percentage of the estimated number of coupons received, as calculated in table 7.1 with the two different sets of population figures. If the NSO/MVAC population estimate is correct then this suggests a very significant number of fertilizer coupons are not reaching the rural people for whom they are intended as the total estimates of coupons received is only 72% of coupons issued and redeemed, suggesting that 28% is unaccounted for. If however the Ministry of Agriculture farm family figure is correct then there is still a discrepancy between Ministry of Agriculture estimates of coupon redemption and the survey estimate, but this is much reduced – the survey estimate is increased to 95% of total coupon redemptions, within the 95% confidence limits of that estimates. It is interesting to note, however, that table 7.2 shows substantial regional differences in both differences in population estimates for the two sources and in the relationship between Ministry sales records of redemptions and survey estimates of coupon redemptions. This issue is discussed further in section 12.

Survey estimates of seed coupon distribution are not shown in table 7.1 as these are extremely low as compared with the Ministry allocations and are not consistent with reported purchases of subsidized seed. It is not clear why there is this discrepancy with seed coupons as there is abundant anecdotal evidence and evidence from suppliers regarding the large volume of seed coupons disbursed and redeemed. Survey estimates of subsidized seed sales appear to be more reliable, however. The survey estimate of overall subsidised seed sales is a little under 3,400 tonnes using the NSO population estimate and 4,500 tonnes using Ministry of Agriculture

estimates. The latter figure is very close to subsidized seed sales of 4524 tonnes reported by the Logistics Unit (see table 4.1).

7.2 Targeting

Actual receipt of coupons by different categories of people is the complex result of central allocations of 'base' and supplementary coupons between regions, districts and EPAs with different livelihood mixes (as described earlier), any diversions of coupons that prevent them from reaching communities, and then the process of allocation and access within the community, determined by formal and informal targeting criteria and processes and people's situations relative to these criteria and processes. We investigate targeting of households to receive coupons and access of different types of household by considering first household survey findings regarding the distribution of coupons between regions and within communities, and then relate these findings to information gained from focus group discussions held in February and June 2007 and from the AISP community questionnaire. Information from the household survey is used to investigate targeting primarily by comparing household characteristics with receipt of coupons. We begin by examining differences in coupon receipt between households with different characteristics, and then look at the same issue from a different perspective by examining differences in the characteristics of households receiving different amounts of coupons.

7.2.1 Receipt of coupons

Table 7.3 shows the number of coupons received per household by region, gender of household head and IHS2 poverty status. It is clear from this that sample households in the North are more likely to receive 'maize fertiliser' coupons and to receive more coupons than households in other regions. Distribution of 'tobacco fertiliser' coupons on the other hand is more favourable to households in the centre. These findings are consistent with MoAFS relative allocations to the regions. It is interesting to note although recipient households were intended to receive two coupons for 'maize fertilisers' (one for basal and one for top dressing), a large proportion of households received only one 'maize fertiliser' coupon, particularly in the centre and south (more than half of recipients).

Figures in table 7.3 are for households reporting receipt of fertilizer coupons. The percentage of households reporting purchase of subsidized fertilizer is lower than the percentage of households reporting receipt of coupons (by about 13%). This appears to be due to some farmers reporting subsidy purchases as cash purchases, but there are also complications of purchase of split bags due to sharing and other arrangements between households. For fertilizers the reported receipt of coupons appears to be a more reliable estimate of subsidy receipt than the report of purchase of subsidized fertilizer. The data in table 7.3 can be compared with mean and median estimates of 37% and 25% of households respectively receiving coupons as reported by key informants in the community questionnaire for the same EAs. These estimates are considerably lower than the 54% of households who reported receiving coupons in the household survey, and raise wider questions about the reliability of estimates of coupon receipt where these estimates are (a) obtained from key informants and (b) generally lower than those reported either in the household survey or in MoAFS reports.

Table 7.3 Fertiliser Coupon receipts by region, gender of head and IHS2 poverty status

	Urea and/or 23:20					CAN and/or D Comp.				
Coupons	0	1	2	>2	Mean/ recipient	0	1	2	>2	Mean/ recipient
North	38%	18%	37%	7%	1.9	93%	6%	1%	14%	1.2
Centre	45%	28%	21%	5%	1.7	93%	4%	2%	66%	2.1
South	49%	28%	19%	4%	1.7	97%	3%	0%	0%	1.1
National	46%	27%	22%	5%	1.7	95%	4%	1%	0%	1.7
Male headed	43%	27%	24%	6%	1.8	94%	4%	1%	43%	1.7
Female headed	54%	26%	17%	3%	1.6	97%	3%	0%	12%	1.3
Non-Poor (IHS2)	46%	27%	21%	6%	1.8	94%	5%	1%	0%	1.8
Poor (IHS2)	46%	27%	24%	4%	1.7	96%	3%	0%	0%	1.5

Looking at the distribution of coupon receipts, female headed households appear to be less likely to receive fertiliser coupons of all types, and to receive less per household. Limited differences are observed between households classified as poor and non-poor in the IHS2, but given the large number of people near the poverty line and methodological problems regarding seasonality and poverty measurement, this may not be a good variable for distinguishing between households with different livelihood characteristics. However subsidy recipients were generally more wealthy than non recipients (in terms of asset values, see section 7.2.2). Table 7.4 shows Urea & 23:20 coupon receipts by households classified using a cluster analysis of IHS2 data in the larger livelihood zones. Differences in coupon receipts are striking and suggest that targeting recommendations were followed to some extent in that there was a tendency for targeting to reach households which are productive full time farmers: 'wage' and 'remittance' households had higher proportions of households not receiving coupons, as did 'poor female headed' households; 'borrower', 'dimba grower' and 'large farm' households had higher proportions of households receiving coupons, and, for 'borrower' households, higher numbers of coupons per recipient). We discuss later questions about the effectiveness of this targeting pattern in achieving programme objectives.

Table 7.4. Urea & 23:20 coupon receipts by different household types

Coupons Hh type	0	1	2	>2	Mean/ recipient	Mean/hh
Poor female headed	53%	25%	19%	4%	1.7	0.8
Poor male headed	42%	31%	22%	5%	1.6	1.0
Poor dimba grower	54%	23%	19%	4%	1.7	0.8
Remittances	54%	25%	18%	3%	1.6	0.7
Dimba grower	38%	27%	30%	5%	1.8	1.1
Borrower	41%	30%	18%	12%	2.5	1.4
Large farm	40%	32%	20%	8%	1.9	1.1
Wage	50%	28%	18%	4%	1.5	0.8
Remote	41%	35%	24%	0%	1.4	0.8
All	45%	28%	21%	5%	1.7	0.9

Source: AISS and IHS2 data. See working paper for definitions of household types[28].

[28] Names of the different household types are intended to be largely self explanatory. 'Poor' households tend to have less land per household member and lower per capita expenditure and assets in the IHS2. 'Remittances' and 'wage' households are characterised mainly by significant remittance and semi-skilled or skilled labour income respectively, while 'borrowers' are characterised by significant engerprise borrowing, and with 'large farms' more land under tobacco. 'Remote' households tend to be further from a tar road and/or ADMARC market.

7.2.2 Receipt of coupons and household characteristics

Further insights into targeting were obtained by examining differences in household characteristics between households receiving the most subsidized fertilizer (from 100 to 600 kgs), those receiving .relatively small amounts of subsidized fertilizer (from 0.5 to 100 kgs) and those who did not receive any subsidized fertilizer. Mean household characteristics for these different groups of household are reported in table 7.5 (similar analysis is presented in Annex table A1, but with median rather than mean household characteristics).

Table 7.5. Mean Attributes of Households According to the Quantity of Subsidized Fertilizer Received in 2006/07.

	Households groups by amount of government subsidized fertilizer received **2006/07**			
Mean characteristics	Households receiving the most subsidized fertilizer (100 to 600 kgs/hh) N=562	Households receiving relatively small allocation of subsidized fertilizer (0.5 to 100 kgs/hh) N=562	Households not receiving subsidized fertilizer N=1,461	Total Sample N=2,585
Total household income (Mkw/hh)	30,711	22,374	29,017	27,938
Gross value of harvest (Mkw/hh)	19,391	12,658	15,719	15,859
Value of assets* and livestock (Mkw/hh)	49,352	42,452	34,756	39,639
Landholding size (ha)	1.67	1.20	1.14	1.27
Kgs acquired of subsidized government fertilizer	122	51	.	37.6
Kgs purchased of unsubsidized fertilizer 07	21	22	72	50.0
Subjective assessment of household economic standard relative to community (+ value indicates better-off)	+.15	-.22	-.35	-.21
Female headed household (%)	18.2%	26.4%	30.0%	26.7%
Days worked on ganyu labor 2006/07	7	15	10	11
Years of education of hh head	5	4	4	4
Adult equivalents in household	4.58	4.21	4.15	4.26
Can hh read a one page letter in English? (% yes)	61.2%	48.7%	47.4%	50.7%
Can hh write a one page letter in English? (% yes)	54.0%	41.6%	39.8%	43.3%
Expenditures for last 12 months on selected non-food items (Mkw/hh)	4,602	3,863	3,514	3,828
Social safety net cash benefits (Mkw/hh)	1,895	1,692	1,360	1,559

Note: 2,585 households include 2,426 households obtaining a maize harvest plus 159 households that harvested no maize. *Assets include mortar/pestle (mtondo), bed, table, chair, radio ('wireless'), sewing machine, kerosene/paraffin stove, bicycle, motor vehicle, value of animals owned, beer brewing drum, boat or canoe, fishing net, lantern (paraffin), ox-cart, wheelbarrow, hand sprayer, panga, hoe, axe, sickle, ox drawn plough/ridger, other draft equipment, and irrigation equipment.

The basic pattern that emerges from Table 7.5 is that the households receiving the most subsidized fertilizer are somewhat better off than non-receiving households in terms of their landholding size, value of assets, total incomes, and expenditures. Households receiving the most subsidized fertilizer also appear to have slightly higher education levels, and a smaller proportion of them are headed by a female. Some of these indicators (such as income and value of crop output) may be influenced by the fact that they received subsidized fertilizer. However, the mean value of household variables like landholding size, assets, and education are unlikely to have been affected in the short-run by production levels in the same season, and hence these bivariate

findings suggest that the fertilizer subsidies were generally received by households of relatively higher economic/livelihood standards.

To gain a more comprehensive picture of how the fertilizer coupons were allocated, multivariate statistical techniques were used to identify more precisely the attributes of receiving households. Probit models were estimated for the full national sample and for each region. Detailed findings are presented in Annex table A2[29]). The results indicate the following:

1. Female-headed households were less likely to receive fertilizer coupons than male-headed households. In the Northern Region, for example, the probability of receiving fertilizer coupons declined by 11.1 percentage points (from roughly 45% to 34%) for female-headed households. Female-headed households were less likely to receive fertilizer coupons in all regions.
2. Household landholding size was positively and significantly related to receipt of fertilizer coupons. For example, a household with 3 hectares in the Northern region was 14 percentage points more likely to receive fertilizer than a neighbouring household with one hectare. A household in the Southern region with 3 hectares was 5.4 percentage points more likely to receive fertilizer than a household with one hectare.
3. Households ranking themselves in the bottom economic tercile relative to their neighbours were less likely to receive subsidized fertilizer. Households ranking themselves in the top economic tercile were more likely to receive subsidized fertilizer, but this relationship was statistically significant only in the South. Such households were 23 percentage points more likely to receive coupons. Holding all other values at their means, this indicates that households in the top economic group in the South had a 61% probability of receiving subsidized fertilizer, compared to a 38% probability for households in the bottom economic group.
4. Households receiving the most social safety assistance were also more likely to obtain fertilizer coupons, although this relationship is highly significant only in the Central Region. This might suggest that other social safety net assistance in this region is also targeted to relatively better-off smallholder farmers.
5. The proximity of households to tarred roads, towns and ADMARC depots is sometimes statistically related to whether a household received subsidized fertilizer, but with a few exceptions, these effects are small. For example, a household 50 kms from an ADMARC depot in the Southern region is 16 percentage points less likely to receive subsidized fertilizer than a household only 10 kms from an ADMARC depot, other factors held constant.
6. Whether or not a Member of Parliament resides in the community or recently visited the community does appear to affect the probability of households in that community receiving fertilizer, but in different ways in the various regions. In the South, households in communities in which an MP resides were 27.5 percentage points more likely to receive fertilizer subsidies than households in other communities. This probability rises by another 9.7 percentage points if the MP visited the community in the past 6 months. By contrast, an MP's residence in the community in Northern region actually reduced the likelihood that households in that community would receive fertilizer. In the Central region, there was no relationship between MP representation and households' receipt of fertilizer subsidies.

The probit model results in Annex Table A2 only identify the factors associated with whether a household received subsidized fertilizer or not. To examine factors influencing how much a household received, we run truncated OLS models on the sub-sample of households receiving fertilizer. These model results are reported in Appendix Table A3. The results indicate the following:

[29] Coefficient estimates are marginal probabilities. A statistical test of whether the findings could be pooled across the entire sample was rejected, indicating that there were differences across regions in targeting criteria.

1. Even though female-headed households in the North are less likely to receive subsidized fertilizer than male-headed households, when they do receive it, they tend to get higher quantities (22.4 kgs more on average) than male-headed households[30]. Female-headed households in the Central region are not only less likely to receive subsidized fertilizer; when they do receive it they get on average of 18 kgs less than male-headed households. There is no discernable difference in the south in the amounts received by male-headed and female-headed households who received fertilizer subsidies.
2. Neither household size nor the age of the household head has much influence on the quantity of fertilizer received by coupon recipients.
3. Landholding size is positively related to the quantity of subsidized fertilizer received in the Central and Southern regions, but not in the North. In the South, a household with 3 hectares received, on average, about 18 kgs more than a household with 1 hectare, other factors held constant.
4. Households considering themselves to be in the top economic tercile were likely to have received between 14 to 35 kgs more subsidized fertilizer than households in the middle or bottom economic tercile.
5. Households in Northern region communities in which a MP has visited in the past six months received, on average, 27 kgs more subsidized fertilizer than households in other communities, other factors held constant. Similarly, if a MP resides in the community, households in that community received, on average, an additional 17.9 kgs of subsidized fertilizer. No significant relationships were observed between MP residence/visit and the quantity of fertilizer received by households in the Central or Southern regions.

Overall, the modelling results indicate that households with greater landholding sizes and relatively better economic standing were more likely to receive subsidized fertilizer in 2006/07 than relatively small and worse-off farmers. The results also show a relationship between political representation and the allocation of fertilizer coupons at the community level, although there was no clear consistent pattern across regions and in the Central region, no such relationship was observed.

7.2.3 Insights on targeting from qualitative studies

The household survey findings regarding the distribution of coupons between regions and within communities are largely consistent with findings from qualitative studies in February (reported in the March 2007 report) and in June and from the community questionnaire conducted alongside the household survey.

The broad conclusions from the February focus group discussions and key informant interviews was that targeting criteria were extremely variable, with diametrically opposite criteria used in different areas. Some of these expressly include the poor, whereas others would exclude them. Similar results were obtained in the community questionnaires. The main intended beneficiaries of the programme were identified by the key informants as 'all farmers' in 34% of EAs, 'more productive farmers' in 8% of EAs and 'the poor' in 81 of EAs. Qualitative field work also revealed that targeting criteria were often incapable of identifying equivalent numbers of beneficiaries to match the coupons available, and in some areas people were formed into lines, and those at the back were unlucky. There are a number of ways in which different criteria pose particular difficulties for poorer farming households in accessing and using coupons. A number of focus group discussions reported that in 2005/6 there had been greater opportunities to be employed on safety net programmes to earn cash for subsidised fertiliser.

There is little or no evidence from the qualitative data that decisions about how many coupons go to each village are linked to existing information about poverty levels, vulnerability and production systems. A key concern of respondents – both key informants and beneficiaries – was that the decision-making process for coupon allocation at all levels was too political. In these cases the

[30] Another way of looking at this is that a female headed household that is receiving subsidised fertiliser has a 45% probability of getting one more bag of fertiliser than a male headed household.

targeting of fertiliser created a great deal of tension within and between villages. In Kasungu many respondents accused village heads of diverting coupons and sharing them with friends and relatives. There were a number of cases of headmen and village heads being arrested. Elsewhere village heads expressed fears of being arrested for making mistakes – some said that they had received fewer books or coupons than they were officially meant to receive whilst others said that they did not understand the targeting criteria nor how to distribute such a small number of coupons to so many people. The chain of distribution of coupons (described earlier) appeared long and complicated and there were examples of diversion at each of the different levels in the chain, although it is not possible to assess the overall extent of diversion.

It was widely argued that greater involvement of local agricultural extension workers in targeting would greatly improve the programme. It was suggested that agricultural extension officers knew:

- Which households were the poorest
- Which households could utilise new technologies (e.g. hybrid seeds and synthetic fertiliser; and
- Which fertiliser is appropriate for which households (especially fertiliser preferred for maize versus tobacco).

There were fewer objections to targeting where agricultural extension officers had been influential in encouraging farmers to form groups through which to save for fertiliser (see Box 7.1). In these cases, cooperation between group members was having a positive effect on social cohesion in villages and there was much less tension surrounding the subsidy programme than elsewhere. Men and women appeared to be equal members of savings groups though more in-depth work is required to understand if this is really the case. Groups also appeared to help foster innovation and the uptake of technology among the poorest farmers.

Box 7.1 Farmers savings groups in Dedza

In Dedza, farmers were encouraged to organise themselves into savings groups. This was a mechanism by which they could save and thereby demonstrate their capacity to purchase fertiliser at subsidised prices. It also enabled households without resources to buy fertiliser, even at the subsidised price, to pool resources. For example, whilst households hoped to receive three coupons (for seed, NPK and Urea), some did not have enough money to redeem all three bags. Rather than be cut out of the programme completely, fellow club members shared the inputs. No club members received only one coupon.

I was considered to be a beneficiary of the subsidy because I was one of the members of clubs found in the village. It was quite automatic that each and everyone who was a member of the club was to benefit from the subsidy programme. When the Village Headman called for a meeting and said that all those that are interested to buy fertilizers should be in clubs, I saw this as an important thing. I have land at the dambo and also upland. Last season, my friends that applied the fertilisers harvested well that myself on the same size of land. I learnt something from this and I thought it was good that I should try.

Of course, benefits were there. Firstly, I learnt the new farming methods because all the people in the clubs were being advised by the Agriculture Officials. For the first time, I used the Sasakawa method. Secondly, I have never bought fertilizer in my life on subsidized prices because it is quite expensive but with the subsidy, I managed to buy. Thirdly, I have learnt to work in groups which I used to think that I can not manage considering that people always have different views to things but however, I managed. Lastly, I harvested a lot and the maize that I have, I am sure it will keep me until the next harvest.

(Case study respondent, Dedza)

Two key issues emerge from the qualitative data regarding the targeting of beneficiary households.

1. Combining poverty / vulnerability and productivity indicators for targeting

The second round of focus group discussions and key informant interviews found that across all districts household targeting was broadly similar (More variation was found in the first round of focus group discussions – in terms of how targeting was conducted if not in the formal definition of criteria). The most common list of criteria were in line with the central definition of targeting criteria, that coupons should be issued to:

- The poorest and most vulnerable households (usually measured by food stocks or by social categories – e.g. widows, elderly, orphans, disabled)
- Those with access to land (ignoring those who do not own land but who rent land)
- Those with access to cash (to pay the K950 to redeem the coupon)
- Those with the capacity to adopt / utilise technology

In all cases the criteria were a combination of poverty and productivity indicators. However, there was very little discussion of the potential contradictions between the two sets of indicators and it is also difficult to tell how far these different criteria were followed. It seems that female-headed households were less likely than male-headed households to receive a coupon (see discussion of household survey findings above), and this implies that some of the targeting criteria (for example access to land) skewed the distribution of coupons towards men, whilst targeting criteria that ought to have resulted in the targeting of female–headed households (widows, the poorest and most vulnerable) do not appear to have been used as much and/or may have been over-ridden by other criteria.

2. Concentration versus Dilution?

This was a second area in which respondents did not acknowledge a potential contradiction or trade-off, but it is an important issue raised in the March 2007 report and which needs to be revisited: should the programme spread but dilute the available coupons by sharing them among a broader number of households, or should it concentrate them among a smaller number of beneficiaries for greater effect? Follow-up questions then need to ask what 'greater effect' should be prioritised (for example household or national food security) and where (geographically and within communities) would targeted concentration deliver the greatest effect? At the local level many beneficiaries commented on the one hand that one coupon (or a coupon shared between two or four beneficiaries) was not enough for the land holdings of most households, and that it was inappropriate – i.e. that applying only NPK had significantly less impact on yields than applying both NPK and Urea. On the other hand, they also argued that more households should benefit from coupons.

The general perceived trend is that more households received coupons this seasons but that beneficiaries received fewer than last year (i.e. the increase in the total number of beneficiary households was substantiallly higher than the total number of coupons). An increased number of beneficiaries in 2006/7 is supported by data from the household survey (which found that 54% of households received coupons in 2006/7 compared with 30% in 2005/6) but there was little difference between the two seasons as regards the average number of coupons received per recipient

In some places it was argued that the impact of the subsidy on production / yields was particularly good when people received supplementary coupons, suggesting that concentration is appropriate. Elsewhere, it was clear that political expediency led to dilution – particularly when those responsible for targeting were afraid to exclude anyone. In this case the impacts on production were thought to be less but the programme gained wider popularity.

In Ntcheu, for example, it was argued that In Kanama Village according to what the local leaders (respondents) decided, people did not get two types of fertilizer. Some recipients could get only urea while others got 23:21:0 fertiliser only. There was no way the maize could produce bumper yields with only one type of fertilizer said the respondents.

However, respondents in Ntcheu also noted that the impacts on food security were greater and more progressive if the coupons were diluted - almost everybody knows that inputs subsidy programme has helped quite a lot in reducing hunger throughout the entire nation apart from a few areas where other factors came into play.

The implication is that determination of the appropriate balance between concentration and dilution may depend on whether the objective of the inputs subsidy programme is household food security or increases in productivity. Whilst there are linkages between the two, they are not automatically or necessarily complementary. This issue will be raised again in discussion of

Livelihood and Rural Economy impacts and in the Conclusions and Recommendations section of the report.

7.3 Access to inputs

Access to subsidised inputs required a coupon and cash to purchase the input (except in the case of maize seed). It was noted in the March 2007 report that these conditions place particular difficulties on access by the poor and by women, and the determination of people to get inputs demonstrates the extent of poor peoples' willingness to invest precious time and money in trying to get coupons, and hence demonstrates poor peoples' demand for fertiliser.

Households who received coupons found cash in a number of ways. Table 7.6 summarises reports by recipients of coupons in the household survey, though problems of fungibility often make it difficult to identify precisely how a cash expenditure is financed. The table shows that most households used general savings and ganyu was also important. Investigation of differences by region or household characteristics showed some variation in the relative importance of different sources, but no striking differences,

Table 7.6 Sources of cash for input purchase (% coupon recipient households)

	Savings	Loan	Gift	PWP/ Safety net	Ganyu	Other
Northern region	49%	3%	6%	5%	27%	11%
Central region	61%	5%	3%	3%	22%	6%
Southern Region	48%	3%	5%	3%	26%	14%
National	54%	4%	5%	3%	24%	10%

Source: AISP

Focus group discussions were generally consistent with the findings in table 7.5 but yielded extra insights. In Mzimba, for example, focus group discussions revealed that in common with other districts, many households in Mzimba got cash through ganyu (wage rates had increased on last year) and selling livestock, but that remittances from relatives in South Africa were also important – this was not mentioned in other districts. Safety nets were not considered a good source of cash. There were some small programmes that distributed food (this could free up other household cash) but no cash-for-work programme. In Lilongwe, households got cash by selling crops and livestock. Safety nets were not reliable as sources of income for coupons. Tobacco production was important for many households but in 2005/6 prices were low and selling tobacco was not a good way to get cash to redeem coupons. In Rumphi, it was reported that some households with two coupons sold one to get cash to redeem the second or they shared a coupon (and half of the fertiliser) with someone who could pay the cash. For women, income generating activities, particularly beer brewing, was used to save cash.

In general, the previous good harvest meant that many households still had food stocks and this had reduced expenditure on food and increased the availability of cash in many households. For households whose food stocks had already run out, the most important way of accessing cash was reported as ganyu, though some households depended on transfers or remittances from relatives. However, as discussed elsewhere, good maize supplies from the 2005/6 harvest had generally increased demand and reduced supply of ganyu, and raised wages. Of greatest concern was the sale of livestock to purchase fertiliser, though it was not clear whether these sales were distress sales that meant a permanent loss of productive assets, or whether households still maintain some livestock in spite of these sales.

7.4 The importance / potential of safety nets

Coverage of safety net programmes was patchy but in around half of the locations where qualitative research took place, safety nets were important. In most of these cases the programmes were public works programmes. Where payments were in cash, safety nets enabled

households to redeem their coupon but where payments were in-kind then there were fewer synergies between the two programmes. Where the payment was food, for example the Malaysia Dam Project in Kasungu, households still had to do ganyu to get access to cash. Safety nets and ganyu tended to be incompatible in their timing – it was not possible to do both at the same time. Elsewhere safety nets paid beneficiaries in inputs (fertiliser and seed). In this it was not clear whether the two programmes were in direct competition or whether the safety net programmes were targeting those who did not receive coupons.

Timing of safety nets was also critical. Households complained that safety net programmes tended to be ad hoc and unpredictable which made it difficult for them to plan or rely on safety net income to utilise their coupons. In Lilongwe (rural), beneficiaries had to choose between working on the MASAF cash-for-work programme doing road construction or working to prepare their own land.

The main lesson regarding safety nets is that their impact depends on their design. Thus,

- Safety nets that are ad hoc or unpredictable in their coverage have limited effects on access to or utilisation of coupons.
- Safety nets providing cash can enable access to and utilisation of coupons better than those providing in-kind payments.
- Safety nets that involve public works can divert labour from farmers' own agricultural activities and undermine the effectiveness of coupons.

On the whole, it appeared to be accepted that there was no point targeting coupons to households that could not find K950 in cash. However, there was no discussion of what alternative means of support might be available or appropriate for those households with no access to cash. A critical policy choice emerges here with regard to the linkages between safety nets and the inputs subsidy programme:

- Can and should safety nets be designed and timed to support the fertiliser subsidy programme, by being timed not to conflict with farm labour requirements and by providing cash at the time that households are receiving / redeeming coupons?

Or:

- Should safety nets be designed and timed to compete with the inputs subsidy programme (by requiring work at the same time as households are preparing land, applying subsidised fertiliser, and by providing in-kind inputs that do not facilitate coupon use) in order to ensure support for and coverage of the poorest households that are not part of the input subsidy programme?

7.5 Access to Suppliers

There was consistent evidence from focus group discussions of difficulties in accessing suppliers, with long queues, stock-outs and the need to pay 'tips' to market staff to get fertiliser. These are discussed further below. We note here, however, that the household survey data provide lower estimates of time and expenditure in incurred in buying inputs. Table 7.7 presents summary data on reported distances to buy inputs, time spent buying inputs, and costs for transport and miscellaneous expenses. This does not show major differences between regions, but examination of results from different livelihood zones and districts shows more variation. Similar results were obtained from key informants with the community questionnaire. The greater distances to markets and larger differences in distances to ADMARC and private selling points tend to be in less populous areas and are thus masked in aggregation at national and regional levels. Community questionnaire reports that around 35% of EAs sampled nationally relied on only one outlet for

redeeming fertiliser coupons (57% in the north, 50% in the south and only 11% in the centre), with around 90% of main outlets being parastatals (across all regions). The greater density of private outlets redeeming coupons in the central regions is evident in 43% of EAs in the centre reporting private outlets as the second main outlet for redeeming coupons (as compared with 21% in the North and South).

Table 7.7 Reported distances to buy inputs, time spent buying inputs, and costs for transport and miscellaneous expenses.

	Hours travel & waiting		Transport and misc expenses (MK)		Distance to nearest ADMARC (km)		Distance to nearest private selling point (km)	
	mean	median	mean	median	mean	median	mean	median
Northern region	9	7	293	150	8	5	9	5
Central region	15	7	271	100	7	5	7	5
Southern Region	12	7	208	150	6	5	7	5
National	13	7	247	150	7	5	7	5

Source: AISS, 2007

The key informant interviews and focus group discussions suggest that in many places there does appear to have been a supply response in terms of a reported increase in suppliers of subsidised fertiliser and seed in 2006/7 as compared with 2005/6, but this was geographically patchy. New (private sector) supplies remained concentrated in bomas or larger commercial centres and remoter locations continued to depend on ADMARC. Larger commercial centres benefited from increased competition[31]. In remoter locations, ADMARC centres often ran out of stock and were slow to replenish when demand was greatest. Transport difficulties, both upstream and downstream of supplier outlets, continue to reduce the penetration of suppliers into rural areas. Upstream, heavy rains in Rumphi and poor roads prevented fertiliser getting through to suppliers once the rains had started – and probably contributed to the low levels of stocks in remote ADMARC centres. Downstream, in almost all districts there was congestion at selling points. Men queued for up to a week to redeem their coupons, and women's role in redeeming / controlling coupons was limited because it was too dangerous for them to sleep in the open outside suppliers premises. ADMARC remained important for women redeeming coupons as they did not have to travel so far.

In 2006/7 the coupons specified which type of fertiliser they could be redeemed against. However, depots often did not have the type of fertiliser specified on their coupon, or farmers were not allocated the coupon they preferred. As a result they sometimes applied D Compound to maize rather than the preferred 23:20. These problems led to arguments that coupons specific to particular types of fertiliser disrupted household planning and reinforced supply problems for suppliers, and that more versatile coupons redeemable against a range of input types would overcome some of the input access/ supply problems faced by farmers and suppliers.

The findings regarding access to suppliers and to specific types of fertiliser and how far these are strengths or weaknesses of the programme again raise questions about the objectives of the programme – in particular whether the programme seeks to address household level food security, particularly among the poorest and most vulnerable groups, or whether it seeks to drive productivity increases and greater market integration in smallholder agricultural production.

[31] Both these observations support findings from the study of input suppliers as reported earlier in section 6. However community questionnaire responses show no evidence of perceived increases in fertiliser suppliers in the last 3 years(except perhaps in the central region), and very weak evidence for an increase in seed suppliers (in the north and centre but not in the south).

7.6 Timing

Timing of farmers' purchase and use of seeds and fertilisers is a critical determinant of other aspects of programme implementation and of its production, livelihood and food security impacts. Seeds and basal dressing fertilizers (NPK and Compound D) should be in the possession of farmers by the start of the rains, to allow early planting. Two processes have to be completed for farmers to obtain subsidized inputs: coupons have to be distributed to them, and inputs have to be distributed to local markets. The March 2007 report discussed in detail the timing of major events leading up to and during the implementation of the programme, and concluded that there were delays in both these processes, and both were responsible for problems with late sales (particularly of NPK in the Southern region) and queues and stock outs in markets. Delays in almost all aspects of the programme were a major concern expressed by many key informants and in focus group discussions groups in February. Table 7.8 shows reported timings of receipt of coupons. Similar results were obtained from key informants with the community questionnaire.

Table 7.8 Timing of receipt of coupons by recipients (% coupons)

	October 2006	November 2006	December 2006	January 2007	February 2007
Northern region	4%	36%	45%	13%	2%
Central region	12%	49%	31%	7%	1%
Southern Region	16%	54%	24%	5%	1%
National	13%	49%	30%	7%	1%
Cumulative (national)	13%	62%	92%	99%	100%

Source: AISS, 2007

7.7 Availability of inputs

The situation in 2006/7 was much better in most places than in 2005/6 as regards availability of inputs in markets, as a result of involvement of private sector distributors in fertiliser sales and a larger number of seed sellers. However there were still problems in some areas as regards stock outs and lack of inputs for cash purchase. Discussion groups and key informants reported these difficulties mainly with ADMARC markets and in areas where there were not private sellers. In some areas stock in markets did not match demand from households with coupons, so that households had to travel to more distant markets or coupons were exchanged for a different fertiliser. Household survey data do not show any consistent or substantial differences across different suppliers as regards the extent to which farmers were not able to get the inputs they wanted, with 90% of coupons obtaining the inputs that farmers wanted.[32] Community questionnaire reports suggest that about 75% of ADMARC and private suppliers and 100% if SFFRFM outlets suffered from frequent major queues, but that queues were less of a problem for ADMARC markets in the north. Stockouts varied by region, supplier and type of input, and were generally more of a problem in the south, particularly with SFFRFM, and were less of a problem with seed than with fertiliser.

7.8 Irregularities

A number of irregularities in the 2006/07 input subsidy programme were reported in the media, mainly with regard to fertilizer rather than seed coupons. These irregularities occurred at different levels in the distribution chain and it was concluded in the March 2007 report that although irregularities certainly happened, and constant vigilance and firm action is needed to limit this, they did not prevent the bulk of the input subsidy getting to different households in rural areas. Survey estimates of household access to fertilisers reported earlier support this view. Nevertheless there

[32] This is supported by data in Table 6.5 which shows no statistical difference among types of outlets in terms of stock outages or inadequate supplies of a particular fertiliser. On the other hand, ADMARC had a statistically higher rate of stock outages for seed. Availability of desired seed types was also less of a problem in the south than in the north.

continues to be concern about such irregularities, and in particular key informants and focus groups raised concerns about targeting ands access to coupons (discussed above) and the need to pay 'tips' for access to coupons or to redeem fertilisers.

With regard to payments made to receive coupons, survey data show that overall 5% of coupons were reported to have been accessed with some payments (2% in the north, 7% in the centre and 4% in the south). The major specified recipients of these payments (38%) were traders (roughly equal numbers of payments were made to unspecified others, more in the north where no payments were reported to traders). About 20% of payments were made to traditional or village leaders and VDC members. There were few instances of payments to agricultural extension staff. Median and mean payments for a coupon were MK600 and MK1,000 respectively. Median payments to traders were MK850 with a mean of MK1,050. Reported payments were highest in the centre (median MK1,000),considerably lower in the south (median payments MK500 per coupon) and very low in the North (median MK5 per coupon, mean 150MK). Community questionnaire data did not show any regional pattern but suggested median prices of around MK1000 where coupons were being traded.

In the household survey very few cases were reported of selling of coupons by respondents (0.3% of coupons received).This is not surprising given the sensitivity of the issue, and the survey is likely to underestimate this. However 8% of households receiving one coupon and 14% of all households receiving any coupons reported total fertiliser use less than the amount of subsidised fertiliser use. While some of these cases may result from errors in recall and recording of fertiliser use, it is likely that a significant number represent sales or gifts of coupons to others[33]. Key respondents reported higher levels of reselling of fertiliser in the community questionnaire, with 10% of EAs reporting it happening commonly, 13% reporting it as occurring rarely, and 77% indicating that it never happened. Reported occurrence of reselling was higher in the central region (particularly within the Kasungu-Lilongwe Livelihood zone) with just under 60% of central region EAs reporting that it never occurred (only 46% in the Kasungu Lilongwe Plain) and 19% of EAs reporting that it was common (25% in the Kasungu Lilongwe Plain).

The long queues to buy fertiliser at many markets encouraged the payment of tips to enable people to get to the front of the queues in a number of locations. Qualitative studies indicated that whilst people knew the price that they were to pay for fertiliser (K950), they reported that they sometimes paid more – either to the VDC in order to receive a coupon, or at the supplier when redeeming their coupon. There was no evidence that private suppliers were more or less likely to take bribes than ADMARC. In general, the quality of supplies was perceived to be better at ADMARC – with one private supplier in particular accused of adding stones and dirt to fertiliser – but the level and speed of service was considered better in private suppliers than in ADMARC. This raises questions about how to regulate for quality and standards under a combination of private and parastatal suppliers.

Most respondents in the household survey did not have to pay any 'tips' to market staff to redeem their inputs, but a tip was paid for redemption of about 20% of fertiliser coupons, and there was substantial variation in the extent of this between different suppliers. The percentage of coupons requiring tips and mean redemption price were lower at ADMARC/SFFRFM than at all other distributors, as shown in table 7.9, but this masks considerable variation between different distributors, with some having slightly lower reported incidence of tipping than ADMARC/SFFRFM [34]. Community questionnaire data suggest that payment of tips was less common in ADMARC than SFFRFM, and less common in the North than the South and Centre.

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[33] As noted earlier in section 7.2, qualitative study informants in Rumphi reported that some households sold a coupon or a share of a coupon to get cash for coupon redemption.

[34] However it should be noted that with much larger quantities of fertilizer were distributed through ADMARC/SFFRFM than through other suppliers, the aggregated impact of 18% of coupons redeemed by ADMARC/SFFRFM is probably much greater in terms of money than the 27% redeemed at other distributors.

Table 7.9 Payment of tips to purchase subsidised fertilisers, by supplier

	% coupons paid tips	Median price/ bag (MK)	Mean price / bag (MK)
ADMARC/SFFRFM	18%	950	983
Others	27%	950	1,223
All	20%	950	1,029

Source: AISS, 2007

7.9 Technical advice

Proper use of subsidised seed and fertiliser is an important determinant of the impact of the AISP. Table 7.10 compares reported receipt of advice by AISS respondents with reported receipt of advice by IHS2 respondents in 2004.The percentage of respondents reporting receipt of advice in the 2006/7 season is higher than in the IHS2 survey in 2004, but a lower proportion of the advice was perceived as useful, with the result that the percentage of farmers reporting receipt of useful advice is similar across the two surveys.

Table 7.10 Reported receipt of advice from Field Assistants (FAs)

		% hh received advice		% hh by usefulness of advice			% all farmers
Advice from FA		No	Yes	Useless/ not useful	Average	Useful	Useful
IHS2	new seed varieties	91%	9%	8%	5%	87%	8%
	fertilisers	90%	10%	11%	6%	83%	8%
AISS	new seed varieties	77%	23%	38%	13%	49%	11%
	fertilisers	78%	22%	38%	12%	50%	11%

Source: IHS2 2004 and AISS 2007 data

8. Economic cost benefit analysis

8.1 Introduction

Economic cost benefit analysis is concerned with estimation of the value of incremental benefits and costs of the programme to the national economy. The method is grounded in static analysis of consumer and producer benefits resulting from changes in costs of production, quantities produced and consumed, prices, and hence gains to producers and consumers. The analysis is static, however, and largely ignores dynamic growth impacts, either positive or negative, and poverty reduction and social protection effects. Economic cost benefit analysis of the subsidy programme is also very challenging, as there are considerable methodological difficulties (mainly in assessing what benefits there are from such a programme and how they might be formally assessed), and considerable data difficulties (estimates are required of incremental costs to government and farmers, of incremental production, and of prices and values of incremental production, estimation of the latter being particularly problematic, as discussed in annex B). These difficulties interact as different methodological approaches make particular demands for data, while data and analytical resources limit the methodologies that can be used.

The result is that it is not possible to avoid considerable uncertainty regarding the economic benefit: cost ratio in the evaluation of the 2006/7 programme. The purpose of the evaluation is not, however, to provide definitive and precise analysis of the benefits and costs of the 2006/7 programme, but to set out the likely benefits and costs of the programme if it were to be implemented in the future in order to (a) inform decisions about whether or not the programme should be implemented in the future, and (b) identify critical design and implementation issues that

will affect the efficiency and effectiveness of any future programmes that are implemented. Primary value of economic cost benefit analysis in these circumstances is therefore in investigating the sensitivity of programme efficiency to external and management variables We therefore set out a range of cost:benefit ratio estimates for a range of different conditions and assumptions, identifying the main variables effects in determining the net benefits, effectiveness and efficiency of the programme.

We also report on analyses for two separate time periods. The first focuses on an ex post analysis of the 2006/7 programme. It is recognised, however, that this is not particularly useful for policy decisions about future programmes, which have to take account of the possibility of different market conditions. We therefore conduct a second, *ex ante*, analysis which considers what returns such a programme might have if implemented in the future, with estimates of input and output prices in the next 5 years or so.

Full information on the data, assumptions and methods used in the cost benefit analysis is provided in Annex B. As noted above, particular difficulties are faced in determining appropriate prices for valuing incremental maize production, and we therefore conduct both the *ex post* and *ex ante* analyses using two different estimates of price levels, to show the range of returns associated with these prices and the sensitivity of results to maize prices. Issues in determining maize prices are discussed in annex B.

8.2 Benefit Cost Ratios, ex post analysis of 2006/7 season

Table 8.1 sets out the benefit cost ratios calculated for the 2006/7 programme with the estimates of benefits and costs outlined above and in Annex B.

Table 8.1 *Ex Post* Benefit: Cost ratios for 2006/7 AISP

Benefit: cost ratios, maize price = $ 147.5 /tonne

Displacement ----->		50%			40%			30%		
Grain:N ratio------>		12	15	18	12	15	18	12	15	18
Seed	70.9	0.76	0.92	1.08	0.77	0.94	1.10	0.78	0.95	1.12
yield	118.2	0.85	1.01	1.17	0.85	1.01	1.18	0.85	1.02	1.19
	163.4	0.93	1.09	1.25	0.92	1.09	1.25	0.91	1.08	1.25
Mean B:C ratio		0.85	1.01	1.17	0.85	1.01	1.18	0.85	1.02	1.19
Fiscal efficiencies		-0.13	0.01	0.14	-0.15	0.01	0.18	-0.18	0.02	0.21
			0.01			0.01			0.02	

Benefit: cost ratios, maize price = $ 160.0 /tonne

Displacement ----->		50%			40%			30%		
Grain:N ratio------>		12	15	18	12	15	18	12	15	18
Seed	70.9	0.83	1.00	1.17	0.84	1.02	1.20	0.85	1.03	1.21
yield	118.2	0.92	1.09	1.27	0.92	1.10	1.28	0.92	1.10	1.29
	163.4	1.01	1.18	1.36	1.00	1.18	1.36	0.99	1.17	1.36
Mean B:C ratio		0.92	1.09	1.26	0.92	1.10	1.28	0.92	1.10	1.29
Fiscal efficiencies		-0.07	0.08	0.23	-0.08	0.10	0.28	-0.09	0.12	0.33
			0.08			0.10			0.12	

A number of points of interest should be noted regarding this table.

There is considerable variation in benefit : cost ratios, the lowest being 0.76 and the highest 1.36. Although these depend upon the price used to value the maize, there is greater variation as a result of differences in assumptions made about incremental production, and indeed these differences in assumptions lead to variation from 0.76 to 1.25 if incremental maize production is valued at $147.5 per tonne and to variation in B:C ratios from 0.83 to 1.36 if incremental maize production is valued at $160 per tonne . The benefit : cost ratio is therefore highly sensitive to the quality of management: effective management of the programme with early delivery of fertilisers, seeds and coupons and with effective use of inputs by farmers is essential if the programme is to yield a positive return[35]. Since effective application of fertiliser can raise returns to fertiliser considerably above 18 kg grain per kg of N, this suggests that effective extension services also have an important role to play in raising returns to the programme.

Annex B provides rationale for the choice of retail maize prices for the two scenarios presented above. The chosen prices of $147.5 and $160 per ton under the scenario of a good production season imply a significant increase in maize prices over historical average prices. The mean and median Lilongwe monthly retail maize prices between January 1994 and December 2007 have been $154 and $143 per tonne. Lilongwe prices at the 10th , 25th ,50th, 75th, and 90th percentiles were $83.0, $103.7, $142.8, $169.1, and $245.2, respectively, over this 1994 to 2007 period. The 2007 harvest, by contrast, was considered an exceptionally good rainfall year with a record level of maize production, implying that prices at the low end of the price distribution should be used for a good production year if historical prices are the best guide to current conditions. However, there

[35] These calculations assume efficiency losses of 15% of the value of displaced fertilisers. This loss would be higher, however, if farmers usually purchase and apply fertilisers earlier than they are able to if the subsidy causes them to delay application and thus get a lower response to the fertiliser. In such circumstances higher rates of displacement would lead to lower benefit : cost ratios than indicated where 12 kg grain per kg nitrogen is achieved by subsidised fertiliser.

were producer and consumer subsidies lowering maize prices in a number of years during the 1994-2006 period, and there are also indications of structural increase in maize prices in recent years, such that historical averages may provide a somewhat inaccurate guide to current and future with and without subsidy prices. Based on the rationale provided in Annex B, prices of $147.5 and $160 were used as alternative estimates of average with and without subsidy prices in a good rainfall year in the current supply/demand conditions in 2007/08.

Based on these findings of benefit-cost ratios ranging from 0.76 to 1.36, high, indeed very high, returns can be achieved with good programme management and with higher incremental production, just as very poor returns can be achieved with poor program management and low incremental production. Finally, fiscal efficiencies vary widely both with the effectiveness of use of incremental inputs and also with displacement rates. Although the benefit : cost ratio does not change much with higher rates of displacement, fiscal efficiencies do vary considerably. These are calculated as net economic or social benefit from the programme (ie benefits less costs) divided by the total fiscal cost of the programme (including donor expenditures). This provides a measure of the gain to the country per unit of government funds utilised. As expected, highest fiscal efficiency is found with low displacement and high grain ratios and gains from improved seed. It should be noted that the lack of sensitivity of benefit: cost ratios to changing displacement rates is the result of the effectiveness of the seed subsidy in promoting incremental production and limited estimates and hence analysis of displacement in seed purchases. Other programme benefits arising through maize price and wage rate impacts are also sensitive to displacement effects (these are not accounted for in the economic benefit cost analysis but discussed in section 9).

8.3 Benefit Cost Ratios, ex ante analysis

Table 8.2 below sets out the benefit cost ratios calculated for the ex ante analysis, with benefits and costs estimated as outlined earlier. These are presented with three different assumptions about implementation: good implementation (with low displacement and high grain to nitrogen responses); moderate implementation (with intermediate displacement and grain to nitrogen responses); and poor implementation (with high displacement and low grain to nitrogen responses). Three different maize price scenarios are used, with, for each, assumptions about prices associated with different types of season (good, medium, bad, very bad) , and then an average or expected benefit cost ratio calculated for each price scenario, taking account of the probability of different types of season.

Table 8.2 *Ex ante* Benefit: Cost ratios for AISP

Low price scenario			*Implementation*	Good	Medium	Poor
		Probabilty	*Displacement*	30%	40%	50%
Weather	Good	25%	Grain:N ratio	18	15	12
Price	110		B/C ratio	0.79	0.64	0.48
Weather	Medium	45%	Grain:N ratio	18	15	12
Price	140		B/C ratio	1.01	0.82	0.61
Weather	Bad	25%	Grain:N ratio	13.5	11.25	9
Price	250		B/C ratio	1.35	1.01	0.82
Weather	Very bad	5%	Grain:N ratio	9	7.5	6
Price	400		B/C ratio	1.44	1.16	0.88
		Weighted average B:C ratio		1.06	0.84	0.65

Middle price scenario			*Implementation*	Good	Medium	Poor
		Probabilty	*Displacement*	30%	40%	50%
Weather	Good	25%	Grain:N ratio	18	15	12
Price	160		B/C ratio	1.15	0.93	0.70
Weather	Medium	45%	Grain:N ratio	18	15	12
Price	190		B/C ratio	1.36	1.11	0.83
Weather	Bad	25%	Grain:N ratio	13.5	11.25	9
Price	250		B/C ratio	1.35	1.01	0.82
Weather	Very bad	5%	Grain:N ratio	9	7.5	6
Price	400		B/C ratio	1.44	1.16	0.88
		Weighted average B:C ratio		1.31	1.04	0.80

High price scenario			*Implementation*	Good	Medium	Poor
		Probabilty	*Displacement*	30%	40%	50%
Weather	Good	25%	Grain:N ratio	18	15	12
Price	190		B/C ratio	1.36	1.11	0.83
Weather	Medium	45%	Grain:N ratio	18	15	12
Price	240		B/C ratio	1.72	1.40	1.05
Weather	Bad	25%	Grain:N ratio	13.5	11.25	9
Price	300		B/C ratio	1.62	1.21	0.99
Weather	Very bad	5%	Grain:N ratio	9	7.5	6
Price	400		B/C ratio	1.44	1.16	0.88
		Weighted average B:C ratio		1.59	1.27	0.97

Note: Grain to nitrogen ratios reduced in 'bad' and 'very bad' seasons by 25% and 50% respectively. Fertiliser prices 30% above 2006/7 prices

These calculations show that benefit: cost ratios vary dramatically with maize prices. As discussed earlier and in annex B there are considerable difficulties in determining appropriate prices for valuing both *ex post* and *ex ante* maize prices. It will also be noted later in section 9 that while high maize prices lead to high economic returns, they are not good for social protection, livelihood benefits and growth benefits from the programme. This highlights weaknesses with over reliance on economic cost benefit analysis in evaluating or appraising a programme such as this.

Economic returns also vary with fertiliser prices. A 30% increase in fertiliser prices above 2006/7 levels have been used in this analysis. However current international prices of some fertilisers (notably DAP) are already far above forecast prices (see annex B). Although this is not the case

for urea, continued increases in international prices of programme fertiliser imports above the 30% increases used in the analysis will make the economic and fiscal costs of the programme even higher, and these can only be justified if the programme delivers very high economic benefits. Thus a 60% increase in fertiliser prices would lead to an approximate 13% fall in the benefit cost ratio (ie with high prices and good management from 1.59 to 1.38 and with low prices and poor management from 0.65 to 0.56). This analysis shows that the economic and fiscal costs of the programme will become increasingly burdensome with high fertiliser prices, and it is therefore extremely important that any future programme is implemented as efficiently as possible.

8.4 Economic cost benefit analysis: conclusions

There are numerous difficult methodological and data issues in the estimation of both the *ex post* and *ex ante* economic benefit : cost ratios. A range of best estimates have been presented to demonstrate the sensitivity of the economic returns and fiscal efficiency of the programme to design and management (principally as they affect the grain to N ratio and displacement), maize prices and input prices. It is not possible to control weather conditions and regional or international prices, but as international input prices and risks of climatic variability rise it would be very important to implement any future programme as effectively as possible. It would also be important to consider how choice of appropriate scale and design (in terms of targeting and pricing) affects costs.

It must be emphasised that while the precise estimates presented here are sensitive to judgements made to address data and methodological difficulties, the broad results are robust, as regards the sensitivity of returns to different variables and likely orders of magnitude of returns under different, specified conditions. It must also be recognised that economic returns are not the only criteria to be used in judging if the AISP is worthwhile, as there are particular limitations in the way that it does not address more dynamic ways that investments may stimulate farm and non-farm growth and social protection in rural economies. However low economic returns indicate that such benefits are being obtained at a high cost, and it is important to be sure that costs are kept as low as possible and that these wider benefits justify their costs. The next section describes the results of modelling of livelihoods and the informal rural economy to illustrate how the input subsidy may promote growth in ways not taken into account in the economic cost benefit analysis.

9. Livelihood and rural economy impacts

This section of the report considers the effects of the subsidy programme on rural livelihoods and the rural economy. We consider two different types of impact: direct impacts are those experienced by recipients of the subsidy as a direct result of their receipt of subsidised inputs; indirect impacts are those that result from changes in society and the economy as a result of direct impacts on large numbers of people affecting their assets and behaviour and hence the behaviour of markets (principally maize and labour markets) and the resources available to the community. We consider direct and indirect impacts in turn.

9.1 Direct subsidy impacts on rural households

No attempt is made to use the household survey data to estimate direct impacts of receiving subsidised inputs since, as noted earlier, the yield and production data collected in the survey do not appear to be reliable enough for use in this way. We consider, however, information from focus group discussions and key informant interviews and from previous sections of the report on different types of households' access to subsidised inputs, and of reported effects of receiving subsidies We also estimate the direct effects of receipt of subsidised inputs using a set of household livelihood models described in Dorward, A., 2007.

In the focus group discussions and key informant interviews there are arguments in all districts, even those that experienced flooding, that food production has increased as a result of the coupon distribution. In areas with good rains the impact on food production has been greatest but even those areas that experienced floods or a dry spell at the time of tasselling have some

improvements in production. The increase in food production is reported to have had a number of positive effects on household welfare:

- Food security indicators – namely number of meals consumed each day, number of malnutrition cases and the time which food stocks are lasting – are all reported to have improved.
- Income and access to cash has increased as more households have produced a surplus to sell.

"mbuyomu chakudya chimatha September kapena October kenako nkumadya gaga, pano chimatha kupezana gaga uja kumapitsira nkhumba. Kupemphananso chakudya kwangotsala kwa amodziamodzi".

(in the past food was running out in September or October and then people had to eat bran, now the food meets with that of another harvest, the bran is now given to pigs. Begging each other food has just has remained with a few people) (Case study, Ntcheu).

Other reported direct impacts of the programme include:

- Increased access to cash is resulting in other types of investments. Households now have money to buy school uniform from the sales they make or indirectly from cash that would otherwise have been spent on fertiliser. There are also investments in productive assets in the immediate term - some of us bought pigs and chickens right now they are reproducing and multiplying because of the same maize we sold…this is an improvement because in future we can sell some of these pigs and handle more easily household problems"

  "ana sakujomba chisawawa ku school poti chakudya chilipo pomwe kale amajomba kupita kukathandiza makolo ganyu kapena kutsala pakhomo makolo atapita ku ganyu"

  (children are no longer staying away from school anyhow because of availability of food in their homes unlike in the past when they had to stay away from school to assist their parents in ganyu or stay at home while the parents have gone to do ganyu).

- Increased utilisation of technologies – including fertiliser and hybrid seeds. Households are increasingly exposed to examples of how technology can work and are taking it up with increasingly enthusiasm. In some districts they are also adopting other changes in their cropping systems, including Sasakawa techniques. Even in Chikwawa, where flooding washed away many crops and where consumption of fertiliser is low because many people work on already fertile soil, there is recognition that fertiliser can be positive for production. People who have never used fertiliser before are reported to be planning to use it next season to increase yields.
- Less tangible, though very important, is the change in attitudes of people towards their land. Feelings of hopelessness have been replaced with confidence and enthusiasm about households' own capacity to be more productive and increase their income earning potential in agriculture. Intra-household disputes are fewer. More widely there is anecdotal evidence of increased social capital – people are now able to do the 'right thing' at social events such as weddings and funerals. They can invite their neighbours and feed them.

  "maphokoso mmbanja atha poti anthu pano chakudya akukhala nacho, mmbuyomu pakhomo chakudya chikangotha amuna amakhala mmavuto poti unali udindo wao kukafuna chakudya ndiye ngati sapita kuganyu sikulongolola kwake azikaziwo"

  (Quarrels in families have now stopped since people now have food. In the past, once the food was over men were in problems because it was their duty to find food for the family so if they did not go to ganyu the women were shouting at them)

There are also some less positive signs. The most important of these is that the call for more coupons so that all rural households can receive them is interpreted by many as a sign that the subsidy may increase the dependency of households on subsidy support. For example, one respondent commented that Negatively, the subsidy has increased the dependency syndrome and

as such, that is why people are refusing to target and everyone just wants to benefit. It is clear that the programme has benefited from two good rainy seasons in many districts. The importance of maximising the benefits of these good years and using them to make households more resilient to problems and less reliant on programmes in subsequent years is recognised by some respondents (Box 9.1).

Box 9.1 Diversification and risk management in Ntcheu

Benefits from the coupon system depend on good implementation – particularly the delivery of the programme by government and suppliers – but also on the responses of households. In Ntcheu participants in the programme complained that problems with implementation – especially timing, targeting and poor information about how many coupons each household would get hampered their planning for the forthcoming season. Households that immediately invested in other productive assets – particularly livestock – were better able to cope when the subsidy programme did not deliver what they had expected. Those that continued to focus on maize were less prepared to respond.

Authorities have disturbed the programme this season by causing coupon shortages because of selling. "we could have been somewhere now but look…we will be going back to ganyu seeking this coming season," they complained.

Participants said that the programme could have had long terms effects had it been not for this disturbance caused by coupon sellers who have caused shortages …"there could have been long term effects if this season was like last season…but now we are like starting again…we just hope the government will come up with ways of combating this selling of coupons and that it should increase the number of allocation to each village," they said.

However one of the women said that those people who bought items like livestock would be able to enjoy the effects of the programme in the long-term because she said if the livestock multiply as they are doing right now, then in future these people will be able to just sell some and buy inputs just like the a-bit well to do and the well to do are doing now.

There are of course difficulties in quantifying the scale of the direct impacts reported above, as (a) it is difficult to judge the extent of the impacts described on different households and the number of households affected in these ways, and (b) it is difficult to separate out the effects of the subsidy from the effects of good weather. Models of rural households' livelihoods were constructed and used to provide an alternative method of investigating impacts in which these difficulties could be to some extent overcome.

The development and features of the model used to investigate direct (and later indirect) impacts of the subsidy programme are described in Dorward, A., 2007. Cluster analysis of IHS2 data was used to define seven or eight different household types for each of the larger livelihood zones defined by Malawi National Vulnerability Assessment Committee, 2005. Household livelihood models were then developed for the two largest zones (in terms of population) the Kasungu Lilongwe Plain and the Shire Highlands zones. Between them these two zones include just over 40% of rural households in Malawi and they represent examples of less and more densely populated areas in the centre and south of the country. A common structure was used to construct models of seasonal constraints and activities for seven household types in each zone. Receipt of coupons was then simulated for each household type.

Although the models describe key features of and differences between household types and zones, they cannot capture the complexity and diversity of rural livelihoods, and are from necessity constructed using at times inadequate data. Simulation results discussed below should therefore

be taken as illustrative of the nature of subsidy impacts and of the way that they interact with and are affected by the various characteristics of different households and rural areas.

Tables 9.1 and 9.2 summarise key household characteristics, baseline model conditions and simulated results for the changes that result from access to different subsidy packages for the different households in the two zones (packages are made up one or two bags of fertilizer containing 17.5 kg N with a 70% subsidy and 2 kg hybrid seed free)[36]. More detailed results of these simulations are provided in Dorward, A., 2007.

There are three possible uses of the subsidy by subsidy recipients: reselling of coupons or of subsidized inputs, incremental use of the inputs in production, or use of the inputs with displacement of otherwise unsubsidised purchases. These lead to two main types of direct benefit for recipients: immediate income transfers from reselling or displacement, or incremental production at harvest if the inputs are used on farm[37].

The model estimates substantial resale among poorer households (to the left of the tables), while less-poor households who are already using fertilizer tend to substitute unsubsidised purchases with subsidized purchases. As discussed earlier the household survey did not report substantial reselling of fertilizer, but 14% of households reported fertilizer use lower than receipt of coupons and examination of reported fertilizer purchases suggests complex patterns of exchange and sharing of subsidized inputs. Qualitative field work suggested that selling of coupons or fertilizer was one way of raising cash for coupon redemption.. It may also be that the discount on reselling fertilizer in the model was too small, that there are strong pressures which discourage reselling, or some combination of these explanations for the discrepancy between model and survey results. Receipt of coupons by less poor households appears to lead to a combination of incremental fertilizer use and displacement, the balance between these varying between household types. Incremental fertilizer use is slightly increased and reselling and displacement are reduced when seed is also subsidized alongside fertilizer.

Tables 9.1 and 9.2 show both substantial differences between the two areas[38] and substantial increases in estimated net incomes of some recipient households, even with significant reselling or displacement. Proportionate increase in income are particularly significant for poorer households in the Shire Highlands simulations where, even at discounted prices, the income from reselling fertiliser can ease seasonal cash and food constraints and allow poor households to reduce the time spent hiring out ganyu labour to others and to increase the time spent working on their own farms. These gains are also immediate and do not depend upon their ability to work. Benefits from incremental fertiliser use are, however, deferred to the end of the season and are dependent upon the household's access to labour and land. There are also generally positive and in some cases substantial increases in maize production result from the subsidy, varying across households. Impacts on tobacco cultivation vary between households.

[36] No distinctions were modelled between different fertiliser types. Some minor changes in intercropping of beans and maize and in groundnut cultivation are not shown in the tables and explain apparent discrepancies between changes in maize production and maize areas.

[37] The purchases of resold inputs are considered in later simulations and may lead to displacement and transfer benefits or incremental use and incremental production benefits among purchasers.

[38] Poorer household types in the Kasungu-Lilongwe Plain have slightly higher dependency ratios than poorer household types in the Shire Highlands, and IHS2 prices used had slightly lower maize prices and higher fertiliser prices in the Kasungu-Lilongwe Plain, depressing returns from fertiliser use on maize.

Table 9.1 Summary household characteristics, baseline model conditions and simulated subsidy impacts: Kasungu Lilongwe Plain (2004 prices)

	Cluster labels	Poor Female headed	Poor Male headed	Remit-tances	Dimba grower	Borrower	Large farm	Wage
				Household characteristics (IHS2)				
Rainfed land ha/member (median)		0.14	0.16	0.27	0.23	0.26	0.34	0.15
Dimba land ha/member (median)		0.00	0.00	0.00	0.04	0.02	0.00	0.00
% Female headed		100%	0%	49%	12%	9%	8%	4%
Dependency ratio (mean)		1.4	1.0	0.9	0.8	0.8	0.6	0.7
Per capita expenditure (median)		14,292	16,624	22,218	19,247	21,302	26,405	22,854
Persons/hh	(mean)	4.9	5.5	3.1	5.3	5.6	4.6	5.1
Poverty incidence	(mean)	60%	48%	29%	38%	23%	15%	29%
				Baseline				
Local maize area	Ha	0.79	0.93	0.78	0.95	1.10	0.93	0.53
Hybrid maize area	Ha	0.00	0.00	0.00	0.09	0.24	0.19	0.27
Tobacco area	Ha	0.00	0.00	0.00	0.29	0.51	0.44	0.13
Maize production	Kg	480	563	473	745	1,286	1,468	831
Net income	MK	41,797	51,548	38,892	66,854	85,960	72,383	93,048
Fertiliser use	kg N	0	0	0	3	17	33	10
				Direct impacts of receipt of subsidy (changes)				
One bag fertiliser								
Local maize area	Ha	-0.01	-0.02	-0.02	+0.01	-0.00	0.00	+0.01
Hybrid maize area	Ha	0.00	0.00	+0.03	+0.13	+0.00	0.00	-0.05
Tobacco area	Ha	+0.01	+0.02	-0.00	-0.14	0.00	0.00	+0.06
Maize production	Kg	-4	-11	+44	+349	+6	0	+46
Net income	MK	+302	+441	+247	+76	+1,941	+1,604	+1,844
Net income %		+1%	+1%	+1%	+0%	+2%	+2%	+2%
Fertiliser use	kg N	+17.5	+17.5	+17.5	+14.4	+0.5	0.0	+7.9
Resale		+17.5	+17.5	+15.7	+2.1	0.0	0.0	0.0
Other displacement	kg N	0%	0%	10%	70%	3%	0%	45%
One bag fertiliser & 2 kg seed								
Local maize area	Ha	-0.02	-0.03	-0.08	-0.01	-0.00	0.00	-0.03
Hybrid maize area	Ha	+0.02	+0.03	+0.08	+0.13	+0.00	0.00	-0.05
Tobacco area	Ha	0.00	-0.00	-0.00	-0.12	0.00	0.00	+0.10
Maize production	Kg	+28	+59	+139	+337	+7	0	+25
Net income	MK	+575	+765	+457	+613	+2,241	+1,904	+2,424
Net income %		+1%	+1%	+1%	+1%	+3%	+3%	+3%
Fertiliser use	kg N	+17.5	+17.5	+17.5	+14.4	+0.5	0.0	+7.9
Resale		+16.4	+15.2	+11.9	+2.1	0.0	0.0	0.0
Other displacement	kg N	7%	13%	32%	70%	3%	0%	45%
Two bags fertiliser & 2 kg seed								
Local maize area	Ha	-0.03	-0.05	-0.08	-0.01	+0.18	0.00	+0.05
Hybrid maize area	Ha	+0.03	+0.05	+0.08	+0.13	+0.00	0.00	-0.05
Tobacco area	Ha	0.00	-0.00	-0.00	-0.12	-0.18	0.00	+0.02
Maize production	Kg	+51	+83	+139	+336	+387	+34	+233
Net income	MK	+932	+1,154	+787	+792	+1,053	+3,282	+1,507
Net income %		+2%	+2%	+2%	+1%	+1%	+5%	+2%
Fertiliser use	kg N	+35.0	+35.0	+35.0	+31.9	+18.0	+1.8	+25.4
resale		+33.0	+31.7	+29.4	+19.6	+2.9	0.0	+8.5
other displacement	kg N	6%	9%	16%	35%	43%	5%	48%

Table 9.2 Summary household characteristics, baseline model conditions and simulated subsidy impacts: Shire Highlands (2004 prices)

	Cluster labels	Poor Female headed	Poor Male headed	Remit-tances	Dimba grower	Large farm	Wage	Poor dimba grower
				Household characteristics (IHS2)				
Rainfed land ha/member (median)		0.14	0.15	0.20	0.27	0.43	0.12	0.14
Dimba land ha/member (median)		0.00	0.00	0.00	0.06	0.00	0.00	0.04
% Female headed		100%	0%	62%	18%	18%	4%	21%
Dependency ratio (mean)		1.3	0.9	0.9	0.7	0.4	0.8	1.1
Per capita expenditure (median)		11,326	12,060	18,529	20,016	29,871	16,869	12,342
Persons/hh	(mean)	4.2	4.9	3	4.3	3	5.1	5.4
Poverty incidence	(mean)	76%	70%	39%	40%	15%	46%	73%
				Baseline				
Local maize area	ha	0.76	0.79	0.89	0.94	1.33	0.54	0.95
Hybrid maize area	ha	0.00	0.06	0.11	0.20	0.13	0.22	0.00
Tobacco area	ha	0.00	0.00	0.00	0.23	0.15	0.00	0.00
Maize production	kg	466	617	793	1,194	1,413	913	576
Net income	MK	40,643	50,936	43,002	67,622	63,079	80,014	54,673
Fertiliser use	kg N	0	4	8	21	23	19	0
				Direct impacts of receipt of subsidy (changes)				
One bag fertiliser								
Local maize area	ha	-0.04	-0.06	-0.02	-0.03	+0.01	-0.03	-0.04
Hybrid maize area	ha	+0.08	+0.11	+0.02	+0.00	0.00	+0.00	+0.10
Tobacco area	ha	0.00	0.00	0.00	-0.01	-0.01	+0.05	0.00
Maize production	kg	+160	+217	+34	+14	+34	+24	+197
Net income	MK	+436	+770	+737	+1,227	+841	+1,051	+430
Net income %		+1%	+2%	+2%	+2%	+1%	+1%	+1%
Fertiliser use	kg N	+17.3	+13.4	+10.0	+1.5	+1.4	+1.9	+17.5
resale		+11.8	+5.9	+8.6	0.0	0.0	0.0	+10.8
other displacement	kg N	31%	43%	8%	9%	8%	11%	38%
One bag fertiliser & 2 kg seed								
Local maize area	ha	-0.05	-0.07	-0.04	-0.04	+0.01	-0.05	-0.06
Hybrid maize area	ha	+0.10	+0.13	+0.02	+0.00	0.00	+0.00	+0.11
Tobacco area	ha	0.00	0.00	+0.02	-0.01	-0.01	+0.08	0.00
Maize production	kg	+190	+247	+32	+18	+54	+28	+227
Net income	MK	+1,010	+1,334	+1,161	+1,611	+1,104	+1,458	+1,007
Net income %		+2%	+3%	+3%	+2%	+2%	+2%	+2%
Fertiliser use	kg N	+17.3	+13.4	+10.0	+2.0	+2.3	+2.8	+17.5
resale		+10.6	+4.7	+8.1	0.0	0.0	0.0	+9.6
other displacement	kg N	38%	50%	11%	11%	13%	16%	45%
Two bags fertiliser & 2 kg seed								
Local maize area	ha	-0.06	-0.08	-0.06	-0.05	-0.06	+0.00	-0.08
Hybrid maize area	Ha	+0.11	+0.13	+0.02	+0.00	+0.08	+0.01	+0.13
Tobacco area	Ha	0.00	0.00	+0.04	-0.01	-0.01	+0.03	0.00
Maize production	Kg	+206	+259	+37	+186	+280	+317	+254
Net income	MK	+1,378	+1,665	+1,499	+2,022	+2,226	+1,469	+1,488
Net income %		+3%	+3%	+3%	+3%	+4%	+2%	+3%
Fertiliser use	kg N	+34.8	+30.9	+27.5	+13.7	+11.9	+16.4	+35.0
resale		+27.5	+21.7	+24.5	0.0	0.0	0.0	+26.0
other displacement	kg N	21%	26%	8%	39%	34%	47%	26%

9.2 Indirect subsidy impacts on rural households

The discussion in the previous section suggests that there are substantial direct benefits from the subsidy for recipient households, and the nature of those benefits varies according to the nature of the subsidy and the characteristics of households. Previous discussion of conditions in the 2006/7 season also, however, suggested wider changes affecting all households as a result of the good weather and contribution of the 2005/6 subsidy to a good maize harvest in 2005/6. These changes centred around maize price impacts and ganyu supply and demand and wage rates. The interplay between the input subsidy programme, ganyu, maize prices and how these affect household livelihoods and well-being, and the wider rural economy came out strongly in the qualitative data focus group discussions and key informant interviews.

The general story told in these fora was that a combination of subsidised access to fertiliser and good rains in almost all locations in season 2005/06 resulted in an exceptionally good harvest. All households groups (see the household group descriptions in Section 2: Information about Data) harvested crops. The richest two groups of households had food stocks that lasted through to the 2006/07 harvest. They also sold surpluses. Many households in the 'poor' group had stocks that almost reached harvest, at which time they took ganyu. The poorest households – those who usually consume their maize green – i.e. before it has ripened - had stocks that lasted through the rainy season. As a result, many households were selling maize and much fewer were entering the market to buy. This led to a significant fall in the price of maize. At the same time, households with food stocks, especially those in category 3, became less dependent on ganyu to provide either food, or cash to buy food. The seasonal problem of oversupply of labourers then switched to an undersupply and some households that usually sell labour (again in category 3) began to buy in labour. As a result, those that entered into the ganyu market were able to command better wage rates than has been the case for many years. Labourers have become wage-setters rather than wage-takers – though men have been more successful at setting prices than women. A further benefit is that less theft of crops is reported, because maize prices are lower and there is ganyu available at a good price from those households who want it.

Although the survey data do not show substantial changes in periods of time for which households report or expect their maize stocks to last, there is clear evidence of higher ganyu rates and of lower maize prices as compared with previous seasons (and lower maize prices led to further increases in real wage rates for ganyu). The discussion of possible incremental production as a result of the subsidy also suggests that it has played a role in lowering maize prices. It is difficult , however, to separate the effects of the subsidy from the effects of the good rains in 2005/6 and 2006/7.

The household models discussed above were therefore used to investigate further the relationships between the subsidy, maize prices, ganyu rates and income and welfare benefits. This was achieved by calculating aggregate baseline labour and maize market demand and supply from all households in each zone (allowing for the total numbers of each type of household in each zone), and then for different subsidy scenarios (a) simulating subsidy impacts on each household type and on aggregate labour and maize market demand and supply and then (b) modifying maize and labour prices and rerunning step (a), either with predetermined maize and labour prices or with maize and labour prices which allowed the maize and labour markets to be roughly in equilibrium in line with assumptions about relatively thin markets and inelastic maize and labour demand outside each zone. Again further information on the methodology and results can be found in Dorward, A., 2007.

9.3 Simulation of indirect impacts of a universal subsidy

We consider first a simple situation where all households in each zone have access to subsidized fertilizer providing 17.5kgN together with 2kg of hybrid maize seed – a universal subsidy which avoids targeting problems. As discussed earlier, simulation of the direct impacts of this shows immediate transfer benefits from reselling and displacement and deferred benefits from incremental fertilizer use.

Immediate transfer benefits lead to tightening of the labour market in the season of implementation, with a contraction in labour supply by poorer households (who need to hire out less ganyu to earn food, as a result of income from reselling fertilizer[39]) and a much smaller expansion of hired labour demand by less-poor households (who have more resources available to hire labour as a result of cash saved by subsidy displacement of unsubsidized seed and fertilizer purchases). This tightening of the labour market should lead to an increase in real wages, estimated at around a 5 to 11% increase in the first year of subsidy implementation (see the column headed 'year 1 subsidy' in table 9.3, which shows separate results for the Kasungu Lilongwe Plains and the Shire Highlands).

Table 9.3 Simulation of subsidy impacts on the Informal Rural Economy

	KAS			SHI		
	Year 1	Year 2	Year 2	Year 1	Year 2	Year 2
	Subs	No Sub	Subs	Subs	No Sub	Subs
Total subsidised Seed (MT)	1482.5	0	1482.5	754.468	0	754.5
Subsidised Fertiliser (MT N)	12971	0	12971	6601.59	0	6602
Wage change (% from base)	5%	20%	20%	11%	30%	30%
Maize price change (%)	0%	-26%	-26%	0%	-27%	-27%
Real net income change						
Target hh	5%	15%	16%	9%	16%	15%
All hh	2%	1%	2%	4%	3%	4%
Total cost / hhold (MK)	2,015	0	2,015	1,770	0	1,814
Total cost / target hhold(MK)	6,717	0	6,717	3,161	0	3,240
Total benefit / hhold (MK)	506	310	670	2,160	1,791	1,984
Benefit / target hhold (MK)	1,193	3,648	3,928	3,435	6,088	5,929

Increased wages lead to immediate real income and hence welfare and consumption gains to poorer households, both recipients and non-recipients. Increased on farm labour use by the poor (as a result of reduced need to hire out labour) also mean that gains from direct transfers to poor people and higher wages should lead to incremental production and welfare gains at and after harvest, even without any incremental input use (though these gains will be offset to some extent in the wider economy by losses of low cost labour to the less poor). Less poor people who hire in labour may also incur a loss in net real income if they have to pay higher wages when hiring labour in and for purchasing local goods and services whose prices are determined largely by unskilled wage costs.

Simulated income gains as a result of transfer benefits and incremental production benefits to recipients and of wage changes in the year of subsidy are shown in the 'year 1 subsidy' column in table 9.3 in real terms (allowing for cost of living changes as a result of wage and maize price changes). The universal subsidy is seen to give higher percentage income increases to poorer households (defined as 'target hh' in table 9.3) even before allowance for falls in maize prices. Comparison of % income changes for poorer households in year 1 in table 9.3 with % income changes as a result of direct impacts of receipt of the same subsidy shows that indirect impacts are important, again even without allowance for falls in maize prices.

Major impacts of a subsidy are, however, also expected in the season following its implementation, as a result of households having increased stocks of grain produced with the subsidy. To simulate this, the model was run with household pre-seasonal grain stocks increased, assuming that 50% of the incremental net income from the subsidy is retained in these stocks. Two alternative

[39] The wider production effects of any incremental input use from resold inputs are not simulated.

scenarios were simulated, without and with a subsidy in the second year. Again the results for both simulations in both zones are presented in table 9.3.

Increased grain stocks carried over from the previous year have two effects: decreased need for pre-harvest purchases of grain by households with insufficient stored grain and, as a result of this, decreased hiring out of ganyu to earn cash and food by poorer households and (slightly) increased financing to hire in farm labour by less-poor households. The effects of the loosening of the grain market are a fall in maize prices and a rise in wages, as discussed earlier for the 2006/7 season[40]. Interactions between wages and maize markets make it difficult to simulate the precise balance between maize price and wage changes, but their effects on net incomes are similar: poorer households benefit from both higher wages and lower maize prices, while less-poor households may gain or lose from these changes, depending on the extent to which they hire labour in and out and buy and sell maize at different times. Column 'year 2 no subsidy' in table 9.3 shows simulated wage increases of 20% and 30% in the Kasungu Lilongwe Plains (KAS) and Shire Highlands (SHI) zones and maize price falls of just over 25% (these are smaller than differences observed in the 2006/7 season, following the 2005/6 subsidy, but it is impossible to differentiate here between weather and subsidy effects on prices, it should also be noted that field reports of wage and price changes are not changes from equivalent and well defined baselines). These processes at work in a year following a subsidy are strengthened by the implementation of a subsidy, as this further eases seasonal cash constraints and tightens the labour market, as described above for year 1.

The effects of wage and maize price changes in these scenarios are to increase average real net incomes, with particular benefits to the poor (indeed they may in the short term appear to be damaging for less-poor households). This is shown by comparison of estimated increases in real net income for poorer and all households in table 9.3, and by comparison of these estimated increases with the estimated direct increases from an equivalent subsidy as set out earlier in tables 9.1 and 9.2. It is also worth noting that estimated wages increases are higher in the Shire Highlands zone than in the Kasungu zone, as a greater proportion of households benefit from the reduced need to look for ganyu and so the subsidy has a greater effect on the labour market (56% of all households fall into the poor female headed, poor male headed and poor dimba categories in the Shire Highlands zone, whereas 30% of all households fall into the poor female headed, poor male headed categories in the Kasungu zone). Similarly although poorer households in the Kasungu zone have a higher estimated % gain in real income, the greater proportion of poorer households in the Shire Highlands zone leads to a higher average increase in real income in that zone.

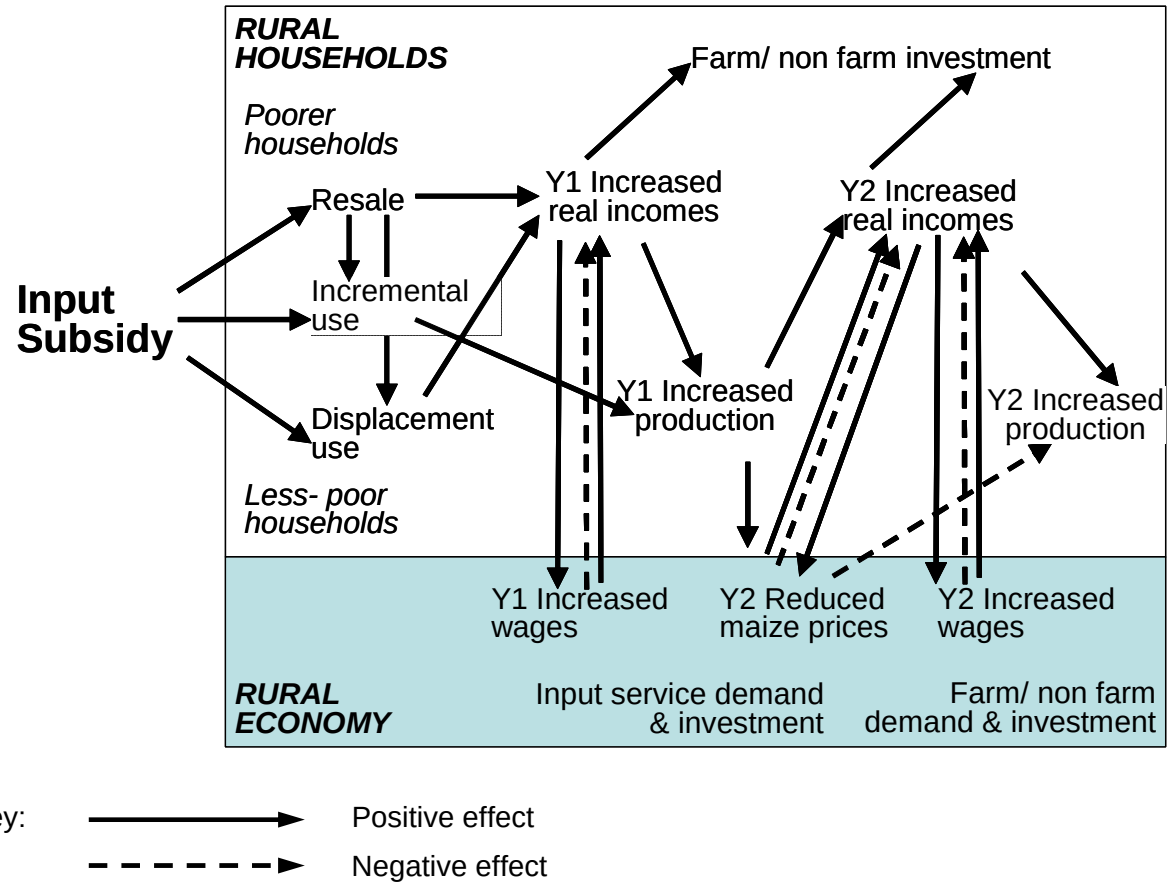
The increased income benefits from the subsidy can be compared with the estimated costs of inputs supplied under the subsidy. Two comparisons are offered in table 9.3, one averaging costs and benefits across all households, and the other looking only at the benefits to poor ("target") households, and dividing total subsidy costs by the number of target households to give the costs per target household. Costs incurred in one year then need to be compared with benefits that accrue over that season and subsequent seasons (and will be contingent on policies that do not push maize prices up and wages down, a pertinent issue given maize price rises experienced during the 2007/8 pre-harvest season). Comparison of costs and benefits in table 9.3 shows benefits to be substantially greater than costs in the Shire Highlands zone, and slightly less than costs in the Kasungu Lilongwe Plain. As these model results should be considered as illustrative rather than prescriptive, too much weight should not be given to precise comparisons of costs and benefits. However it is appropriate to take note of (a) the substantial difference between costs and

[40] There are difficulties in modelling changes in maize prices across and within seasons, partly due to the structure of the model and partly due to difficulties in distinguishing between and allowing divergence between *ex ante* price expectations driving farmer decisions and *ex post* price outcomes resulting from those decisions. Changes in both maize prices and wages between years are simulated as a proportionate fall or rise that is constant across the whole year, but post-harvest maize prices will sometimes behave differently from pre-harvest and are also more likely to diverge from price expectations. However it is not thought that this will have particularly significant effects on the results presented here as regards overall benefits over two years.

benefits in the Shire Highlands zone and (b) the differences in cost-benefit relationship between the two zones. Under (a) we should note the potential of indirect market effects to allow the programme to make very substantial contributions to dynamic benefits to poor people's livelihoods and to economic growth in poor rural areas, provided that markets are allowed to let increases in production lead to reduced maize prices and increased wages. Under (b) we should note that both basic differences in input and output prices (as noted earlier) and differences in land pressure and livelihood structures between areas will lead to differences in the ability to which the subsidy programme contributes effectively to increased real incomes and improved livelihood opportunities for the poor.

This analysis draws out the importance of understanding different direct effects of subsidy access on different households and the different indirect effects of these as they affect labour and maize markets. These effects are illustrated in figure 9.1, which shows the rather complex set of direct and indirect impacts and their relationships over time as described above. Further subsidy impacts shown in the figure are that increased real incomes should lead to greater farm and non-farm investment (in human and social capital as well as in financial, natural and physical capital for particular enterprises), and that growing real incomes in rural areas should lead to increased demand for locally produced goods and services, including non staple foods. Impacts on demand for and investment in input services will depend heavily on the way that subsidies are implemented.

Figure 9.1 Tracing out direct and indirect subsidy impacts over time



Simulations were also conducted for preliminary investigation of the effects of targeting subsidies and of increased confidence in maize markets. These are discussed briefly in turn.

9.4 Simulation of indirect impacts of a targeted subsidy

Targeting of subsidies was investigated by running simulations where a larger subsidy package was provided only to poorer households[41]. The subsidy package consisted of 2kg seed and 35 kg of nitrogen, equivalent to two 50 kg bags of fertilizer, and 'poorer' households were defined as those labelled as 'poorer' in the cluster categorization (poor female headed, poor male headed and poor dimba). There is immediately a difference between the two zones, as 56% of households qualify for the subsidy in the Shire Highlands zone as compared with 30% in the Kasungu zone[42].

In both zones the simulations suggests substantial reselling of fertilizer by poorer households and purchasing of resold fertiliser by less poor, untargeted households. Income from reselling fertilizer is used not only to finance seasonal consumption but also extra purchase of hybrid seed by some households. Poor households benefits from the targeted subsidy are roughly equivalent to gains from the smaller comprehensive subsidy (as larger direct gains are more than offset by smaller indirect gains through falling maize prices and rising wages) but the balance between these and costs per target household differ between the two livelihood zones: in the Shire Highlands zone a comprehensive programme is more cost effective as target households make up a substantial proportion of the population and savings from targeted subsidies are smaller, but in the Kasungu Lilongwe Plain they make up a smaller proportion of households and hence savings from targeted subsidies are very substantial and more than offset lower benefits from smaller labour and maize market impacts. Less poor households who do not receive the subsidy lose out marginally from the increased ganyu rates wages, and in selling any surplus grain, but their dynamic, longer term gains from growth in the economy should be positive.

9.5 Simulation of indirect impacts of increased buyer confidence in maize markets

An issue that was raised in the March 2007 Interim Evaluation report was the importance of stabilization of maize prices if the programme is to deliver longer term benefits of increased productivity and rural incomes leading to diversification out of maize production. In this section we describe simulation of the effect of increased consumer confidence in maize markets. Simulations were run for the without subsidy base year and for the second year of a universal subsidy (i.e. simulating the effects of increased confidence in maize buying in the absence of any subsidy and in the presence of a universal subsidy). Increased confidence in buying from the maize market leads to a fall in maize production (due to lower subsistence production) and increased reliance on purchases. The subsequent tightening of the maize market leads to increases in maize prices. At the same time there are relatively small cropping switches by some household types from maize to groundnuts and tobacco, and these cause some tightening of the labour market. These changes occur in both without and with subsidy scenarios. However there are important interactions with the effects of the subsidy.

As discussed earlier, the subsidy tends to tighten labour markets and raise wages in the year of implementation and then additionally depress maize prices in subsequent seasons. Where increased confidence in maize markets is accompanied by a subsidy, then both these changes tighten labour markets and raise nominal wages (benefiting poorer households). However if market confidence increases in the absence of increased maize production from the subsidy, then the increase in nominal wages is counteracted by the increase in maize prices. As a result the poor suffer real income losses although there are real income gains for less poor households across both the Kasungu and Shire Highland zones. In this situation although all households,

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[41] Varied patterns of coupon distribution between different household types in the 2006/7 programme prevented simulation of a pattern of targeting matching actual distribution of coupons, and it was considered more useful to compare the universal distribution of a smaller (one 50kg bag) subsidy (as occurred in many places) and targeting on the poor.

[42] Note that this compares with IHS2 estimates of 56% poverty incidence in the Border zone and 36% in the livelihood zone. Although model estimates of net incomes for the poorer groups are similar across the two zones, IHS2 estimates of median expenditure for poorer households are higher in the Kasungu zone than in the Border zone.

including the poor, gain from increased market confidence (as a result of direct benefits of reduced investment in lower productivity maize), for the poor this is counteracted by the effects of higher maize prices affecting their income and cash flow.

However, in simulations where increased confidence in maize markets is accompanied by a subsidy, then the increased maize productivity from the subsidy counteracts the fall in maize production induced by increased buying confidence in maize markets, reducing maize price increases as compared to the baseline. These are then smaller than the increases in nominal wages, and as a result real net incomes from the poor rise more than they do under the subsidy without increased buyer confidence in maize markets.

These simulation results are highly significant to maize price and subsidy policies in Malawi and need further investigation. Evaluation of these results must also recognise that maize price stabilization policies are normally considered to benefit the poor in two ways: first by protecting them against the very adverse consequence of large price rises in bad years, and second by allowing the poor to diversify out of low productive staple food production in normal years. The results presented here do not question the first of these benefits, but do suggest that for reasons outlined above the second of these benefits may not accrue to the poor, and could actually damage their livelihoods.

Conversely, however, synergies between the subsidy programme and maize price stabilization are suggested. The results presented here provide support for the argument that the long term developmental benefits of the subsidy programme would depend, among other things, on greater price stability allowing a long term shift out of maize production by the poor. More work is needed to investigate the results presented here, but they suggest that the longer term benefits to the poor from price stabilization policies in allowing shifts out of maize production also depend upon policies that increase maize productivity.

9.6 Indirect livelihood and rural economy impacts: conclusions

Although the use of livelihood and informal rural economy models in the discussion above should be taken as providing illustrative insights from simulation of the impacts of different subsidy policy scenarios on rural livelihoods, there are strong complementarities between simulation results, the narrative of the qualitative findings, and more quantitative evidence on maize prices and ganyu wages. Accepting the limitations of each of these information sources, a number of useful conclusions may nevertheless be drawn:

1. Where a range of households are able to access the subsidy packages there are clear direct benefits to recipients which arise from two different features of the subsidy – it acts as a cash transfer programme where subsidized inputs are resold or where they displace cash or credit purchases, and it also stimulates increased use of inputs. These features are largely alternatives in that (a) cash transfer benefits do not normally arise with increased input use (although inputs resold by one household may have a displacement or incremental production effect on input use by the buyer) and (b) cash transfers through displacement are not generally pro-poor. Direct benefits from the cash transfer features of the subsidy are experienced in the year of subsidy (and can give continued benefits in subsequent years if they increase the wealth of the household) whereas direct benefits from increased input use are not experienced until harvest at the end of the season, but increased input use gives benefits in the subsequent year through increased grain stocks (and again can give continued benefits in subsequent years if they increase the wealth of the household).
2. As a large scale programme, the agricultural input subsidy delivers both direct benefits to recipients and indirect benefits and costs to all households in a rural economy, through its impact on maize and labor markets. The nature, scale and distribution of benefits and costs vary with the size of the subsidy package provided to each household, and the number and targeting of recipient households. Indirect benefits and costs are very important: they may significantly add to or detract from direct benefits to recipients, and affect the welfare, positively or negatively, of non recipients. Poorer households, in general, benefit from

tightening of the labour market and higher wages, and from lower maize prices. Some but not all less-poor households tend to lose in the short term from paying higher wages for ganyu and gaining lower prices for surplus maize sales (they should make larger gains in the long run from dynamic growth effects but these have not been examined). Immediate tightening of labour markets arises from the cash transfer feature of the programme, whereas the indirect impacts from increased input use are felt in maize prices and wages after harvest and in the following year.

3. Simulation results support empirical observations that there is the potential for significant displacement with the subsidy programme and that this is greatest where better off households access subsidized fertilizer. The simulation further suggests that displacement may increase over time as people's ability to afford inputs increase. However the discussion in this section has not considered indirect impacts on the input supply sector: as discussed in section 6 there is the potential for both 'crowding in' and 'crowding out' of private sector suppliers by the programme, depending upon its design and implementation.
4. Targeting of subsidies to poorer households can involve some combination of both geographical targeting between areas and livelihood targeting within areas. These pose different political, social, and administrative challenges and costs and benefits which have not been discussed. Relative costs and benefits of targeted versus smaller per unit comprehensive subsidies depend upon the distribution of target households within different areas, relative prices, and costs and effectiveness of targeting.
5. Simulations suggest important positive interactions between the effects of the subsidy and of measures that promote longer term buyer confidence in maize markets, but also suggest that in Malawi benefits to the poor from maize price stabilization policy effects may be largely limited to direct gains in years of high prices unless such policies are accompanied by complementary policies raising the direct incomes of the poor and/or maize productivity and profitability.
6. We have not attempted to conduct a formal benefit:cost analysis of the different scenarios presented here. There has also been no comparison of the cost effectiveness and efficiency of the subsidy as compared with other policies (for example cash transfers) that may provide some similar benefits. However it should be noted that (a) there is likely be both complementarity and competition between alternative policies. While they may compete for resources, targeted cash transfers for example may be more efficient in delivering immediate transfers to the poor. However although such transfers may generate labour market externalities that are beneficial to the poor (by stimulating wage increases), input subsidies should also generate maize market externalities where they lead to incremental fertilizer use and increased maize production. The relationships between and relative merits of cash transfer and input subsidy programmes also vary between households with different access to land, labor and capital, and between areas with different agro-ecological and socio-economic characteristics. They will also change over time if, as would be hoped, farm and non-farm incomes rise and there is structural change in the rural economy.
7. The analysis reported here has highlighted the importance of the beneficial subsidy impacts as a result of higher maize production lowering maize prices. The 2007/8 production season has, however, been marked by sharp maize price increases in early 2008, and these price increases will have seriously undermined many of the poverty reducing, food security and growth benefits of the 2006/7 programme. The causes of these price increases are disputed, but it is clear that a major contributory factor was the export of grain to Zimbabwe. Since this was arranged with the understanding that there was a very large maize surplus in Malawi, the reasons for the over-estimate of grain stocks must be seen as a critical causative factor, and must be addressed.

10. Gender and intra-household issues

Women play a key role in agricultural production and rural livelihoods, and women-headed households are disproportionately represented among the poorest rural households. For these reasons alone it is important to ask specific questions about the impact of AISP on women – in households headed by both men and women. The main areas of concern relate to

- women's access to coupons: the extent to which they are targeted within AISP and their experiences of redeeming coupons;
- gendered impacts of AISP: the extent to which women and men benefit differently from AISP and the extent to which AISP contributes to the transformation of gender relations.

10.1 Women's access to coupons

Evidence presented elsewhere in this report but summarised in Table 10.1 shows that women-headed households are

- less likely to receive fertiliser coupons than households headed by men.
- In the Central Region are likely to receive fewer coupons than households headed by men if they do receive coupons

A number of different factors, most of which are linked to targeting, can explain the disproportionate allocation of coupons to households headed by men. In many districts, targeting of coupons was done based on land holdings. Whilst there is a link between land holding size and poverty in Malawi, there is no significant difference between male and female-headed households in terms of land holding size. However, within small landholding sizes, poverty is higher in female-headed households. (Malawi Government and World Bank, 2006 p. 43). Other targeting criteria used that affect women's access to coupons included that which targeted people with the capacity to adopt / utilise technology. Again, it is clear from the IHS data that women are more likely to grow crops for home consumption, are less likely to use fertiliser and less likely to obtain extension services.

Women have less access to cash than men and found it more difficult to raise the K950 payment in order to redeem their coupon for fertiliser. Women got access to cash through ganyu and through income-generating activities such as beer brewing. In some districts, for example Dedza, savings clubs were important for getting access to cash though there were no distinguishable gender differences in membership of the clubs.

In general women had different views from men on the most important targeting criteria. They focused on supporting the very poorest households whilst men tended to prioritise those with greater capacity to increase productivity. Linking this to the survey findings shows that women's views are overridden in the implementation of the programme.

Table 10.1 Fertiliser Coupon receipts by gender of household head

	Female headed hholds	Male headed hholds	All hholds
% of hholds receiving the most subsidised fertiliser (100 to 600 kgs/hh)	18.2	71.8	100
% of hholds receiving small amounts of subsidised fertiliser (100 to 600 kgs/hh)	26.4	73.6	100
% of hholds receiving no subsidised fertiliser	30.0	70	100
% all holds	26.7	73.3	100
% of households receiving no coupons	54	43	46
% of households receiving 1 coupon	26	27	27
% of households receiving 2 coupons	17	24	22
% of households receiving >2 coupons	3	6	5
All households	100	100	199
Mean number of coupons received per recipient household	1.6	1.8	1.7

More practical concerns may have also influenced targeting. Redemption of the coupons was more difficult for women because their reproductive responsibilities limited the time that they could spend away from their homes queuing for fertiliser. This may have affected targeting decisions the following year. In 2006, men queued for up to a week to redeem their coupons. Even women with some control over coupons were less likely to redeem coupons themselves and often lost control of coupons to their husbands or relatives because it was too dangerous for them to sleep in the open outside suppliers premises. For this reason ADMARC remained important for women redeeming coupons if they did not have to travel so far to reach an ADMARC market.

10.2 Gendered impacts of AISP

In both female- and male-headed households, women tended to report differently to men on the impacts of AISP. Whilst men focus on the sizes of surplus and on output prices, women described how they are better able to afford education costs in the years when AISP had been operating. Women also reported that they were able to command higher wage rates for ganyu than in previous years, though men have been more successful at becoming price-setters than women.

Within households and communities there is some limited evidence that the increased well-being in 2005-06 and 2006-07 seasons is improving community and intra-household relations. Where agricultural extension officers had encouraged people to form fertiliser savings groups, on the whole they had done so in a manner that sought to include women in groups. In these cases, cooperation between group members was positively affecting social cohesion in villages. At the same time, the existence of groups fostered innovation and the uptake of technology – including by women.

A less tangible, but equally important, effect has been the change in attitudes of people towards their land and own capacity to support themselves. Household members have increased confidence and enthusiasm regarding their earning potential in agriculture and their capacity to feed their families. Households are able to behave in more socially acceptable ways in the community – for example inviting neighbours to weddings and funerals and feeding them. The gender impacts of this are manifested in reports of fewer disputes within households.

> *"maphokoso mmbanja atha poti anthu pano chakudya akukhala nacho, mmbuyomu pakhomo chakudya chikangotha amuna amakhala mmavuto poti unali udindo wao kukafuna chakudya ndiye ngati sapita kuganyu sikulongolola kwake azikaziwo"*

(Quarrels in families have now stopped since people now have food. In the past, once the food was over men were in problems because it was their duty to find food for the family so if they did not go to ganyu the women were shouting at them)

Whilst increased wellbeing has reduced disputes over resources within households, it is less clear how far AISP is having lasting effects on women's (perceived) roles within households. It appears that some women do want to engage in market-oriented agricultural activity rather than focusing solely on the domestic provision of food. This is demonstrated by the high demand for fertiliser among women, despite the significant demands on women's time (and safety) that procuring fertiliser under AISP requires. At the same time, many women expressed a desire to get fertiliser most suitable for application to maize and not fertiliser suitable for tobacco. For many women, production of food for household consumption remains a priority over cash cropping for the market.

There are some examples of women using the profits or benefits from AISP to make further investments in productive assets. Some women have bought livestock and their explanations of these choices reflect a clear strategy to ensure that the immediate benefits of AISP are translated into longer-term ones.

However, as noted above, the benefits of AISP appear to have been greater for men than women. Men are benefiting from greater increases in the rates for ganyu. In Chikwawa, it was men who planted rice rather than maize when the first maize crop was washed away by flooding. The extent to which AISP is generating real transformations in gender relations appears rather limited.

11. Macroeconomic impacts

The AISP is largely financed by the Government of Malawi. In 2005/06 fiscal year, government spent MK6.9 billion in the subsidy, which was 45 per cent above the budgeted level. In 2006/07 and 2007/08 fiscal budget, the subsidy accounted for 45 percent and 51 per cent of the MoAFS, respectively. In terms of the overall budget, the subsidy constituted 5.2 percent and 6.2 per cent of the national budget in 2006/07 and 2007/08, respectively. The significance of the subsidy in the budget may have implications on macroeconomic developments. Some of the implications include the potential of the subsidy in crowding out allocations to the other sectors in favour of the agricultural sector, particularly allocations to the social sectors and for infrastructure development. In addition, within the MoAFS, there may be a bias in the allocation of the budget towards the subsidy at the expense of other vital services such as research and development and extension services. There is also potential that the expenditure over-runs on the subsidy may contribute to deficit spending with consequences on price stability. The analysis of the macroeconomic impacts of the subsidy programme will focus on sectoral allocation of resources to the agricultural sector, the allocation of the MoAFS budget to various services, and the overall impact of government spending behaviour.

The immediate impact of the subsidy is its impact on the share of the agricultural sector in the national budget (Table 11.1). The implementation of the subsidy has raised spending on agriculture from an average of US$3.2 between 2000 and 2005 to about US$11.1 in 2006 and 2007. In the 1990s, the share of the agricultural sector in the total budget had declined to below 10 per cent, the level recommended by AU/NEPAD (2003) in order to achieve pro-poor growth in agriculture. It is clear that the subsidy has helped Malawi to surpass the 10 per cent level to an average of 12.1 per cent in the years of the subsidy.

Table 11.1 Agriculture Sector Government Spending Trends, 1970 – 2007

Indicator	1970-79	1980-84	1985-89	1995-99	2000-05	2006-07
Agriculture Share in Budget (%)	32.15	24.83	10.08	8.98	6.13	12.1
Agriculture Budget ($m)	21.30	43.98	29.05	36.12	37.48	135.9
Recurrent Budget ($m)	8.39	21.69	18.52	26.66	22.17	96.0
Development Budget ($m)	12.91	22.29	10.54	9.46	15.31	39.9
Agriculture Spending/Capita ($)	4.03	6.88	3.85	3.51	3.21	11.05

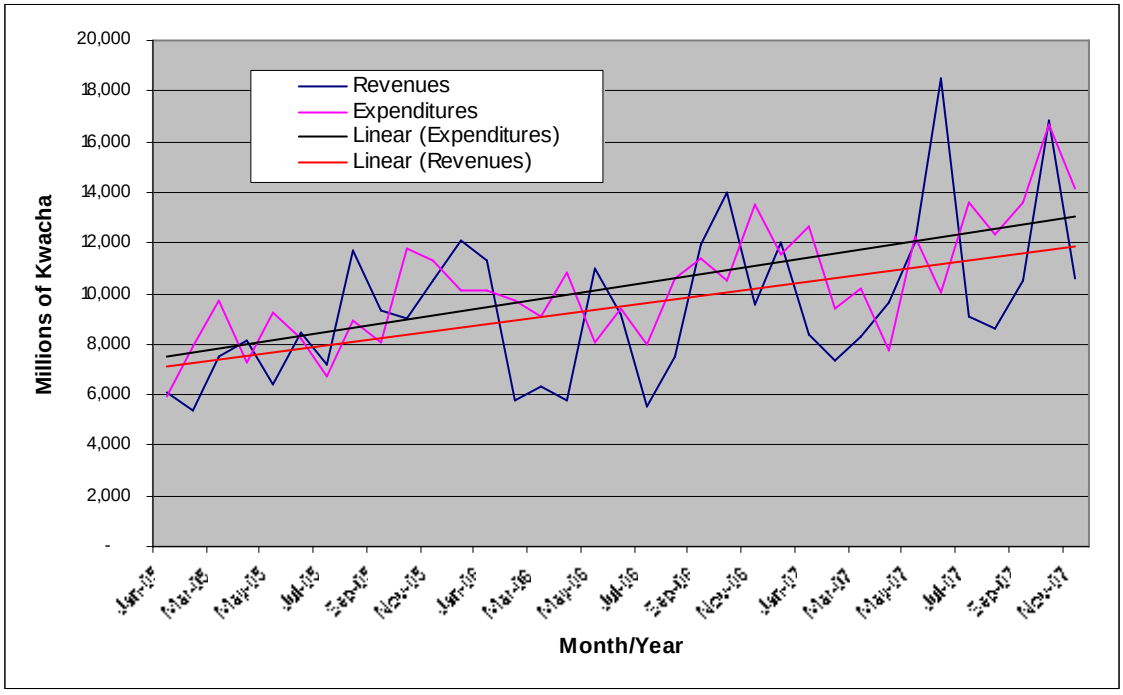
Source: Computed based on NSO data

There is no evidence to suggest that the social sectors have been adversely affected by the increasing share of agriculture in the total budget. The shares of infrastructure, education and health sectors in the budget have not been adversely affected by increase in the allocation to the agriculture sector. For instance, in the 2007/08 budget, both health and education each accounts for 14 per cent of the budget, representing an increase of about 6 per cent over the 2006/07 budget. There has generally been a shift of budgetary resources to the agriculture, health, education and infrastructure development since 2004.

The increased resource allocation to the agricultural sector and the cost overruns resulting from the subsidy has not lead to general macroeconomic instability. During the period over which the AISP has been implemented the price level has stabilised and government spending has been controlled with manageable budget deficits. In 2005/06 fiscal year, the budget deficit was 1.5 per cent of gross domestic product, and slightly rose to 1.8 per cent in the 2007/08 budget, compared to 2.6 per cent in 2005/06 fiscal year. Figure 10.1 shows the trends in government revenues and expenditure from January 2005 to November 2007. Both revenues and expenditure show some increasing trend, however, the deficit is also increasing with time. The low deficit spending and reduced borrowing of the government from the Central bank, has resulted in the sharp decline in inflation from a peak of 17.1 per cent in February 2006 to 14.9 per cent in July 2006 and falling further to 7.9 per cent in May 2007. Since maize prices account for a larger weight in the consumer price index, undoubtedly lower maize prices resulting from a bumper harvest in 2005/06 and 2006/07 seasons have also contributed to price stability.

In terms of allocation of the MoAFS budget to various activities, there is evidence that the subsidy has had some impacts on the delivery of other services by the MoAFS. Key informant interviews at district level, revealed that although the MoAFS provided operational funds for the implementation of the subsidy, the resources were often inadequate. As a result there was a substantial shift of resources from other recurrent expenditure budget lines towards subsidy implementation activities. Apart from resources, the implementation of the subsidy becomes the core activities by the MoAFS at district level, often at the expense of other activities.

Figure 11.1 Trends in Government Expenditure and Revenues, 2005 - 2007

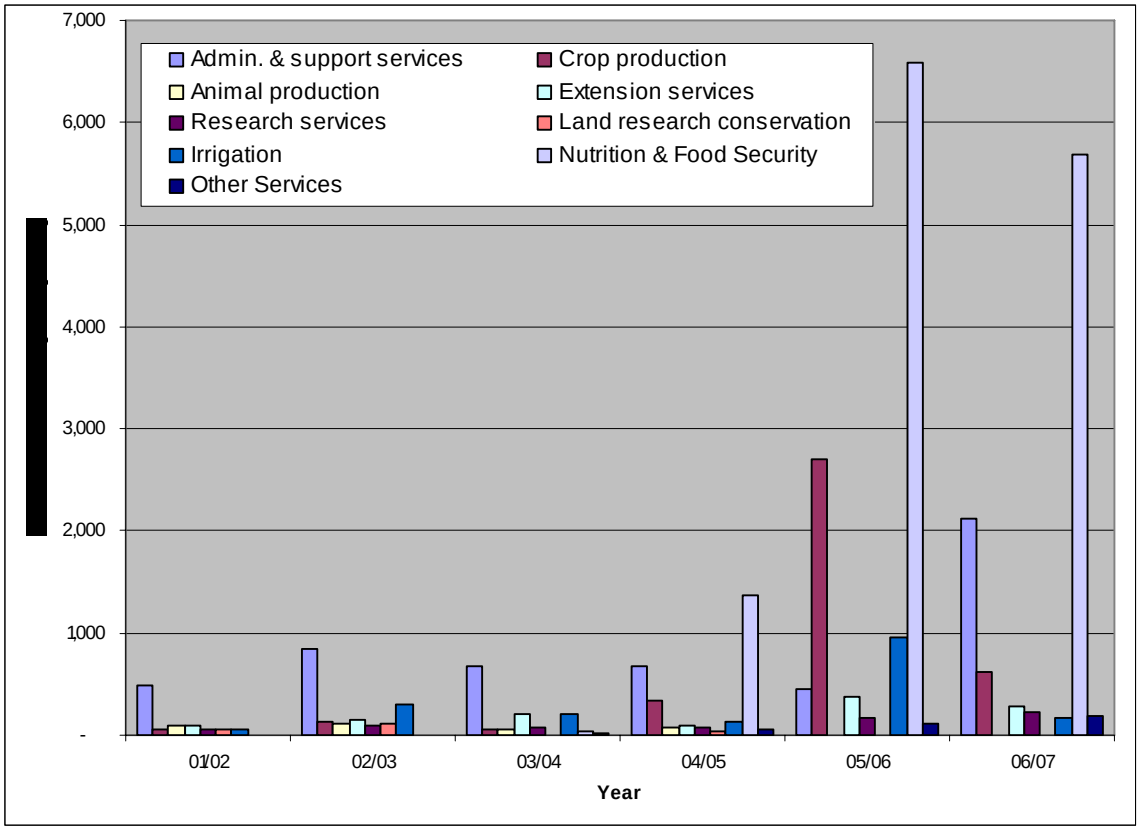


Source: Reserve Bank of Malawi, *Financial and Economic Review* (Vol. 39, No. 2, 2007)

Examination of allocation of Ministry of Agriculture recurrent expenditure to different services shows declining budget shares for research and extension since the subsidy was introduced.

However Figure 11.2 shows that while expenditure on the subsidy has grown dramatically in the last two years (reflected in expenditure on food security [43]), research and extension expenditures have also grown, though too a much lesser extent, and perhaps not enough to offset the diversion of resources to subsidy implementation activities, as described above. Research and extension expenditures are nevertheless very low. This cannot be attributed to the subsidy, it is rather the result of budget cuts in previous years when, following structural adjustment programmes, the budgetary allocations to research and development and extension services were cut back with wider cuts to the Ministry of Agriculture budget, leading to declines in recruitment and training of agricultural extension officers and reduced funding and activities of both agricultural training institutions and agricultural research institutions. In this context it is not clear how far the subsidy programme is crowding out expenditure on research and extension as this depends upon how much government would be committed to increasing expenditure on these activities in the absence of the subsidy programme. Some measure of Government commitment to extension activities may, however, be judged from the specific mention of the rebuilding of extension services in the 2006/7 and 2007/8 budget statements by the Minister of Finance.

Figure 11.2 Real Agricultural Sector Expenditure (Recurrent and Development) at 2000 prices



Source: calculated from data supplied by Ministry of Agriculture and Food Security

[43] The high expenditure on 'administration and support services' in 2002/03 and 2003/04 is attributed to misclassification of programmes such as starter pack and targeted input programme. These should have been classified under 'food security'.

12. Conclusions and recommendations

At the heart of the ToR for this evaluation are two questions:

- Is the AISP a good use of government resources (and implicitly should government continue to invest in it)?
- How could the AISP be made a better use of government resources?

Both these questions require that the performance of the AISP be measured against government objectives in investing in it, and the two questions are of course related: even if it were judged that the 2006/7 AISP was not a good use of resources, continued investment in the AISP might be justified if its performance could be improved in future or if different conditions in future were expected to lead to it generating higher benefits.

The final section of the report pulls together the findings from the evaluation in four main sub-sections which we consider in turn

- The performance of the 2006/7 Agricultural Input Subsidy Programme against its objectives and likely performance of future programmes
- Critical issues affecting AISP performance
- Design and implementation principles for improving performance
- Specific recommendations for improving performance

12.1 Performance of the 2006/7 Agricultural Input Subsidy Programme

The programme's stated objectives centred around improvement of land and labour productivity, increased production of both food and cash crops by smallholder farmers, and reduction in people's vulnerability to food insecurity, hunger and poverty. Other generally recognized programme objectives were the development of private sector capacity and engagement in input marketing, and the promotion of wider pro-poor growth and economic development.

Improved land and labour productivity and increased smallholder production of food and cash crops are all closely related. Attempts to directly measure changes in smallholder yields did not provide reliable estimates of changes in yields or production. Very large maize production increases reported in the 2006/7 National Crop Estimates do not seem credible when compared with the already large increases in production reported for 2005/6 (which was also a year of good rainfall with a large input subsidy), and also do not seem to be consistent with patterns of maize price increases observed from September 2007 onwards. Retail maize price levels between July-December 2007 already exceed historical mean prices over the past 14 years. Increases in production are therefore likely to be much lower than those reported in the 2006/7crop estimates. The export of over 300,000 tonnes of maize to Zimbabwe has also contributed to higher than average maize prices in 2007/08. Nevertheless, the evolution of maize prices during the 2007/8 season (allowing for sales of over 300,000 tonnes and lower reported imports from Mozambique as compared with previous years), livelihood modeling and estimates of increased grain production from incremental fertiliser use suggest a significant increase in maize production as a result of the subsidy, probably of the order of around 700,000 tonnes.

Based on this estimate, economic cost benefit analysis and livelihood and rural economy modeling suggest that smallholder maize productivity, and indeed smallholder productivity as a whole, has increased as a result of the subsidy. However production and productivity increases vary with and are sensitive to (a) the extent to which subsidized fertilizer sales displaced commercial sales and (b)) the timeliness of delivery of the subsidized fertilizer and the effectiveness of its application. Sales of improved maize seed also have an important effect on productivity. Economic cost benefit analysis is also sensitive to maize prices – and is lower under conditions where regional maize prices are low. Although only one measure of performance, economic cost benefit analysis does provide important information about programme efficiency and effectiveness. This suggests that the programme will not contribute to achievement of its objectives, and indeed will have wider

negative impacts, if it is not implemented in a way that keeps down displacement and increases the productivity of subsidised inputs. These challenges will become even more important in the future, with reduced benefit-cost ratios expected from large increases in world input prices and probably less dramatic increases in local maize prices in the region in the future except in years when the region as a whole is food deficit.

It has not been possible to investigate incremental application of fertilizers to particular crops, but the pattern of changes in household fertilizer use between years suggests that displacement of unsubsidized fertiliser sales by subsidized sales are likely to be higher for cash crops than for maize, and the AISP is likely to have led to limited direct increases in cash crop production.

Well distributed rainfall made 2006/7 a generally good year for maize and other rainfed crop production, and this, with low maize prices following a good 2005/6 season, will have reduced vulnerability to food insecurity, hunger and poverty even in the absence of the 2006/7 AISP. However multiple sources of evidence, particularly from the qualitative interviews and livelihood and rural economy modeling, suggest that where the implementation of the subsidy programme increases maize production then this leads to both higher wages and to lower maize prices, and hence to increased real incomes and food security and reduced vulnerability for poorer households. If the AISP leads to changes in labour markets and to increases in national maize production large enough to push wages up and maize prices down, then poor households experience these benefits whether they benefited directly as subsidy recipients or not. However income and food security gains, and reduced vulnerability and poverty, are greater for direct recipients of the subsidy. Benefits are also sensitive to maize market stability and the absence of policies or shocks that raise maize prices – a particularly pertinent issue in the context of high domestic maize prices in the first quarter of 2008.

With regard to development of private sector capacity and engagement in fertilizer marketing, it seems clear that the 2006/7 AISP offered substantially improved opportunities for the six large private firms and their distributor affiliates to participate in fertilizer distribution. These accounted for 28% of subsidised fertilizer sales. The private sector also imported 70% of the subsidized fertilizer distributed by ADMARC and SFFRFM. However, there are significant concerns that (a) tendering procedures and late orders led to increased costs in importing fertilizers, (b) terms for private sector participation in fertiliser retail sales were agreed only as fertiliser distribution was getting underway, leading to delays in sales in some areas, and (c) the program was not able to involve the large number of independent agro-dealers in the sales of subsidized fertilisers. There are also significant concerns that the subsidy has depressed unsubsidized fertiliser sales, and retailers who were not able to sell subsidized fertilizers reported very low sales. This is a particular problem for the small agro-dealers and a matter of some concern since these agro-dealers may otherwise have a critical role to play in the development of input markets in more remote areas (although they are not currently reaching such areas).

With regard to development of private sector capacity and engagement in maize seed marketing, the AISP offered substantially improved opportunities for a wide range of seed wholesalers and retailers. Private dealers report that the seed subsidy had a particularly beneficial effect in stimulating overall seed sales.

Historical experience in other countries, theory and the livelihood and rural economy modeling suggest that the promotion by the AISP of higher wages and lower maize prices also promotes wider pro-poor growth and economic development. This, however, will take time and requires a significant period of increased maize productivity and of low and stable maize prices, to allow matching growth of both demand and supply in domestic non-farm and non-staple farm markets. This in turn requires consistent and stable policies that encourage greater stability of maize prices and promote both maize and non-maize productivity and markets.

Although we observe that the 2006/7 AISP does appear to have contributed towards achievement of most of its objectives, we also note that no targets were set for these objectives and that the effectiveness of the AISP in promoting these objectives is highly sensitive to three particular variables: crop response to fertilizer, valuation of incremental maize output, and displacement of unsubsidized sales by subsidised sales. At least two of these variables are sensitive to program

design and implementation and therefore under at least partial control of government.. Actions needed to improve crop responses to fertilizer are, conceptually at least, relatively straight forward, and involve, for example, timely receipt of fertilizers by farmers, proper application, and use of improved seeds. Actions needed to reduce displacement are, however, more complex.

Critical and related issues here are targeting and control of programme scale and costs. Survey results clearly show higher rates of displacement with less poor households and higher rates of incremental fertilizer use when subsidized fertilizer is received by poorer households. We are not aware of any evidence to indicate that poor farmers are less efficient in their use of fertilizer than relatively non-poor farmers. In fact, because poor land-constrained households tend to have greater labour-to-land ratios, there are reasons to believe that such households could, with proper extension messages and seeds, achieve greater response rates to fertilizer than larger farmers. It is also widely reported in different parts of the world that smaller farms are more efficient users of land and capital than larger farms and the Malawi Poverty and Vulnerability Assessment (Malawi Government and World Bank, 2006, p 180ff) presents evidence that this is also the case with maize production in Malawi. We discuss below how better targeting towards poorer farmers may be achieved, but note here that this is critical for achievement of all the programme objectives discussed above: it should promote greater achievement of increased production and productivity, and greater efficiency of use of government and national resources. It should also lead to greater reductions in vulnerability to food insecurity, hunger and poverty, and greater impacts on wider growth, through both direct effects (since more poor and vulnerable households would gain directly from receipt and use of subsidised inputs) and through indirect effects (as a result of greater programme impacts on wages and maize prices). Reduced displacement of unsubsidised sales will also reduce the negative effects of the programme on development of private sector capacity and engagement in input marketing.

The need to limit the scale and cost of the programme is related to but goes beyond targeting: effective targeting should be part of a strategy to limit the scale and cost of the programme. An almost universal feature of subsidy programmes around the world is their tendency to grow in scope, scale and cost, as stakeholders exert political pressure to increase their access to private benefits. These processes are clearly affecting the AISP, and it is very important that they are resisted. Economic theory and historical experience with subsidies in general and specific analysis of the AISP all suggest that most effective use of scarce government resources is achieved through strictly controlling subsidy costs and reducing, not increasing, its scale and scope over time.

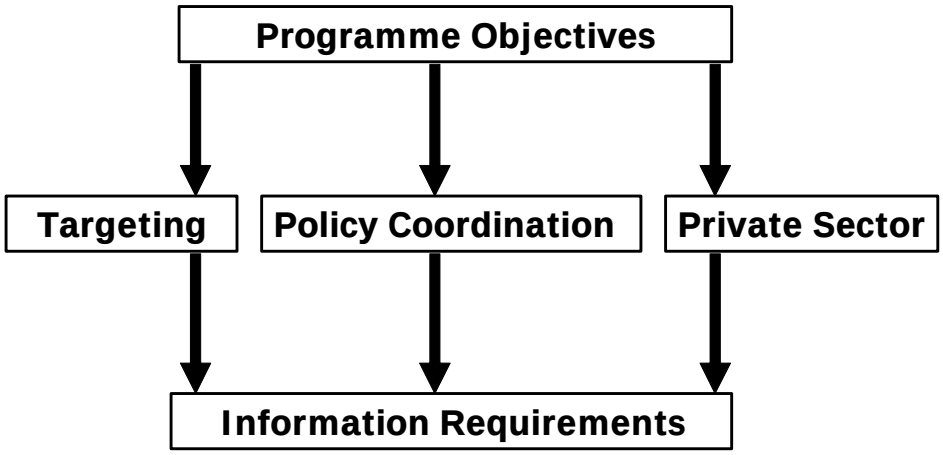
Overall the analysis of evidence available in evaluating the AISP both (a) recognizes the programme's potential to contribute positively to both its stated objectives and to wider government objectives for pro-poor growth, and (b) considers that the 2006/7 contributed to the achievement of those objectives. The estimated benefit cost ratios ranged from 0.76 to 1.36. These estimates demonstrate that with good management the program can yield favorable economic returns. It is beyond the scope of the study to have considered the rate of return to the AISP subsidy programme in relation to other alternative public investments and hence it is not in a position to assess whether the objectives of the programme could have been better achieved with an alternative mix of public investments in measures promoting growth and social protection. Any use of the results for such comparisons should also take into account some of the more difficult to measure benefits of the AISP such as providing immediate social protection and stimulation of farm and non-farm growth – benefits that are not directly accounted for in results reported above. There are, however, many ways in which the effectiveness of the programme could be improved, and there are substantial dangers that without explicit action to improve its effectiveness and control its costs the programme could become inefficient and ineffective, and an unsustainable drain on resources, pulling down rather than promoting growth, food security and poverty reduction.

12.2 Critical issues affecting AISP performance

Our review of the 2006/7 AISP highlights five main critical issues affecting AISP performance: definition of programme objectives, targeting, policy coordination, development of the private

sector, and information requirements. Figure 12.1 illustrates how these are related: clear definition of programme objectives is a pre-requisite for improved targeting, policy coordination and development of the private sector, while improvement in each of these areas of policy requires information. We discuss each of these issues in turn.

Figure 12.1 Critical issues for AISP performance



12.2.1 AISP objectives

It was argued in the March 2007 report that an effective subsidy programme could support long term pro-poor growth and development with diversification out of low productivity agriculture, if it increased land and labour productivity, increased ganyu wages, and promoted stable and relatively low prices, although it also noted that a difficult balance needs to be struck between the needs of poor net buyers for low maize prices and the needs of net maize sellers for prices high enough to stimulate investment in surplus maize production. Evidence presented in this report from market price data, qualitative field work, the household survey, and rural livelihood and informal rural economy simulations supports this argument. It is therefore important that clear objectives be set at the highest level for the way that the AISP is expected to contribute to long term economic growth and development. These objectives should then be used to guide the development of short and medium term objectives related to productivity growth, poverty reduction, food security and development of private sector input networks. These short and medium term objectives should in turn guide decisions about the design and implementation of the programme and its interactions with other policies.

A consistent framework of objectives can help to resolve apparent conflicting objectives, such as that between household food security and national food self sufficiency as described above. A number of points can be made regarding this particular issue.

Once broad objectives are agreed it is important that appropriate achievement targets are set for these in long term subsidy programme planning and in short and medium term plans. These should be integrated with planning of other complementary programmes and should specify, for example, targets for subsidized and unsubsidized imports and sales by both private retailers and parastatals and for increasing maize yields, incremental maize and other crop production, maize prices (and maize price stability), ganyu wages, growth in horticultural and livestock production, and growth in non-farm incomes. Targets should also set limits for the scale and cost of the subsidy programme and provide a means for transparent and consistent communication among the various stakeholders in the programme.

12.2.2 Displacement

National and household level estimates presented and discussed in section 6.4 suggest that between 30 and 40% of subsidized fertiliser purchases displace commercial purchases. Examination of national fertilizer sales also suggests that displacement is higher with 'tobacco fertilizers' than with 'maize fertilizers'. High displacement rates seriously undermine the efficiency of the programme and its effectiveness in delivering developmental benefits. This occurs because high displacement lowers the impact of government investments on incremental crop production and hence on food production, incremental incomes, maize prices, wage rates, and input market development - indeed on achievement of all programme objectives. Many of these impacts of high displacement are not captured by economic benefit cost analysis.

Lowering displacement rates must be a major objective in the implementation of any future programme but will not be easy. A number of recommendations made in the report should help to reduce displacement, most notably measures to promote timely and transparent implementation and targeting of a greater proportion of subsidised inputs to poorer households. Both these issues are addressed below.

12.2.3 Targeting

The targeting of subsidized inputs to different groups or types of people is a critical and sensitive issue, and some form of implicit or explicit targeting is inevitable unless a universal and equitable subsidy is implemented. It is helpful to distinguish two principle levels of targeting – geographical targeting (between regions, districts and different geographically defined communities) and intra-community targeting (between different categories of people or households within communities). Geographical differences between areas and communities will often be correlated with socio-economic and cultural differences between these areas and communities. The distribution of subsidized inputs between different categories of people then depends upon the interaction of formal criteria determining geographical targeting and intra-community targeting together with 'informal' de facto criteria and mechanisms which are actually implemented.

The formal criteria that were supposed to be used in determining geographical and intra-community targeting were described briefly in section 4.3.1. The March 2007 report paid particular attention to regional and district patterns of distribution and showed that the basal allocation of coupons proportional to estimated maize and tobacco areas led to substantially higher allocations per household in the northern and central regions as compared with the southern regions, with substantial variation between districts within regions. Regional and district differences were often then reinforced in the allocation and distribution of a second round of supplementary coupons, for which formal allocation criteria were much less clear. Communication about criteria to be used for coupon allocations between different areas and villages within districts were less clear, particularly for the supplementary coupons and appeared to vary between districts. Similarly formal criteria for coupon allocations between households within villages were loosely defined and not consistently and clearly communicated, as discussed in sections 4.3.1 and 7.2. Targeting criteria in programme design in 2006/7 rightly intended to identify recipients who would not otherwise have purchased fertilizers, but also stressed the need for households to have access to cash for coupon redemption with land and labour for fertilizer use, and capacity to adopt / utilise technology. These criteria were often at odds with other criteria identifying recipients as poor and vulnerable households. Lack of clarity and transparency meant that informal allocation criteria reflecting the interests (sometimes legitimate and sometimes illegitimate) of powerful stakeholders therefore became increasingly important at lower levels of allocation and distribution.

Evidence from the household survey in section 7 of this report shows that (a) actual fertilizer coupon receipts did follow the broad regional and district patterns of allocation reported by the Ministry of Agriculture, and (b) significant quantities of subsidised fertiliser went to less poor households, many of whom purchased greater amounts of fertiliser in previous seasons. Greater displacement of commercial purchases and hence less incremental fertiliser use occurred when less poor households received subsidized fertilizer. It is possible that this may have been partly the result of lower tobacco prices in 2005/6, of uncertainty about access to subsidized fertilisers, and of lack of unsubsidised fertiliser stocks at ADMARC /SFFRFM markets. Nevertheless it

suggests that there may well be higher incremental productivity gains from targeting more fertilizer towards poorer households.

As a result, and as discussed earlier, ensuring that more poor people get subsidised inputs for maize production should have positive benefits in promoting reduced displacement, greater productivity and growth impacts, and greater impacts on reducing food insecurity, hunger and poverty. This can be achieved in four ways:

a. by making district allocations proportional to farming population in maize growing areas;

b. by specifically targeting maize growing areas where there are more poorer, food insecure people (using, for example, MVAC information) with lower per household allocations in other areas;

c. by making the programme a universal one, but with lower quantities of subsidized inputs per households; and

d. by specifically targeting poorer, more vulnerable households within communities.

(a) and (b) represent different geographical approaches to targeting while (c) and (d) represent different intra-community approaches to targeting. (a) and (c) both try to correct discrimination against poorer households in the 2006/7 programme, whereas (b) and (d) go further in seeking to actively discriminate in favour of poorer households. Successful implementation of (b) and (d) should be more effective in directing subsidized inputs to poorer people who, it is argued from evidence in this report, should use it more productively and to greater effect in reducing food insecurity. There are, however, potentially significant political difficulties with both (b) and (d), and significant practical difficulties with (d) (although comparison of the AISS and IHS2 data suggests that the TIP programmes in 2003/4 and 2004/5 were reasonably successful in targeting starter packs to poorer households, despite difficulties with and reports of the problems caused by targeting of TIPs in previous years (Levy and Barahona, 2001, Chinsinga *et al.*, 2002, and Levy and Barahona, 2002).

(a) and (c) were both recommended in the March 2007 report, and (a) is being implemented in the 2007/8 season, while there are concerns about the need for 25kg bags of NPK and urea if subsidized quantities per households are halved and about 'dilution' of the benefits with smaller subsidized quantities per households (as discussed earlier in section 7.2). If targeting a proportion of households is to continue, however, much greater care needs to be given to deciding and communicating the objectives of targeting, the types and characteristics of households to be targeted, and the criteria (and methods and people) to be involved in targeting. These may need to vary between different areas to reflect their particular livelihood and rural economy characteristics[44].

There may also be a targeting dimension in the allocation of the subsidy between food crop inputs (not only 'maize fertilisers' and seed but also legume seed, for example) and cash crops, in that poorer households are less likely to be investing in cash crops and more likely to be food crop cultivators unable to afford the purchase of unsubsidised inputs. Displacement may also be lower with food crop inputs, and indirect benefits from lower food prices higher. However cash crops are also important in offering opportunities for diversification and can be high demanders of labour offering benefits to the poor through tightening of labour markets.

If it is not politically or practically feasible to develop a targeting system that effectively reaches poorer households then comprehensive coverage of all smallholder farmers with a smaller subsidy per household (to keep down the total budgeted cost) could be a better alternative than ineffective targeting and high displacement, though as discussed earlier the relative costs and benefits of .these alternatives will vary across different areas.

There are a number of potential advantages to a comprehensive system:

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[44] The relationship between eligibility to receive coupons and receipt of remittances, regular wage employment and other sources of income needs to be given greater consideration, for example.

- To some extent it is merely accepting what has already been happening in many villages.
- It provides a transparent system of allocation which is easily understood and can easily be explained and justified to the public. It also extends benefits to a much larger proportion of the smallholder farmers. The system can also be applied consistently at all allocation levels from region to district, EPA and village.
- It does away with difficulties in targeting within villages, which was inconsistent and sometimes not transparent, and led to opportunities for and sometimes suspicion of misappropriation of coupons by those involved in their distribution.
- It could reduce pressures for supplementary coupon issues and therefore support better budgetary control.
- Coupon allocation according to number of households should also increase direct and indirect benefits where there is food insecurity, and reduce grain transport and marketing costs.

To address some potential difficulties arising with this system and to take full advantage of the benefits listed above, four further modifications were proposed in the March 2007 report:

- the subsidy should be extended to include all smallholder farmers, not just maize growers, but without additional allocations to cash crop growers;
- farmers should have more choice of inputs and fertiliser bag sizes to buy at subsidised prices;
- coupons should be given a nominal face value approximately equal to the subsidy they represent; and
- when redeemed by input sellers the fixed face value should be augmented by a district/EPA specific 'location premium' which can be used to provide an incentive to input sellers to operate in more remote areas.

Further details of this system may be found in the March 2007 report.

12.2.4 Agricultural sector and programme information needs

There are some fundamental information gaps that prevent proper planning, management, monitoring and evaluation of the subsidy programme.

A fundamental problem arises with differences between the National Statistical Office and the Ministry of Agriculture as regards the number of farm families. Whereas the Ministry of Agriculture based its subsidy planning and crop estimates on a total of just under 3.4 million farm families in the 2006/7 season[45], estimates derived from National Statistical Office population projections give a total of 2.47 million rural households[46]. As noted in section 7.1 this leads to very different estimates of total subsidised input use under the programme, and/or of the proportion of households receiving subsidised inputs and/or of quantities of subsidised inputs received by each recipient household. These discrepancies were discussed to a limited extent but not resolved in evaluations of the Starter Pack programme. A 'ground truthing' study explicitly investigating this issue came up with results that were supportive of the Ministry of Agriculture figures, although with some regional differences (Wingfield Digby, 2000). Levy and Barahona, 2002 suggest that the number of household varies between years, as households may merge 'merge to share scarce resources in bad year' and then may separate again after a good harvest (Levy and Barahona, 2002, p16). Another, and perhaps associated, source of difference may be related to the difference between households and dwelling units. National Statistical Office, 2000 reports an average of 1.3 dwelling units per households in the 1998 census, It is very important that the

[45] Estimated from 2005/6 figure of just over 3.28 million.

[46] Calculated from data supplied by MVAC, excluding protected and urban and urban and peri-urban areas.

Ministry of Agriculture and the National Statistical Office resolve this discrepancy and together determine and agree on an accurate figure.

A second topic where better information is very important concerns incremental yield benefits from the application of fertilisers to local, hybrid and OPV maize on farmers' fields. It was intended to gather this information from the household survey conducted in 2007 but as noted earlier the area and harvest data were not sufficiently reliable to generate the necessary information. While there appear to have been particular problems with this module in the survey, analysis of the IHS2 data shows that there are major difficulties in using farmer estimates of production and of crop areas to investigate such relationships. Discussion of the national crop estimates of maize production for 2006/7 also cast doubts on the reliability of basic information about crop areas, yields and production. Although it is hoped that the 2006/7census on agriculture and livestock will provide important information on these issues, the Ministry of Agriculture and the National Statistics Office need to consider how to obtain regular and reliable information on smallholder agricultural production, including cultivated areas under different crops, yields, input use, sales, storage and storage losses. Rural wages are critical to the livelihoods of the poor but very little information is available on access to informal employment and temporal and geographical variation in wage rates.

Better information is also needed on market behaviour, particularly staple markets. It was argued earlier that the maize price rises in early 2008 have seriously undermined many of the benefits of the 2006/7 AISP and that these price rises could be attributed in large part to information failures in assessing and predicting national maize stocks. In addition to better production data, as discussed above, information is therefore needed on storage losses, consumption of different staples, stocks, imports, and regional trade flows. District and livelihood zone information on poverty and vulnerability levels, assets and food security should also be used in coupon allocations, while information on parastatal input marketing costs, particularly overhead costs, is essential for determining the relative efficiency of parastatal and private sector delivery of subsidised inputs.

12.2.5 Engagement of the private sector

A major feature of the 2006/7 AISP was greater involvement of the private sector, although more broadly for seed distribution than for fertilizer distribution. Engagement between Government, donors and the private sector in the development of new systems was difficult at times, and agreements were often reached late, but private sector confidence was much greater after the 2006/7 season than after the 2005/6 season. The success of the seed distribution system is particularly noteworthy. There are, however, continued major concerns that need to be addressed. As discussed in section 6, uncertainty about the subsidy programme depresses incentives for both fertilizer suppliers and farmers to invest in fertilizer procurement. With regard to retail sales of subsidized fertilizers, only six relatively large players were involved. While this was an important step forward from 2005/6, large numbers of small agro-dealers have been excluded. Since growth in the activities of these agrodealers may offer the best opportunities for increasing fertilizer supplies into more remote areas, it is important that the AISP should seek ways of promoting rather than inhibiting their development. On a wider front, both government and the private sector need to work together with serious intent to develop and commit themselves to mechanisms for overcoming the particular constraints that otherwise inhibit the development of private sector services in more remote areas. This requires commitment from all stakeholders to the development of a mutually beneficial 'transition strategy' that would quickly move to less government involvement in input markets that are already well served by the private sector and a more gradual transition from government to private sector outlets in remote areas, recognizing that in these remote areas there is still an important role for government to play. Specific recommendations for improving private sector involvement are made later in section 12.4. Core to these are the need for greater consistency and transparency on the part of government, and for systems that promote the integrity of private and public sector engagement in the supply chain.

12.2.6 Coordination with social protection policies and programmes

Another issue we highlight in this report is the importance of coordination of the AISP with complementary social protection policies and programmes.

There are a number of interactions between the input subsidy programme and social protection measures. The indirect effects of the programme in raising wages and depressing maize prices should have very positive social protection benefits, and if low stable prices can be maintained with reductions in inter and intra-seasonal prices (a major question given the high maize prices in early 2008), then this will reduce the need for and cost of social protection measures. Direct effects of the programme in delivering social protection to poor and vulnerable households are undermined if these households are unable to access coupons either because they are excluded due to lack of land or labour, or because they cannot raise the cash to redeem coupons. Where such households do get coupons then they either gain immediate transfer benefits from selling the coupon or deferred benefits from using subsidized coupons on their own land. However qualitative field work and survey results show that female headed households and those with less assets are less likely to get coupons than others, and that if coupons are sold they generally fetch prices some way below their real value – so that the subsidy programme may not be effective in delivering direct immediate transfers to the poor, as the value of the transfer may be too small to meet household needs. However there may be pro-poor positive externalities from input subsidies where they lead to incremental food production.

As reported in section 7.4, social protection measures (such as public works schemes) seem to have been less effective in 2006/7 than in 2005/6 in assisting vulnerable households to access and use coupons. Although safety net programmes were important in around half of the locations where qualitative research took place, there were common problems limiting the contribution that they could make in improving households' access to coupons. If safety net programmes are to assist vulnerable households in accessing coupons and subsidised inputs then they need to be predictable and reliable, to provide cash, and they must not demand labour in ways that compete with farm labour demands.

Some clear policy conclusions and questions emerge from this.

- Fundamentally the linkages between the inputs subsidy voucher programme and safety nets need to be given much greater attention and specific coordination mechanisms need to be established at different levels, with coordination in the central design of the subsidy and safety net programmes and coordination in local coupon allocation, distribution and redemption mechanisms.
- If the subsidy programme is to continue as a widespread regular annual programme then this should both reduce the need for social protection interventions and change the nature of social protection support that is needed. Social protection instruments should then be designed to increase vulnerable peoples' ability to participate in the subsidy programme and gain direct as well as indirect benefits from it, and/or support those vulnerable people who, from lack of labour or land, are unable to gain direct benefits from the programme. They should also look to promote and 'crowd in' rather than replace and 'crowd out' traditional community responsibilities for social protection, as local communities should become more able to support the more needy among them.
- Where safety net programmes are intended to increase vulnerable peoples' ability to participate in the subsidy programme then they must be designed and timed so that they do not make labour demands that conflict with farm labour requirements and that they either provide cash at the time that households are receiving / redeeming coupons or they create 'entitlements' to coupons and coupon redemption (as, for example, with membership of fertiliser savings clubs reported in box 7.1).
- Where safety net programmes are intended to support those vulnerable people who are unable to gain direct benefits from the subsidy programme, then it may not matter so much if participation competes with agricultural labour demands, indeed such competition might be an effective form of self targeting.

It also needs to be recognised that as long as the subsidy programme is not operative in some areas, or is operative on only a very small scale, then the indirect subsidy benefits (of higher wage opportunities and lower food prices) will be much more limited and there will be no or very limited opportunities for direct benefits from participation in the subsidy programme.

12.2.7 Coordination with other policies and programmes

In the March 2007 report it was stressed that government needs to invest in ensure greater maize price stability and to invest in agricultural research, extension and finance (to support increased productivity in current crops and agricultural diversification[47]), sound macro-economic management, infrastructural development, policies promoting wider private sector development across the country and social protection. A particular issue arises with synergies and conflicts between the AISP and other investment programmes.

There is substantial evidence from around the world that investments in agricultural research and development and roads can yield high returns and are important pre-conditions for agricultural development in poor economies. There is less agreement and evidence about the relationship between these investments and returns to input subsidies. We are aware of only one study that examines these issues together and pays explicit attention to the way that returns to investment change over time (Fan *et al.*, 2007). This study, of India from the 1960's to 1990's to 2000, confirms wider findings by Alston *et al.*, 2000 that returns to agricultural research and development are (a) high and (b) tend to increase with development and/or are higher in more developed economies. It also reports lower but still good returns in agricultural GDP growth and in poverty reduction from investments in fertilizer subsidies in the 1960's and 1970s, but these declined markedly in the 1980's and 1990s, when returns to agricultural research and development were increasing. Very high returns in the 1960s and 1970s were achieved from investments in roads and education.

While there are difficulties in separating out the precise differences in effects of complementary investments in this analysis, the clear conclusion about India's experience of agricultural growth and poverty reduction is that these different investments are complementary. There is no reason to believe that this conclusion does not also apply to smallholder agricultural growth and rural poverty reduction in Malawi today. The benefits of the subsidy programme depend upon previous research, in Malawi and elsewhere, on fertilisers and improved seeds. It is suggested elsewhere in the report that the performance of the AISP could be improved by better use of existing research findings on fertilizer responses in different areas of Malawi, by better integration of organic and inorganic soil fertility management, and by extension services that promote this. If the AISP is successful in helping to stimulate growth as outlined in this and the March 2007 report, then effective client oriented research and extension have important potential roles in promoting profitable diversification into other crops and livestock. Similarly better road infrastructure is needed for rural people to access markets, as producers and consumers, both now and in the future.

Section 11 of the report suggested that although the AISP has not led to a decline in funding allocated to research and extension, it has reduced the effectiveness of research and extension activities, and expenditure on research and extension is a small proportion (8%) of expenditure on the subsidy. This is very low and it is important that more resources are put into effective research and extension. Section 11 does not provide information on investments in road infrastructure, but again it is important that expenditure on this is increased, and this has implications for the scale and scope of the AISP, and the need to make sure that resources devoted to the AISP are used as efficiently as possible.

[47] Agricultural diversification offers opportunities for increased incomes, improved diets and better growth linkages or multipliers where it meets increased local demand for horticultural and livestock products. It also provides some help in increasing farm household resilience and reducing vulnerability by spreading risks and (in the case of livestock) holding productive assets

It has been argued that effective long term development benefits from the AISP will involve increased maize productivity, low maize prices and higher wages stimulating local demand for non-staple higher value foods (livestock and horticultural products) and non farm goods and services. Low stable prices are essential for this process, and while the AISP may reduce maize prices in most of good and normal rainfall, there may still be significant price rises in years of poor rainfall. Investments in the AISP therefore need to be accompanied by measures to stabilize the price of maize.

12.2.8 Future challenges

The discussion of changes in international and regional maize and fertiliser prices, consideration of the management and implementation challenges facing the programme, and experience with subsidies around the world suggest that if the programme continues then the challenges it faces will in many ways intensify.

The 2006/7 programme experienced cost overruns due to both under-estimates of unit costs and considerable over-budget distribution of coupons and subsidised fertiliser. Cost overrun problems will be exacerbated in future by expected major increases in costs from higher fertilizer prices This will challenge the affordability of the programme for government and, unless regional maize prices rise to an equivalent extent, erode net economic benefits (the 'profitability' of the programme for the country). Climate change is also likely to increase variability in rainfall and seasons with too much or too little rain.

Continued implementation of the programme presents both opportunities and challenges. On the one hand programme managers should learn from experience, allowing development of more efficient means of implementing the programme. This requires incentives and stimuli that encourage and reward efficiency and innovation, and will be best served by a progressive transition moving to less government involvement in input markets that are already well served by the private sector and a more gradual transition from government to private sector outlets in remote areas, as described above. Successful implementation of the programme will demand the management of other transitions, as livelihoods and the rural economy evolve and horticultural, livestock and non-farm services become increasingly important, and the programme is then phased out or changed to have a more explicit social protection function.

However as subsidies are implemented over longer periods there is also a tendency for the 'dark side' of subsidies to grow: fraudsters work out how to cheat the system, displacement is likely to increase if farmers' incomes are growing, and political pressures for the continuation and extension of the programme also tend to rise. Specific measures need to be taken to address these problems, including for example annual changes in coupon printing systems and designs, constant watchfulness and action against fraud (with clear communication of new or changed systems to input distributors and farmers), and clear independence of programme management from political influence.

These challenges reinforce the need for increased agronomic and management efficiency and for improved management systems. They therefore reinforce recommendations made elsewhere in the report to achieve efficiency gains and good governance. In particular fixed value coupons can help to control costs as well as promote flexibility, farmer choice, competition and private sector development. Similarly complementary investments in research and extension for better fertiliser application methods and soil conservation and organic matter management can improve fertiliser response rates and, with investments in transport infrastructure, lower costs facilitate horticultural, livestock and non-farm diversification.

12.2.9 Type of fertiliser subsidy

Broad debates in Malawi about different types of fertiliser subsidy have centred around a choice between general price subsidies and rationed subsidies with limited quantities to be accessed by specific beneficiaries and, where there is targeting, whether this should be achieved through coupons distributed by local government or through farm clubs.

A Ministry of Agriculture document setting out the concept of the 2006/7 coupon scheme clearly presented a very strong set of arguments in favour of a rationed scheme: significant general fertiliser price subsidies will be very costly, with major cost control problems as lower prices which fuel both domestic demand and cross border leakage. A coupon system, on the other hand, can be used to limit the cost of the programme (by limiting the number of coupons) and can also be used for targeting of the subsidy to households with particular characteristics and can help to limit cross border leakage. As is evident from discussion of displacement problems with AISP, a coupon system does not eliminate or necessarily reduce displacement, but it offers options for doing this in ways that are not possible with more general price subsidies. A comprehensive but rationed system (where all households get a rationed quantity of fertiliser) should be a more efficient use of government and of national resources than a universal price subsidy, in terms of incremental production and poverty and food insecurity benefits. Appropriate and effective targeting offers opportunities for further efficiency gains but as reiterated throughout this report, the extent to which potential gains from a rationed and targeted system depends heavily upon effective implementation.

With regard to the debate about the relative benefits of the current coupon system and use of farm clubs in delivering rationed and targeted subsidies, there are important questions about their relative effectiveness in targeting and about the practicality of the two approaches. Farm clubs were the major conduit for delivery of targeted and rationed fertiliser subsidies until the early 1990's. However the strong network of farm clubs has subsequently largely disintegrated. Those that have continued tend to provide services mainly oriented to cash crop production, particularly tobacco. The current network of farm clubs therefore does not have the broad membership base needed for the delivery of the subsidy programme. Attempts to rapidly scale up clubs will be very demanding of extension staff and are not likely to lead to effective subsidy distribution : even when they were established the previous farm clubs were very heavily supported by an extension service that had more staff and resources than the extension service has now.

The limited spread of farm clubs and likely difficulties in their establishment and operation mean that their use as the primary institution for subsidy distribution is likely to pose many more difficulties than the current system, as regards lack of access for poorer households (although there are exceptions, farm club membership has tended to exclude poorer households), and higher rates of diversion and displacement. This is not to say that farm clubs should not have a positive role in the disbursement of a targeted voucher subsidy (Box 7.1 suggests that there can be strong complementarities between farm clubs and better use of subsidised inputs, and indeed the AISP could be a stimulus for the establishment and strengthening of farmer clubs in some areas).

Finally, if a targeted and rationed subsidy system is to be implemented, the use of coupons provides important potential benefits over direct physical distribution of inputs to beneficiaries. There are benefits from the way that it allows the easier separation of subsidy targeting and registration from delivery, but the greatest benefits are from the way that it can allow the development of systems where subsidised inputs can be delivered by different suppliers, and where farmers can exercise choice regarding which inputs to acquire from which supplier. Where systems can be developed to allow this choice they provide a triple benefit, (a) allowing farmers to choose inputs that are mos appropriate to their needs, (b) promoting competition among suppliers, and hence lower input costs for farmers and/or government, and (c) subsidising the spread and expansion of supplier networks.

12.3 Subsidy programme principles

It is important to agree on broad principles for the programme which can be the basis for searching for and developing specific options for effective system design and implementation. The following principles are proposed:

1. Given Malawi's complex food security challenge the input subsidy programme should seek to reduce national and household food insecurity, reduce poverty and vulnerability, promote economic growth and diversification in the ways outlined earlier, and stimulate private agribusiness services in rural areas.

2. It is essential that the programme be implemented efficiently and effectively to ensure that the country gets the maximum benefit from this investment, and at as low a cost as possible.
3. The input subsidy programme is one of a set of policy instruments and programmes concerned with food security, agricultural and economic development, and social protection that needs to be designed and implemented in a coordinated way to promote food security and avoid excessive swings in food production and prices over time.
4. The programme should be targeted only at smallholder farmers, preferably those in the bottom half in terms of their livelihood incomes.
5. The programme should be designed and implemented with a view to the reduction and eventual withdrawal of the subsidy as its objectives are progressively achieved. This requires a joint vision of, and objectives for, agricultural input sector development that will promote public, private and civil society partnerships founded on mutual trust and accountability.
6. In pursuit of low cost, sustainable, effective and efficient achievement of its primary objectives, the programme should promote the development of a strong, competitive, and efficient private sector in fertiliser and other agricultural input supply. This will free up government capital and other resources (particularly skilled staff) for other critical uses that complement and enhance private sector effectiveness (e.g., road infrastructure, agricultural research). Effective quality control monitoring is also essential to maintain the integrity of the input supply sector to the benefit of all stakeholders.
7. The programme should be designed and implemented to minimise displacement of commercial input sales in order to (a) maximise the incremental benefits and efficiency of the programme and (b) reduce negative impacts of the programme on the commercial input sector, whose expansion can generate employment and free up government budgets for other important investments.
8. In remote areas where volumes are small and access costs high, it is difficult for the private sector to serve farmers without some form of subsidy from government, and effective partnerships between the government and the private sector will be needed. In this there are specific roles for state owned enterprises that complement rather than replace private sector activities.
9. Predictability, transparency and timely decision making and communication are critical for the programme to deliver benefits to smallholder farmers, leverage new investment by private sector agents (farmers, input suppliers and produce buyers), and lower costs in government purchase and delivery of goods and services.
10. It is important that some flexibility is built into the programme over time to respond to weather-induced fluctuations in food supply, as well as changes in farmer input demand that support crop diversification. A three year rolling programme, integrated into the government's medium term expenditure framework, could promote the necessary balance of predictability and flexibility.
11. Strict budgetary control is critical for programme sustainability and benefits, to avoid disrupting complementary planned investments in agricultural and other sector support programmes, and to facilitate macro-economic stability.

Bearing these principles in mind, the following sections (drawn largely from the March 2007 report) suggest:

1. Ways in which the implementation of the subsidy programme as currently designed could be improved;
2. Potential innovations in programme design to increase effectiveness and reduce costs;
3. Further recommendations for innovations which could be tested in pilot programmes.

12.4 Improvements within the current system

12.4.1 General system operation and management

1. Programme review and design must begin early and follow a calendar agreed with representatives of key stakeholders, including Government, private sector, civil society and donor partners. Adherence to an effective calendar will be greatly facilitated in the context of a 3-4 year agricultural input subsidy program framework. To ensure that subsidized fertilizer is incremental to commercial sales to the maximum extent possible, coupon distribution would ideally take place in April at the same time as farmers begin to receive income from tobacco sales.
2. An agricultural input programme committee should provide a forum for representation and coordination of all key players in the planning and execution of the program. The committee should be small enough to be efficient, and comprised of representatives from the private sector (minimum 3), Government (ADMARC/SFFRFM, Ministry of Finance and Ministry of Trade), donors, farmers, civil society and one or two independent members of standing in the industry. The committee should be chaired by the Permanent Secretary of the Ministry of Agriculture and should meet regularly to ensure timely development and implementation of the programme.
3. Increased and earlier communication about the programme should accompany greater transparency and accountability to and involvement of stakeholders throughout the programme, for example in coupon allocation and distribution, in monitoring and coordination of input sales, and in the prevention of fraud.

12.4.2 Coupon allocation and distribution

1. All activities in the process of coupon allocation and distribution must be started much earlier – district allocations, EPA allocations, ordering of coupon printing, communication about the subsidy programme, despatch of coupons to districts, despatch of funding to districts, distribution to villages and distribution within villages. This is necessary if fertiliser purchases are to occur in October, but there are potential benefits in aiming for and achieving much earlier subsidy sales.
2. Coupon allocations at all levels (to districts, EPAs and villages) should be determined by, and be proportionate to, the numbers of smallholder farmers rather than crop cultivated area. This method of coupon allocation should increase production benefits in areas where there is more food insecurity, provide direct benefits of increased food production to more poor (but productive) households, reduce grain transport and marketing costs to the areas with most food insecure people, and lead to minor reductions in fertiliser transport costs[48]. In addition this would be a more transparent system of allocation, more easily explained to, understood by and justifiable to the public. It would also be more consistent with common practice of allocating coupons to villages in proportion to their population, and would better match the geographic distribution of potential beneficiaries.
3. Clearer beneficiary targeting criteria need to be developed and communicated through the local government system. These should be consistent both with the programme objectives and with local understandings of differences between people's livelihoods and entitlements. This is extremely difficult, and it may well be better to target smallholder farmers as a whole in a comprehensive smallholder agriculture input subsidy programme. [49]
4. Social protection programmes that enable poorer households to earn cash, similar to those implemented in 2005/6, would expand the proportion of the productive poor who qualify to

[48] With the volumes and prices of budgeted fertiliser quantities in 2006/7 this would have been of the order of 1% or MK 0.5 million.

[49] Other reasons for implementing a comprehensive system alongside wider system changes are presented in section 12.2.3 but if these wider system changes are not considered appropriate there may nevertheless be a strong case for introducing comprehensive targeting within the current system.

obtain and use subsidized fertilizer and reduce the (as yet unquantified) incidence of coupon sales due to cash constraints.

5. There are strong arguments for conducting pre-registration to identify coupon recipients before coupon distribution, with public listing of beneficiaries and of the coupons they are to receive. This would increase transparency and accountability in the process of coupon allocation, and assist beneficiaries and non-beneficiaries in planning their cash allocations and purchases of unsubsidised fertiliser. There are also strong potential synergies with social protection interventions to enable poorer households to earn cash for fertiliser purchase, as early pre-registration for coupon beneficiaries could be linked to registration for public works programmes.
6. There should be further investigation of and lesson learning from the successful development of local mechanisms and examples of good practice in increasing transparency and accountability in coupon distribution (see point 8 below). The Ministry should seek to learn about and from different systems developed in different districts. Examples of such innovations encountered included farmer savings groups or clubs with specific emphasis on promoting encouraging farmers to save up for the cost of coupon redemption in Dedza (see box 7.1) and village level organisation of bulk fertiliser transport in Mzimba (section 4.3.1).
7. Critical attention needs to be paid to coupon design and security features. Attempts at fraud are likely to become more sophisticated as the programme continues, and greater attention should be paid to preventing fraud.
8. The influence and involvement of Traditional Authorities in coupon distribution at local level should be eliminated where this is still significant. The involvement of VDC sub-committees, assisted by Ministry agricultural staff, could facilitate a more transparent and equitable allocation when combined with clear mechanisms for tracking and publicising of all coupon issues to districts, EPAs and villages.
9. There should be early, widespread and clear communication by radio and public meetings about the coupon allocation and distribution system, and about people's reasonable expectations under the programme.
10. A public relations strategy should be developed for managing information to the press. This should ensure that the strengths and achievements of the coupon allocation and distribution programme are publicised before and alongside the inevitable news stories about abuse of the system.
11. There must be formal controls on the issue of supplementary coupons. They should preferably be eliminated or, if it is desirable to maintain some flexibility, then they should be costed in the initial budget and held back from the initial allocation, with strict adherence to the budgeted quantities. No additional coupons should be printed after the approved programme quantity has been fulfilled.

12.4.3 <u>Input procurement & distribution</u>

1. To enable timely decision making and procurement by both private sector and public entities Government needs to announce early in the calendar year the indicative quantity of fertilizer to be covered by the subsidy program in the following year, and to indicate the share of that total that government intends to procure and distribute through its own outlets. In the interests of national food security and of efficient implementation of a major national programme the parliamentary budget approval process should recognize and accommodate this requirement for early announcement.
2. Following the Government announcement above, private sector importers and distributors should make their own arrangements for fertilizer procure for retail distribution to coupon beneficiaries, and should also continue to submit tenders in response to the procurement needs of SFFRFM.

3. The share of subsidized fertilizer imported and distributed by the private sector should expand over time, with a commensurate reduction in the shares directly imported by SFFRFM, and distributed by ADMARC and SFFRFM and concentration of their (declining) activities in markets located in more remote areas. Resources liberated by this reduction should enable ADMARC and SFFRFM to strengthen service provision in remaining locations through adequate staff numbers and training, and reliable stocking of complementary agricultural inputs for maize seed and fertilizer (e.g., crop storage chemicals). The ability of ADMARC to improve service even with a smaller network will be contingent on government making approved budget allocations available on time.

4. The rate of expansion in the share of subsidized fertilizer and seed distributed by the private sector should depend in part on credible commitments to expand retail coverage in poorly served areas of the country. This commitment can be met through new or re-activated distributor outlets, but even more cost effectively through expansion and integration of independent agro-dealers located away from major trading centers into the commercial input supply chain and through voucher reimbursement policies that adequately account for the increased costs of serving remote areas.

5. A separate and rapid review of government's tendering process is needed to ensure clarity in the criteria for tender selection, adoption of appropriate international industry standards for tender validity and conditions, and clear mechanisms for establishing and handling potential or actual non-fulfilment. Criteria for tender selection must address the need to balance cost considerations with performance capacity and track records while stimulating competition in the market in a transparent way. There should be a transparent separation of government and SFFRFM tendering processes.

6. Rigorous auditing procedures should be implemented for all stakeholders in the system. This should involve

    - spot-checks on coupon distribution processes and outcomes, and on sales of subsidised inputs under the programme.
    - rigorous and substantial end of sales auditing of subsidised sales by both parastatal and private sector agencies.

    There should be strong penalties for organisations which either participate in fraudulent activities or fail to have proper procedures and penalties for preventing fraud by their employees.

7. Expansion of the private sector share while further improving performance will require other measures to ensure integrity of the supply chain. Specific measures include:

    a. Finalization of statutes for the new fertilizer association;
    b. Establishment of an agreed code of business conduct for fertilizer association members;
    c. A licensing system for agro-input dealers that will provide necessary safeguards while allowing them to participate as distributors in the programme;
    d. Review of fertilizer integrity testing procedures and public dissemination of results;
    e. Prompt payment by government with assured timely access to foreign exchange to minimize currency risk (or allow tenders and payment in US dollars)
    f. Allowance for currency exchange movements in reimbursement of vouchers.
    g. The fertiliser and seed associations should collect information from their members about annual sales, imports and stocks, and publish aggregate information to promote transparency and improved coordination within the fertiliser and seed industries.
    h. Formal agreement between government and the input sector regarding procedures and performance standards of private sector and government organisations involved in different ways in the input subsidy programme

12.4.4 Coupon redemption

The majority of the problems encountered by beneficiaries and distributors that have been documented in the report (e.g., lengthy queues at outlets, stock shortages, tipping) can be resolved to a high degree by timely programme implementation, by better communication and by improvements in coupon design, allocation and distribution and in input procurement and distribution as recommended above.

The requirement to sort coupons by location and serial number prior to submission to the Logistics Unit should be dispensed with, and options for more rapid processing systems (for example the use of bar codes) should be investigated. Similarly simpler point of sale systems should be developed to dispense with the need to attach a separate cash receipt to each coupon.

Where multiple donors are involved in supporting the same programme component then payment and other administrative procedures should be harmonized or provision should be made to cover extra administrative costs.

12.4.5 Annual programme scheduling

A consistent theme in recommendation for improvements within the current system is for timely and transparent and consistent decision making and implementation. Table 12.1, which was also presented in the March 2007 report, sets out a proposed calendar for key annual decisions and actions for the timely and effective implementation of the subsidy programme in line with the recommendations above. An important issue that was raised in the March 2007 report is the difficulties for programme planning implementation presented by the timing of the national budget process, as the allocation of funds to tenders for fertiliser purchases (needed in April) can be delayed by parliamentary approval of the budget (in June). If it is not possible to amend the budget year then it is important that special arrangements are made to ensure that the budget process does not delay fertiiser procurement. It is understood that such arrangements were made for procurement for the 2007/8 programme.

Table 12.1 Calendar for key annual decisions and actions in the subsidy programme

Action/Decision	
Review scale of programme and negotiate private and public sector shares	February
Announce programme scale and share decisions	End Feb
SFFRFM tender documents issued	End Feb
Pre-registration campaign	Feb - Mar
Finalize programme modalities (target group, coupon design, processing etc)	Mid-Mar
SFFRFM tender awards	April
Awareness campaign	March – May
Coupon Distribution	April - May
Coupon Redemption	April - Dec
Coupon Processing and Payment	April - Jan

12.5 The Scale and Scope of the Subsidy Programme

Viewing the issue of scale from the national perspective, there are two major considerations that need further examination: the direct costs of the programme and the impact of the programme on maize production.

As discussed in section 8, fertiliser prices have risen substantially since the beginning of 2007. This leads to three main alternative courses of action: (a) maintaining both the budget and the scale of the programme (in terms of physical quantities of subsidised inputs) at roughly the same level with a large increase in farmer contributions; (b) maintaining both the budget and farmer contributions at roughly the same level with a large cut in the scale of the programme (in terms of physical quantities of subsidised inputs); and (c) maintaining both the farmer contributions and the scale of the programme (in terms of physical quantities of subsidised inputs) at roughly the same level, with a large increase in the budget. There are difficulties with each of these approaches. First, if farmer contributions increase too much then this will limit the participation of poor farmers who most need the subsidy and who make the best use of it. If on the other hand the programme is scaled back too much then the 'indirect' benefits of higher wages and lower food prices are diluted, and these are important elements of the programme' contribution to reduced food insecurity and to wider pro-poor growth. However a large subsidy programme may also be inefficient in that it tends to promote displacement rather than incremental input use, and the need for the subsidy to stimulate incremental use may decline over time. Furthermore it may be possible to maintain high levels of incremental production with a smaller volume of subsidised inputs through improved management of the programme, complementary investments and more effective extension advice. Finally if the budget increases too much then poses problems for fiscal and macro-economic management and increases the opportunity costs of the programme in reducing government expenditure on other worthwhile investments. Some combination of these responses to increased input prices is likely therefore likely. This should be linked to scaling back of the programme over time to ensure that it is appropriate to (declining) need.

Scale should also be examined from the perspective of incremental maize production. If the programme were to operate with increased efficiency in terms of reduced displacement of commercial sales, then the production impact from the subsidised fertiliser would rise. This should also happen if there is increasing use of hybrid seed and more timely delivery of inputs. How much maize should Malawi aim to produce in a good year? Experience with the large 2005/6 and 2006/7 harvests make this a highly pertinent question, and it is very difficult to make a judgement – but

clearly there must be a limit and if displacement of commercial sales was reduced and hybrid maize seed increased then in good years a subsidy on 150,000 tonnes of fertiliser will probably produce more maize than is needed[50]. However these two years were unusually good, and decisions need to be made looking at longer term average rainfall conditions, recognising that low stable prices are needed in years with lower rainfall – acute food security problems in the past have been associated with simultaneous reductions in fertiliser use and rainfall.

12.6 Longer term options

A number of important potential innovations can improve the cost effectiveness of the agricultural input subsidy programme, or increase the indirect benefits generated by it. Detailed appraisal of these innovations is beyond the scope of the current study, but provision for such appraisal and the subsequent design of pilot programmes, should be planned for at an early stage.

Fertiliser formulations: Many actors in government and the private sector believe that current recommended fertilizer formulations may not be the most cost effective, and that a shift from blanket to more area specific fertilizer recommendations could lead to increased profitability for farmers. Specifically, the formulation 23:21:0 +4S is relatively costly compared to alternative formulations of NPK. A complete NPK formulation would also be appropriate to many areas where Potassium deficiency is becoming evident. Additional potential trace element deficiencies include manganese. A wealth of on-farm and on-station research data collected over the past decade has yet to be exploited to improve and adapt recommendations to the diversity of agro-ecological conditions in Malawi. The proposed agricultural input programme committee could establish a sub-committee to rapidly assess this work and make recommendations.

Promotion of soil conservation practices: The profitability of chemical fertilizer use depends very much on soil physical qualities (organic matter, topsoil depth, presence of hoe pans, porosity). A wide range of conservation practices are available to prevent soil erosion and degradation, and improve soil qualities, that would increase crop response to chemical fertilizer in the longer term. Farmers often lack the incentives to invest in conservation practices that do not have an immediate benefit. One way to provide such an incentive would be to provide farmers who commit to participation in a 3-4 year program with an additional input voucher.

Smart cards: The use of smart cards in place of coupons could potentially reduce transactions costs and the potential for fraud. The technological options and their ability to spread into rural areas are constantly increasing, while costs are falling. Such cards are already in use by the commercial sector and under pilot testing for social protection programs. Their issue to smallholder farmers as part of a comprehensive input subsidy programme would be a major 'one off' task presenting many challenges, but it offers potential low cost solutions to a wide variety of problems related to prevention fraud, the pan territorial face value systems discussed above, and the integration of commercial and subsidised sales. The introduction of appropriate smart cards also offers the possibility of very substantial wider benefits to rural people beyond the subsidy programme - in terms of agricultural finance, micro finance, remittances, and deepening of the financial sector. There are also significant logistical challenges in their use, and major questions about intra-household relations where cards are issued to men or women. The potential contribution of smart cards as part of the agricultural input subsidy program warrants further and thorough investigation.

Barcoding of coupons; use of barcodes as security features on coupons may be another way of improving security and protecting against fraud. Unique barcodes for every coupon with battery

[50] We have not conducted a formal analysis of minimum maize prices needed to provide incentives to farmers to invest in maize. However consideration of results from the livelihood modelling suggest that in 2006/7 prices a maize purchasing price of around MK20/kg may in the context of the subsidy programme provide about the right incentive for some surplus maize production and allow a rough equilibrium between supply and demand – while not undermining the needs of the poor to cheap food. This needs further investigation.

operated barcode readers able to check numbers against district allocations, for example, may pose challenges to criminals seeking to use counterfeit coupons.

National ID cards: The use of national ID cards offer a further alternative approach to reduction of fraud in coupon issue and use. This must be part of a wider policy decision which has ramifications beyond the subsidy programme.

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ANNEX A. FURTHER INFORMATION ON ATTRIBUTES OF RECIPIENT AND NON-RECIPIENT HOUSEHOLDS

Table A1: Median Attributes of Households According to the Quantity of Subsidized Fertilizer Received in 2006/07.

1130 households	Households groups by amount of government subsidized fertilizer received **2006/07**			
Median characteristics	Households receiving the most subsidized fertilizer (100 to 600 kgs/hh) N=565	Households receiving relatively small allocation of subsidized fertilizer (0.5 to 100 kgs/hh) N=565	Households not receiving subsidized fertilizer N=1,461	Total Sample N=2,591
Total household income (Mkw/hh)	15,100	11,646	9,172	11,200
Gross value of harvest (Mkw/hh)	9,356	5,970	4,699	5,833
Value of assets* and livestock (Mkw/hh)	15,850	8,755	6,500	8,605
Landholding size (ha)	1.22	.91	.81	.91
Kgs acquired of subsidized government fertilizer	100	50	--	0
Kgs purchased of unsubsidized fertilizer 07	0	0	0	0
Subjective assessment of household economic standard relative to community	0	0	0	0
Female headed household (%)	18.2%	26.4%	30.0%	26.7%
Days worked on ganyu labor 2006/07	0	0	0	0
Years of education of hh head	5	4	4	4
Adult equivalents in household	4.48	4.07	3.92	4.04
Can hh read a one page letter in English? (% yes)	61.2%	48.7%	47.4%	50.7%
Can hh write a one page letter in English? (% yes)	54.0%	41.6%	39.8%	43.3%
Expenditures for last 12 months on selected non-food items (Mkw/hh)	1,892	1,496	1,335	1,496
Social safety net cash benefits (Mkw/hh)	719	880	660	734

Note: 2,591 households include 2,341 households obtaining a maize harvest plus 160 households that harvested no maize. *Assets include mortar/pestle (mtondo), bed, table, chair, radio ('wireless'), sewing machine, kerosene/paraffin stove, bicycle, motor vehicle, value of animals owned, beer brewing drum, boat or canoe, fishing net, lantern (paraffin), ox-cart, wheelbarrow, hand sprayer, panga, hoe, axe, sickle, ox drawn plough/ridger, other draft equipment, and irrigation equipment.

Table A2: Probit estimates for subsidized fertilizer received in 2006/07.

	Dependent Variable: 1 if household procured fertilizer from commercial sources. Coefficients are marginal probabilities			
	Full Sample	North	Center	South
	(1)	(2)	(3)	(4)
=1 if Female headed household (0/1)	-0.073***	-0.111*	-0.077*	-0.097***
	(-2.99)	(-1.72)	(-1.82)	(-2.62)
Age of household head	-0.001	-0.003	0.001	-0.003**
	(-1.50)	(-1.22)	(0.57)	(-2.23)
Household size (in adult equivalents)	0.004	0.020	0.009	0.003
	(0.81)	(1.39)	(1.04)	(0.38)
Landholding size (hectares)	0.032***	0.070**	0.030**	0.027*
	(3.30)	(2.55)	(2.40)	(1.69)
=1 if household ranks itself in bottom economic tercile	-0.069***	0.002	-0.070*	-0.129***
	(-2.97)	(0.039)	(-1.82)	(-3.62)
=1 if household ranks itself in top economic tercile	0.074***	0.106	0.033	0.107***
	(2.84)	(1.56)	(0.77)	(2.69)
Number of years household head has lived in village	0.001	0.001	-0.000	0.002*
	(1.58)	(0.93)	(-0.35)	(1.80)
=1 if Household head born in village	0.034	-0.026	0.023	0.071*
	(1.47)	(-0.43)	(0.58)	(1.93)
=1 if Household incurred death of head in past 3 years	-0.035	0.066	-0.105*	-0.016
	(-1.03)	(0.61)	(-1.88)	(-0.32)
Value of social safety net received (000 MKW)	0.010*	0.013	0.054***	0.005
	(1.81)	(0.88)	(2.95)	(0.71)
Distance to nearest tarred road (kms)	0.000	0.005***	0.003***	-0.004***
	(0.84)	(5.63)	(2.73)	(-4.86)
=1 if improved road in community	-0.041*	-0.074	-0.034	-0.036
	(-1.83)	(-1.30)	(-0.83)	(-1.07)
Distance to nearest town (kms)	0.001**	0.001*	-0.003***	-0.001**
	(2.26)	(1.77)	(-3.35)	(-2.13)
Distance to nearest ADMARC depot (kms)	0.001	0.002	0.000	-0.004**
	(1.25)	(0.84)	(0.074)	(-2.10)
=1 if Member of Parliament resides in community	0.084***	-0.289***	0.010	0.275***
	(3.72)	(-4.23)	(0.27)	(7.40)
=1 if Member Parliament visited community past 6 months	-0.023	-0.193***	0.029	0.097*
	(-0.72)	(-2.75)	(0.50)	(1.80)
=1 if Central Region	-0.024			
	(-0.77)			
=1 if Southern Region	0.055*			
	(1.79)			
Observations	2551	439	964	1148

Robust z statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A3: Truncated OLS estimates for quantity (kg) of subsidized fertilizer received in 2006/07.

	Dependent Variable: kgs of subsidized fertilizer received by the household			
	Full Sample	North	Center	South
	(1)	(2)	(3)	(4)
=1 if Female headed household (0/1)	-0.104	22.423**	-18.244***	-1.544
	(-0.020)	(2.00)	(-2.94)	(-0.36)
Age of household head	-0.005	0.305	-0.146	0.243
	(-0.035)	(0.98)	(-0.65)	(1.45)
Household size (in adult equivalents)	3.136***	3.961*	0.745	0.460
	(2.75)	(1.83)	(0.41)	(0.40)
Landholding size (hectares)	2.932**	-0.561	6.810**	9.178***
	(1.97)	(-0.18)	(2.01)	(13.3)
=1 if household ranks itself in bottom economic tercile	-7.456	5.194	8.795	-3.073
	(-1.62)	(0.79)	(1.20)	(-0.78)
=1 if household ranks itself in top economic tercile	8.641	28.461***	35.642***	13.850***
	(1.59)	(3.40)	(3.92)	(2.96)
Value of social safety net received (000 MKW)	0.526	-2.055*	-3.877**	0.225
	(0.27)	(-1.94)	(-1.98)	(0.49)
Number of years household head has lived in village	0.171	-0.045	0.083	-0.243*
	(1.19)	(-0.22)	(0.43)	(-1.81)
=1 if Household head born in village	1.557	2.631	2.834	7.949*
	(0.33)	(0.31)	(0.38)	(1.66)
=1 if Household incurred death of head in past 3 years	-4.289	-10.254	3.048	3.071
	(-0.90)	(-1.05)	(0.33)	(0.44)
Distance to nearest tarred road (kms)	0.215	0.014	-0.099	0.053
	(1.41)	(0.13)	(-0.41)	(0.48)
=1 if improved road in community	-5.372	-9.236	-5.528	8.673**
	(-1.21)	(-1.44)	(-0.62)	(2.24)
Distance to nearest town (kms)	0.029	0.103	0.107	0.033
	(0.44)	(1.34)	(0.49)	(0.48)
Distance to nearest ADMARC depot (kms)	0.018	0.019	-0.864**	-0.367
	(0.060)	(0.12)	(-2.33)	(-1.62)
=1 if Member of Parliament resides in community	-3.314	17.920**	-9.795	-4.589
	(-0.71)	(2.18)	(-1.18)	(-1.05)
=1 if Member Parliament visited community past 6 months	-0.815	27.273**	-10.536	8.038
	(-0.085)	(2.14)	(-0.99)	(1.17)
=1 if Central Region	-6.099			
	(-0.71)			
=1 if Southern Region	-3.602			
	(-0.42)			
Constant	-2.169	32.958	78.447***	54.034***
	(-0.18)	(1.47)	(4.36)	(6.89)
Observations	270	195	396	514
Robust t statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1				

ANNEX B: COST BENEFIT METHODOLOGY

The economic cost benefit analysis computes the benefits and costs of the subsidy programme to the Malawi economy as a whole, as follows.

Benefits	Incremental production valued at economic (shadow or opportunity cost) prices
Minus	
Fertiliser/seed costs	the full cost of additional fertiliser and hybrid/OPV maize seed used by farmers (amount distributed minus amount displaced) comprising programme procurement and distribution costs for fertilisers sold by ADMARC / SFFRFM plus programme and farmer payments to retailers selling subsidised fertilisers plus programme payments for seed sales.
Minus	
Farmer costs:	labour and other costs incurred by farmers in obtaining programme fertiliser and improved maize seed and in harvesting extra production.
Minus	
Programme costs:	costs incurred by the government in administering the programme but excluding costs of delivering programme fertiliser and improved maize seed to farmers (these are included above under full costs of fertiliser and seed).
Minus	
Efficiency costs:	estimated as 15% of the value of displaced fertilisers.

The relationships between these benefits and costs in the overall economic analysis are shown in figure B1, with each of these main items of benefit and cost shown in a circle. We consider programme costs, benefits and farmer costs in turn.

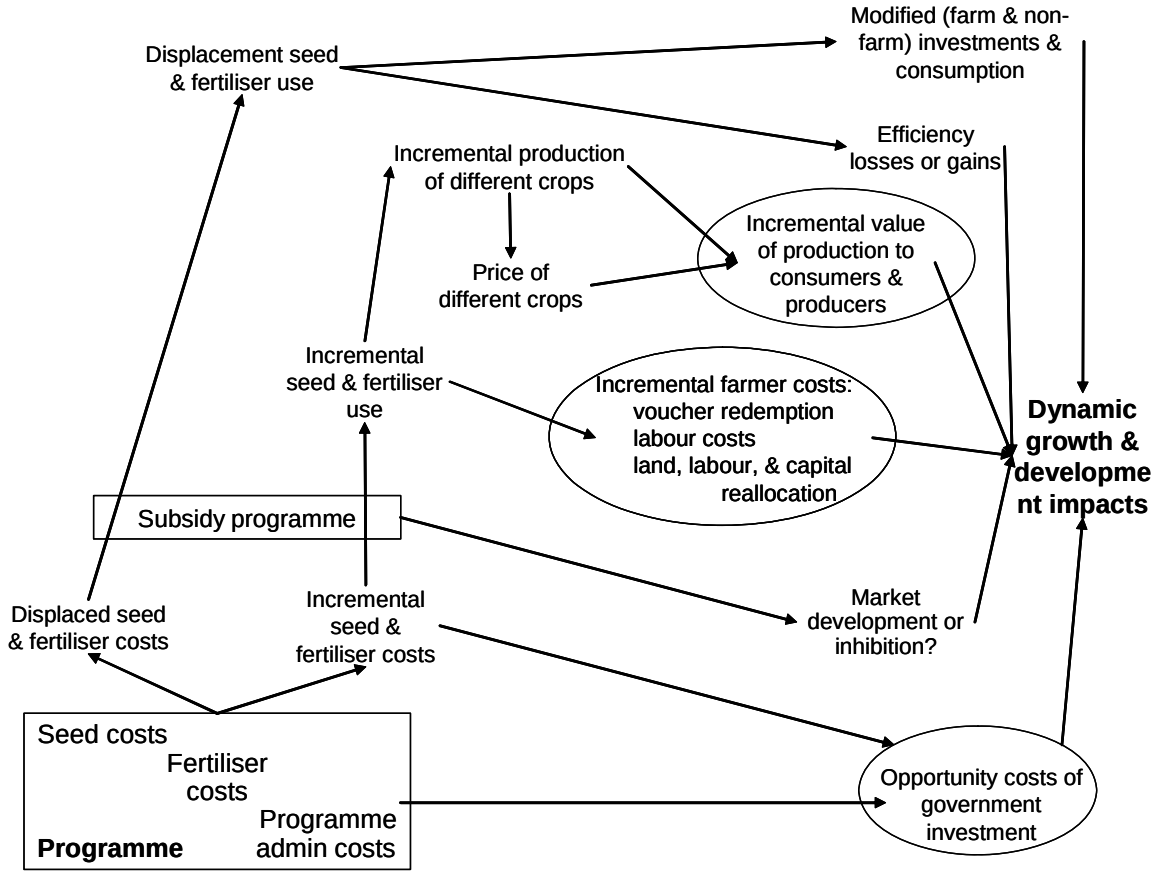
Costs

Incremental programme costs to be considered in the economic analysis are the costs of administering the programme and the costs of incremental seed and fertiliser provided to farmers, farmers' incremental costs, the costs of administering the programme, and efficiency costs.

Costs of seed and fertiliser depend upon the unit cost and volume. Reasonably accurate estimates of costs of seed and fertiliser unit cost can be derived from programme costs as set out earlier in section 4 (although as discussed there may be some under-estimate of overhead costs of ADMARC and SFFRFM and of field administration). Quantities of incremental seed and fertiliser use as a result of the programme are, however, more difficult to estimate, as these depend upon estimates of displacement[51]. As discussed earlier in section 6, we estimate a low rate of displacement for seeds but much higher rates of displacement for fertilisers. The analysis is conducted with three different rates of displacement (40, 50 and 60%) covering the range of estimates presented in section 6, in order to properly represent the uncertainty regarding rates of displacement, and to demonstrate the impact of different fertiliser displacement rates on the efficiency of the programme.

[51] Only the costs of incremental seed and fertiliser use should be considered in the economic analysis, as only these seed and fertiliser costs are an extra cost to the country: displaced seed and fertiliser represent a 'transfer' within the economy. Although the costs of displaced seed and fertiliser contribute to the fiscal costs of the programme, they do not explicitly enter the economic analysis.

Figure B1 The structure of AISP benefits and costs in economic analysis



Looking to the future, international fertiliser and fuel costs (affecting transport costs) have risen dramatically since the implementation of the 2006/7 programme: urea and prices are now three times what they were 5 years ago, and though they are expected to decline somewhat over the next few years, this will not bring them back down to earlier levels. For the ex ante analysis it is therefore assumed that fertiliser and transport costs can be expected to average roughly 30% above 2006/7 programme levels.

Farmers' incremental costs are costs incurred as a result of the subsidy when they buy fertiliser that they would not otherwise have bought, in transporting and applying that fertiliser, and in harvesting extra yield. Some of these costs are estimated using parameters derived from the household survey (1.5 days per household accessing the subsidy, 250MK per household transport costs for the fertiliser, a wage rate of 133MK per day), with on farm labour costs derived from the household model described in Dorward, A., 2007. .

Information on *programme administration costs* is set out in section 4, although as discussed there may be some under-estimate of field administration costs.

Efficiency costs may arise where there is displacement of commercial fertiliser sales by subsidised sales. Although these fertilisers and the returns to them are omitted from the economic analysis (because expenditure on these fertilisers does not represent an incremental cost to the economy). it is possible that there are efficiency costs associated with this transfer of resources, notably (a) subsidised fertiliser delivery may be later than commercial delivery leading to lower efficiency of use, (b) costs of procurement and delivery may be higher under the subsidy programme, (c) farmers' use of the extra income they gain may have a lower return to the economy than if those

resources were retained by government and used in other ways. It is also possible that there are efficiency gains from the subsidy programme, (a) if there are economies of scale and benefits from consistent demand that enable fertiliser procurement and distribution costs to be reduced under the programme or (b) if farmers' investments yield higher rates of return than would be obtained by government investments in alternative activities (as a result, for example, of farmers investing a significant proportion of extra income in high return activities and from high local multipliers from such investment and from their consumption expenditure). It is expected that efficiency losss will be greater than gains and a 15% efficiency loss is assumed in the analysis.

Benefits

Valuation of the benefits from the programme requires estimates of incremental production and of the prices at which to value it. There are considerable difficulties in developing reliable estimates of either of these parameters.

The impacts of the fertiliser subsidy on production are complex, as farmers need to mobilise resources to redeem the voucher, may use the fertiliser on different crops, and may change their cropping patterns and farm and non-farm activities in response to the subsidy.

Increased smallholder crop production and productivity, particularly for maize, is a key immediate objective of the subsidy programme and a requirement to meet its broader objectives of promoting economic growth and reducing vulnerability to food insecurity, hunger and poverty. Estimating increased production as a result of the subsidy is, however, very difficult, as crop production is determined by crop areas cultivated and yields obtained by smallholders, with decisions about crop areas affected by farmers' expectations of input and output prices, rainfall, wage rates, and availabilities of cash, food, seed, fertilizer and labour. Actual conditions during a season may then vary from expectations. Yield\s are affected by similar variables. Different types of farmers and farmers in different areas will be affected by these variables in different ways. Separating out the impacts of expected and actual subsidized input access from these other variables is very difficult.

It was intended that data collected on crop areas and production in the household survey would provide information on input use and production for different crops, and that this could be compared with similar data for the same households in 2003/4 or 2004/5 as recorded in the IHS2. However subsequent analysis of IHS2 data suggested that household area and production data were not sufficiently reliable for such an analysis, and further difficulties were faced with cleaning of area and production data with the AISS. It has therefore not been possible to use household data to investigate subsidy impacts on production.

The national crop estimates provide a source of information on estimates of production of major crops. As noted earlier, very large production increases for maize were estimated for 2006/7, predominantly as a result of increased yields, but also with a small increase in area. Increased yields could be attributed to good rainfall in most areas, increased use of hybrid seeds, increased use of fertiliser and possibly more timely planting and weeding as a result of reduced cash and labour constraints for poorer households, following the good 2005/6 season harvest. There are, however, difficulties in using the maize production crop estimates to determine incremental production as a result of the input subsidy. On the one hand it is not clear that crop estimates are sufficiently accurate and reliable for such use: for example similarities between maize prices following the 2005/6 and 2006/7 harvests (see figures 5.1and 5.2) raise questions about the scale of the increase in maize harvest in 2006/7 over 2005/6. The yields estimated in 2006/7 also seem to be disproportionately large when compared with production and yields estimated for 2005/6, another year with very good rains and a large input subsidy. Further difficulties in using the national crop estimates to determine incremental production as a result of the input subsidy arise because it is not known how much fertiliser is applied to different crops and it is also very difficult to separate out the effects of the fertiliser and seed subsidy from the other variables outlined above.

The March 2007 Interim Report includes regression estimates of the relationship between national 'maize fertiliser' sales and maize production, using crop estimates production and area data together with annual rainfall yield indices for hybrid and local maize. Different model specifications, each with relatively good fit, generated widely differing estimates of incremental maize production

from the 2005/6 and 2006/7 subsidies. Very limited confidence can therefore be placed in estimates of incremental production derived from the crop estimates.

Another approach to estimating the incremental production impact of the subsidy programme is to examine sets of alternative assumptions about the key variables affecting incremental production from the programme, and to consider the range of estimates of incremental production impacts associated with these sets of assumptions. A strength of this approach is that it focuses attention on variables that have important effects on incremental production, and hence on important issues that need to be addressed when considering how to improve the efficiency and effectiveness of the programme in the future.

It is likely that the vast majority of incremental fertiliser use as a result of the programme was applied to maize. This was a major emphasis of the programme, and was emphasised in the focus group discussions and key informant interviews. As argued in section 6.4, it is also likely that much of the subsidised fertiliser used on other crops, such as tobacco, displaced commercial purchases. While there will have been some incremental use of subsidised fertiliser on crops apart from maize, it is likely that this is small. We therefore estimate the effect of programme fertiliser and improved seed entirely in terms of impact on incremental maize production.

Incremental maize production is calculated using estimates of incremental grain produced per unit of nitrogen fertiliser applied. There is a remarkable lack of high quality and reliable information on yield responses to fertiliser on smallholder farms. A wide range of reports were consulted as summarised in table B2. This shows estimates of responses to Nitrogen for local and hybrid maize grown under different management regimes. Variability is high. The estimates in table B2 may be evaluated against wider rules of thumb that smallholder farmers often obtain yields and yield responses which are about 50% of those on research station plots, and that farmer managed trials and demonstrations generally give yields above farmers' but below research station yields. Incremental yield and production estimates need to allow for moderately late application of a substantial proportion of the subsidised basal dressing in the southern region in 2006/7, variation in the extent to which basal and top dressings were both applied, common but not universal availability of phosphate in Malawian soils (Snapp, 1998), and application of fertiliser to both local, OPV and hybrid varieties. We therefore conduct our analysis with three different rates of response to nitrogen (10, 15 and 18kg grain per kg N), to represent the uncertainty and variability in fertiliser responses under different seasonal conditions, and timing and method of application. Similarly three different estimates of differences between (fertilised) local, OPV and hybrid yields are used, as shown below in table B1 .

Table B1 Incremental maize production with different scenarios ('000MT)

Displacement		50%			40%			30%		
	Grain: N ratio	12	15	18	12	15	18	12	15	18
Incremental production from hybrid & OPV seed	71	413	498	583	481	583	686	549	669	788
	118	460	545	631	528	631	733	597	716	836
	163	505	591	676	573	676	778	642	761	881

Note: Calculated from 174,688 MT subsidised fertiliser with an average N content of 32.6%

Table B1 shows that when considered together, these alternative assumptions allow for a very large range of possible increases in maize production as a result of the subsidy, from 413,000 tonnes to 881,000 tonnes, depending upon programme design and implementation and upon other (for example climatic) variables. The potential benefits from reducing displacement, from increasing the grain to N ratio, and from including hybrid and OPV seeds within the subsidy programme are clear. Potential ways to achieve improvements in these variables are discussed in the conclusions and recommendations of the report.

Incremental production from input subsidy programmes in the future is assumed to be determined by the same grain to nutrient ratios as those used to estimate incremental production in 2006/7.

Although global climate change is expected to cause increases in rainfall variability in the medium to long term, past variation in weather patterns may provide the best guide for expected weather patterns over the short to medium term. .

Valuation of increased maize production is also challenging. Large changes in maize production as a result of the subsidy programme have a significant effect on national supply, and this affects national prices. It is therefore necessary first to estimate the prices that there would have been without the subsidy, and then to estimate prices with the subsidy. Standard economic analysis methodology then values incremental production at the average of 'with' and 'without' subsidy prices, where these are prices without other policy induced distortions. Severe difficulties in estimated 'with' and 'without' subsidy prices arise because historical prices (see figure 5.2) have been affected by interactions between constantly changing maize market policies (involving at different times, for example, export bans, large sales of subsidised imports, and large subsidised exports), input subsidy programmes, and seasonal weather and market conditions. Good and bad years also lead to exports and imports, but export and import parity prices vary, with regional market conditions and between, for example, imports from Mozambique and South Africa.

To allow for the effects of different market conditions on the benefits from the subsidy, different maize prices are used in different analyses.

For the ex post analysis of the 2006/7 subsidy estimation of both 'with' and 'without' subsidy prices are difficult. We conduct the analysis with two different approaches to determination of undistorted without subsidy prices. In both approaches it is recognised that the increased production resulting from the subsidy programme should have depressed prices, but export of 330,000 MTs to Zimbabwe has removed some of that extra production and that, together with fears of maize shortages, has raised maize prices. Thus Lilongwe market prices were at 18MK/kg in May (US$130/MT) but by December rose to 30MK/kg (US$214/MT) and while the price in May 2007 was lower than in May 2006 (20MK/kg, US$142/MT), the price in December 2007 was higher than in December 2006 (25MK/kg, US$179/MT). At the same time white maize was being offered on the commodity exchange in Lilongwe for US$197/MT and large lots are reported to have been fetching around $190/MT.

We therefore have a situation where one import parity price (from Mocambique) is below local market prices which were below the price gained from exports to Zimbabwe (and apparently other equivalent export opportunities were available to traders but they were prevented from taking them up by the lack of export licences) Prices in early March 2008 were around MK50/kg (a little over $300/ton), which is roughly the level of international import prices. This very unusual situation is the result of market failures, in terms of information but more importantly government induced risks to traders in holding stock, and hence an absence of temporal arbitrage in Malawi.

Allowing for the normal pattern of maize prices falling in April, the average Lilongwe market price for the 12 months following the 2006/7 harvest is likely to have been around 22MK/kg or $160/MT. This is with both the subsidy putting extra maize into the market and with 330,000 MTs export to Zimbabwe taking maize out of the market. Our estimates for incremental production from the subsidy are a little under 700,000MT. The 2007/8 prices should therefore be lower than the situation without either subsidy or exports, but they would have been lower still with the subsidy but without the exports to Zimbabwe. Given that the 330MT exports are around half of the estimated incremental production and that the economic analysis uses an average of 'with' and 'without' subsidy prices, we use this year's average price of $160/MT for the ex post analysis of the 2006/7 programme.

This price, however, seems high when compared to prices that have been observed in the past after good or reasonable harvests (see figure 5.2). Thus average prices in 2000/2001 were a little under $100/tonne (after a very large harvest in 2001as a result of good rains and the starter pack programme), and across the 2003/4 and 2004/5 seasons prices averaged $153/tonne (after moderately good rains, and with prices also pushed down by significant sales on the domestic markets of subsidized imports). Using 2003/4 and 2004/5 seasons average price as the 'without subsidy' price and a price of $140 as the 'with subsidy' price gives an average price of $147.5 for use in the analysis.

There are arguments for adding a third, higher price scenario to the two price scenarios outlined above. The first of these is that the export opportunities give a price of $200 per tonne for roughly half the incremental production, and the lower market prices in Malawi are artificially low as a result of the export ban (the recent marked rises are the belated response of the market to the tightening as a result of export) and hence all the incremental production should be valued at $200 as export prices are floor prices not ceiling prices. This however poses questions about lower Mocabique import prices. Is Mocambique effectively exporting to Zimbabwe through Malawi, and the price differentials reflect transport and transaction costs? This draws attention to these transport costs, and for exports the farmgate price should be the Lilongwe price less transport from farm to Lilongwe. Since large numbers of consumers are in the rural areas, it would seem reasonable to deduct the farmgate- Lilongwe transport cost from the export price. Fertiliser cost $35/ton to move from depots (Mzuzu, Lilongwe, Blantyre) to markets. Using the same costs (although dry season transport prices might be a bit lower and maize will not be coming from the same range of remoter locations as fertiliser went to) that would bring the farm gate price of the exports to $200-$35 = $165, which is close to the upper price scenario outlined above.

Another possible argument for a higher price scenario is that the incremental production has staved off international imports. We consider this unlikely for a good year like 2006/7,and appropriate import prices should therefore be Mocambique import prices plus internal transport prices – which is probably captured by the price scenarios above.

Ex ante analysis looking into likely benefits and costs in the future needs to consider the effects of recent and expected changes in regional and international maize grain prices.

After steadily falling international maize prices during the 20th century, prices rose sharply during 2007. Von Braun, 2007 reports that maize prices are likely to rise by between 30 and 70% from 2002/3 to 2015 (depending upon growth in biofuel production), while World Bank and FAO/OECD forecast prices increases of over 40% over the same period. Prices in late 2007 and early 2008 are some way above the annual predictions (see figure B1).

The effects of higher international on prices in Malawi are not, however, straightforward as they have to be considered in the context of regional markets. In years when there is a shortfall in production across the whole region, then higher international prices will lead to higher import prices. This is likely to be a relatively rare occurrence,and in other years there may be downward pressure on regional prices as a result of significant shifts out of maize consumption and into consumption of wheat and cassava, reported in Zambia and Mozambique (ref Jayne). Northern Mocambique is likely to be an increasingly important supplier in the region and particularly into Malawi in the future. Taking account of these issues and examining the distribution of average annual prices in Nampula, Mozambique, with allowance for transport costs into Malawi, suggests a possible fall in regional prices in the future. An alternative view is that regional prices will also be affected by upward pressures from rising fertiliser costs and that shifts into cassava will lead to falls in supply – counteracting any falls in demand, which may also be affected by increased demand for biofuel production. This would suggest increasing regional prices. We therefore calculate benefit : cost ratios using three alternative price distribution scenarios for ex ante analysis of the AISP, as shown in table B2.

Table B2 Price distribution scenarios for ex ante analysis of the AISP

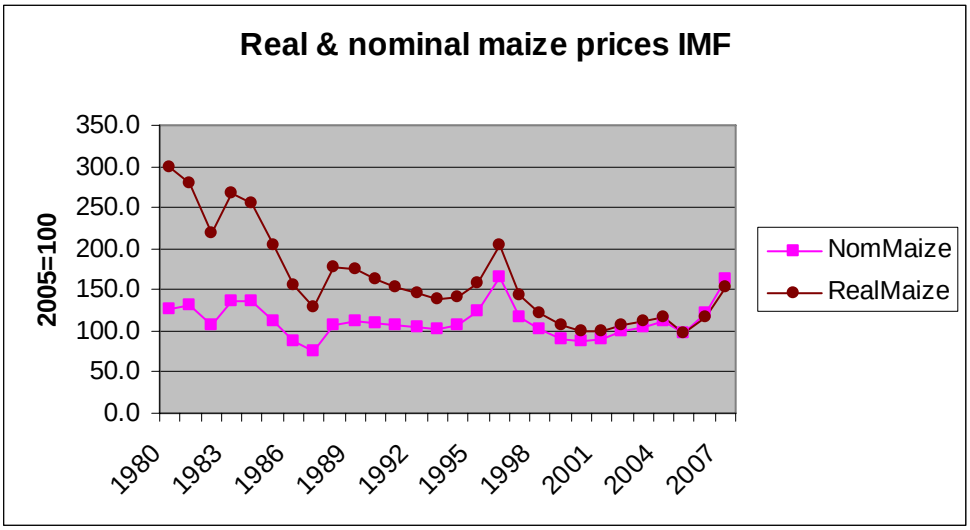
Season	Good	Moderate	Poor	Very poor	Weighted Average
Probability	25%	45%	25%	5%	
A. Lower Prices ($/tonne)	110	140	250	400	173
B. Medium prices ($/tonne)	160	190	250	400	208
C. Higher prices ($/tonne)	190	240	300	400	251

Table B2. Reported maize yield responses to fertiliser

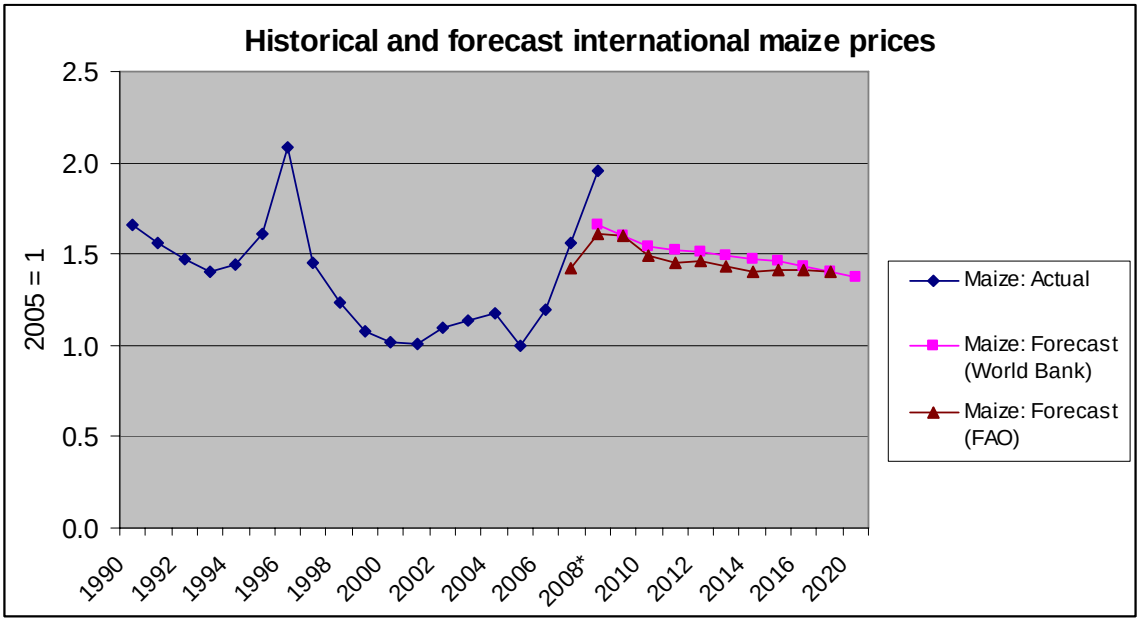
Source	Type of plot	Fertiliser response (kg grain/kgN)		Hybrid yield gain (kg/ha)		Comment
		Local	Hybrid	No fert.	Fert.	
Smale (1995)	farmer demos	20	23		700	good years
	farmer demos	13	12		0	bad year
MPTF (1997)	farmer trials		22 to 28			
Mwato et al (1999)	farmer trials		10 to 20			
Blackie, M. (1998	very high management		36			
	moderate/ high management		27			
	moderate management		23			
Carr (1997) citing FAO				250		
Sakala et al (2004)	farmer managed trials		21.8			
World Bank (1994)	90/91 farmer survey, late applicn	15	21			late application of fertiliser
	FAO/UNDP on farm trials		35			
National Sample Survey of Agriculture, 1980/1	national farm survey			191	672	not necessarily equivalent fertiliser rates
					1,858	not necessarily equivalent fertiliser rates
Annual Survey of Agriculture,1982/83 to 1984/5	national farm surveys	3.9	22.6			1982/83 (differenced)
				231	1,223	1982/83 - 1984/85
Tchale and Sauer (2007)	farmer trials		19			
Whiteside & Carr (1997)	general estimate	15	21			
Carr, pers.comm. (2007)	general estimate	15	18			
Jones,Govereh & Xu (2007)	farm surveys, Zambia		22.5			Good rainfall, timely application, in correct proportions
			16.9			Medium rainfall, otherwise as above
			11.8			Poor rainfall, otherwise as above
Snapp (1998)	Phosphate levels in most Malawi soils are higher than in surrounding countries and sufficient for maize cultivation					

Calculations from sources listed above

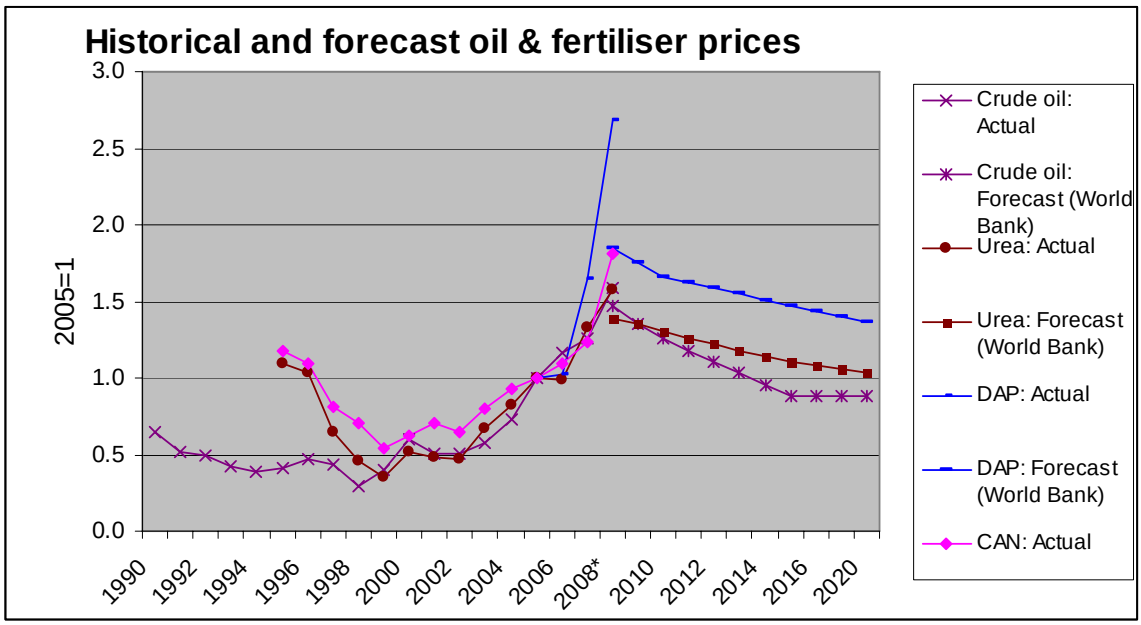
Figure B1. Information on Recent and forecast maize and fertilizer prices



Source: IMF; World Economic Outlook 2007database



Source: World Bank Commodities Outlook: http://go.worldbank.org/R3XB5PL4M0



Sources:

World Bank Commodity Outlook

http://www.yara.com/en/investor_relations/analyst_information/fertilizer_prices/index.html

Annex C: Terms of Reference for the Study

The Objective

- Assess the impact and implementation of the GoM agricultural inputs subsidy and the programme of support (programme memorandum is attached) at the national level and differential impact on households at the local level.
- Provide lessons for future interventions in growth and social protection.

The Scope

National level impact:

- What impact has the inputs subsidy had on productivity?
- What impact has the inputs subsidy had on food security?
- What impact has the inputs subsidy had on GoM crop price policy, market distortions and projected prices?

What impact has the support for growth enhancing GoM 2006 subsidy programme had on the private sector? It has been suggested that the private sector lost 60% of its business in 05/06. What is the evidence for this? What kind of recovery has taken place 06/07? What has the longer term trend been?

Implementation and cost effectiveness

- How efficient and timely was implementation (disaggregated geographically and by supplier i.e. ADMARC and private sector).
- How cost effective was the programme? Which is most cost effective in purchasing and delivering the fertiliser: private sector or government? Are vouchers the most cost effective way of delivering the subsidy? How does the subsidy output compare to equivalent maize import costs?
- What is the cost benefit in terms of cost to the Governments budget compared to the increase in production?

The analysis should give results at the national level and disaggregate the results to District level or (other relevant geographical area) whenever possible.

Local level impact – household and community

Distribution and use of vouchers:

- Who got vouchers and who didn't? Did they get a voucher last year? (requires household profiles aligned to national profiling e.g. MVAC or IHS)
- Where did the money for the fertiliser come from?
- What did households do with the vouchers? If they redeemed them – where and for what and how did they use the inputs? If they sold the vouchers or the inputs, to who and how did they use the money?
- What fertiliser did people choose? Why?
- What seeds did people choose? Why? What seeds did they buy or use in addition to the subsidy?
- What kind of technical advice did they receive regarding the inputs?

Impact:

What impact (direct and indirect) has there been on different types of households? What is the impact on agricultural productivity**;** food security; income; expenditure and coping strategies.

- Performance of fertiliser and seeds?
- What intra household impact is there? Of cash or who used inputs?
- What impact has there been on ganyu and other employment?
- What has the market response been – inputs and outputs?

Is subsiding fertilizer and seed the appropriate approach to increasing production? What would be more effective?

What do households think about the programme? Who benefited? Was implementation effective (access and choice of inputs)? What communication about the programme did they receive? What could be done better?

Lessons

- Who benefits from the inputs subsidy and who doesn't? How?
- What could be changed in the design to enhance the objectives?
- Is the price of subsidised inputs appropriate?
- Is the size (number of vouchers) appropriate?
- What is the fiscal sustainability of the agricultural inputs subsidy?
- Lessons for social protection and growth?

Method

The methodology should include the following:

- Analysis of Logistical unit data on commodity dispersed through different type of outlets (private sector / ADMARC) correlate these (nationally, regionally, districts, EPAs) to production data and food security data.
- Analysis of monitoring reports from GoM and programme meetings.
- Compare to baseline trends over last 5 years (or longer if the data allows) in agricultural production and food security.
- Modelling to determine whether and to what extent the subsidy programme caused the results observed. This may draw upon data used by the weather risk management project and/or MVAC
- Financial and economic analysis to assess the impact on a national scale.
- Semi structured interviews with suppliers – their views and recommendations regarding the programme. Do they have appropriate technology and knowledge for future expansion of the programme?
- In collaboration with NSO need to establish: clear sampling methodology for household level research; structured household survey (those that received vouchers and those that didn't) and semi structured interviews with key informant in selected villages.
- In depth qualitative research with household and key informants.
- Household wealth ranking (linked to MVAC / IHS poverty measures) preferably using an existing method in Malawi e.g. IHS, MVAC or DHS asset register. Ranking should include the economic and social status: wealth, assets, household size, gender of household head.
- Analysis of what determined access to vouchers, beyond the stated criteria.