

**Report No. 54864-ZM**

## **Zambia**

# **Impact Assessment of the Fertilizer Support Program, Analysis of Effectiveness and Efficiency**

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**Sustainable Development Department  
Agriculture and Rural Development  
Africa Region**

**Document of the World Bank**

## List of Acronyms

ACF	Agriculture Consultative Forum
ACMP	Agricultural Credit Management Program
ATC	Authority to collect
CFU	Conservation Farming Unit (of the ZNFU)
CSO	Central Statistical Office
BEO	Block Extension Officer
DAC	District Agriculture Committee
DACO	District Agriculture Coordinator
DMCO	District Marketing and Cooperatives Officer
FNDP	Fifth National Development Plan
FRA	Food Reserve Agency
FRC	Farmer Report Card
FSP	Fertilizer Support Program
FSRP	Food Security Research Project (MSU)
ESW	Economic sector work (of the World Bank)
GRZ	Government of the Republic of Zambia
MACO	Ministry of Agriculture and Cooperatives
NCZ	Nitrogen Chemicals of Zambia
MoFNP	Ministry of Finance and Planning
MSU	Michigan State University
MTFE	Medium-term expenditure framework
PACO	Provincial Agriculture Coordinator
PAM	Programme Against Malnutrition
PCO	Project Coordinating Office (of the FSP)
PRP	Poverty reduction program
SAFEX	South Africa Futures Exchange
SAO	Senior Agricultural Officer
SSA	Sub-Saharan Africa
ZNFU	Zambia National Farmers Union
ZNTB	Zambia National Tender Board

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## **Budget Year**

April 1 – March 31

From 2010

January 1 – December 31

## **Exchange Rates**

2007/08 FSP Season

USD 1.00	=	ZMK 3,850
ZMK 10,000	=	USD 2.60

October 2009

USD 1.00	=	ZMK 4,700
ZMK 10,000	=	USD 2.13

## **Weights and Measures**

1 hectare (ha)	=	2.417 acres (ac)
1 lima	=	0.25 ha
1 kilogram (kg)	=	2.204 pounds (lbs)
1,000 kilograms (kgs)	=	1 metric ton (MT)
1 kilometer (km)	=	0.62 miles
1 bag fertilizer	=	50kg
1 bag seed	=	20kg
Compound D	=	10:20:10 (NPK)
Urea	=	46% N

## **2007/08 FSP Input Pack**

1 ha maize

20 kg hybrid seed  
4 x 50kg bags Compound D (basal)  
4 x 50kg Urea (top dressing)

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## EXECUTIVE SUMMARY

- i. The Fertilizer Support Program (FSP) was launched by the Government of Zambia in 2002 as a temporary measure to provide subsidized input packages for maize to smallholder farmers and to promote the participation of private sector traders in supplying these producers in all areas around the country. In 2007, the FSP accounted for roughly 30% of the Ministry of Agriculture and Cooperatives' (MACO's) total budget allocation and 45% of the discretionary budget for poverty reducing programs. Originally the FSP was to last for three seasons, but it is now in its eighth year at the field level.
- ii. Given the importance of agriculture to Zambia and high level of spending on the FSP, the Government expressed an interest to the World Bank to assist in better understanding the efficiency of its allocations to the sector. Does spending on the FSP represent good value for money and has the program made an effective contribution to agriculture production and other national priorities such as rural poverty reduction, improved domestic and household food security, and private sector development? What are the program's main strengths and limitations, and how could FSP be improved?
- iii. This impact assessment was prepared together with the Government to help answer these questions. The GRZ's commitment to transparent, value for money analysis of the agriculture budget is itself an important part of achieving Zambia's strategic development objectives for the rural sector as set out in the documents "Vision 2030" and "Fifth National Development Plan" (FNDP). With this report, the World Bank aims to support national policymakers and other agriculture stakeholders by providing empirical information needed for transparent discussions and meaningful deliberations on the current and future role of agricultural input subsidies in Zambia.

### ***Background to the FSP***

- iv. In 2001, MACO estimated that only 30% of smallholder households had access to improved maize seed and just 20% of farmers had access to fertilizer. After nearly a decade of market reforms, Government therefore saw that small-scale farmers were too weak economically to provide adequate demand for private inputs and that this was leading to problems with the erosion of Zambia's resources, low farmer productivity, and increased cases of food insecurity and poverty at the household and national levels. Previous input programs since liberalization had suffered from poor credit recovery and were unsustainable.
- v. To improve this record, the FSP sought to disengage Government from credit provision by selling inputs on a direct cost-sharing basis. In addition to the benefits to farmers, it was anticipated that the program would create additional demand for inputs and open new market opportunities for private dealers to supply the rural areas. The FSP was thus conceptualized as a program that would build both smallholder farmer and private sector capacities as part of a well-managed transition to full market liberalization.
- vi. To achieve these aims, the FSP was designed to supply standardized input packs for maize. Each input pack was meant to consist of 20kg of hybrid maize seed plus four 50kg bags of Compound D (basal) fertilizer and four 50kg bags of Urea (top dressing) fertilizer (i.e. 20kg seed + 4x4 fertilizer), which is the amount MACO

recommends to plant 1ha of maize.<sup>1</sup> FSP inputs were to be accessed only through approved farmer cooperatives or other registered farmer groups who would apply through their local District Agricultural Committee (DAC) for members to receive support. Farmer payments were to be collected by the sponsoring organization and deposited in a designated local bank account as a condition for the inputs being released. Originally, the subsidy level was set at 50% but was increased to 60% from the 2006/07 season.<sup>2</sup>

- vii. With regard to the program's second objective of building private sector capacities, MACO intended that FSP inputs would be supplied as far as the district level by private seed and fertilizer companies selected through a national tender. Thereafter, onward distribution of inputs to participating farmer groups was to be managed by local transporters selected by the DACs. In the first seven years of the FSP to 2008/09, MACO's working estimate is to have reached an accumulated 1,055,000 households with 422,000 tons of fertilizer and 21,100 tons of seed for a total cost of ZMK 1,361.1 billion (USD 316.2 million). With these inputs, MACO estimates that the program produced a total of 3,165,000 tons of maize, based on the assumption of 3 tons of new production for every 1ha input pack it budgeted for.

### ***Analytical Approach***

- viii. The analysis in this report follows a unique public sector expenditure tracking and qualitative service delivery approach. Public expenditure tracking surveys (PETS) trace the flow of allocated resources through the different layers of government bureaucracy to show how much of the intended budget reaches each layer and how long the service delivery takes. Qualitative service delivery surveys (QSDS) are focused more broadly on the quality of frontline service delivery and program outcomes. By applying the two methods together, it is possible to obtain a more complete picture of the efficiency and effectiveness of public service delivery.
- ix. In applying these methods to the FSP, the research team took a consultative approach. Discussions were held with key figures in Government at each stage of the research project beginning with inception, through to the design and testing of survey instruments, data collection, data analysis, and presentation of results. Consultations were also held with local civil society organizations, private supply firms, and other members of the donor community. The analysis focuses exclusively on the 2007/08 agricultural season.
- x. Data collection took place in November and December 2008 and covered 20 districts in five provinces chosen at random. In each district, trained enumerators used standard questionnaires to interview a range of FSP stakeholders that included District Agriculture Coordinators (DACOs), warehouse managers, local transporters/distributors, leaders of participating farmer cooperatives, and individual FSP beneficiaries. To supplement the survey, team leaders carried out in-depth interviews with Provincial Agricultural Coordinators (PACOs) in each sampled province and at the national level with the Food Reserve Agency (FRA), Auditor General's Office, Zambia National Tender Board, and others with key insight to the FSP's performance and financial record. The main findings and recommendations of this analysis are summarized below.

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<sup>1</sup> In the current 2009/10 season, the input pack size has been cut in half to support 0.5ha of maize production (i.e. 10kg seed + 2x2 fertilizer).

<sup>2</sup> Due to the sharp rise in global fertilizer prices in 2008, the subsidy level went even higher to around 70-80% during the 2008/09 season.



## ***Expenditure Tracking Results***

- xi. First, at the national level, the PETS work found only minor discrepancies in the quantities of inputs allocated to each district and the amounts district authorities said they received. The analysis was not designed as an audit of tender winner contracts, but the survey team found little evidence of systematic leakages at this level.
- xii. Significant problems were encountered throughout the study in obtaining reliable information from the PCO, both in terms of the time taken for MACO to produce a record of its spending and because of mistakes, errors, and lack of clarity with the numbers when they were received.
- xiii. As the inputs moved from district warehouses to cooperatives and individual farmers, considerable evidence of leakage was reported. For 69 of 84 cooperatives where corresponding data were available, the study found a 20% discrepancy in the inputs DACOs said they released and what the cooperatives said they received. These average results, however, are heavily skewed because of very large discrepancies in four of the 20 surveyed districts (i.e. 20% of the sample). In these locations, the number of packs cooperatives leaders confirmed they received was only 54% of what the DACOs said they sent. Other expenditure tracking findings include:

### **Program costs have grown considerably since the FSP was launched and risk displacing other development priorities.**

- xiv. These high costs have important implications for other budget priorities in agriculture. Between 2000 and 2008, input subsidies accounted for roughly 38% of MACO's total budget. Other sector priorities including investments in irrigation development, agriculture infrastructure, land development, livestock development, and agriculture technology are each ranked higher than the FSP in the FNDP, but have received significantly fewer resources.

### **The 2007/08 FSP cost at least 23% more than expected.**

- xv. In preparing cost estimates, every effort was made to ensure the numbers reflect actual spending by MACO. Nevertheless, due to various data problems and inconsistencies in the numbers supplied by the PCO and MACO Financial Management Unit it is impossible to know with certainty exactly how much was spent on the 2007/08 program. One of the problems is that the agricultural calendar spans two budget years, which MACO indicates complicates reporting on total spending in any one FSP cycle.
- xvi. The original budget for the 2007/8 FSP was ZMK 150 billion (USD 39 million). Analysis of the expenditure record shows that total core spending amounted to ZMK 167.94 billion (USD 43.62 million) or 12% more than expected. When the cost of staff time, DAC meetings, and extras paid by farmers for cooperative membership and other fees are taken into account, the total cost of the 2007/08 FSP is estimated to be at least ZMK 182.61 billion (USD 47.43 million) or 23% more than reported by MACO.

### **Only two private sector firms have been involved with the procurement of FSP fertilizer.**

- xvii. Except in the first two years, all contracts for Compound D have been awarded on a single-source basis to the parastatal firm, Nitrogen Chemicals of Zambia (NCZ). With Urea, all contracts since inception have been awarded to two private firms, Omnia Small Scale Limited and Nyiombo Investments Limited, which also shared the contracts for Compound D with NCZ in the beginning. FSP

administrators report that the main reason for this outcome is that other fertilizer companies were judged to lack the physical capacity to deliver the required volumes and/or could not mobilize the necessary finance. With seed, the FSP is regarded as being more competitive and seven private firms were awarded contracts in 2007/08.

**FSP inputs are less expensive than the private sector benchmark in 1 out of 5 surveyed provinces.**

- xviii. To assess the cost efficiency of the FSP distribution system, the report compared the total cost of each FSP pack with average commercial retail prices in the exact same survey locations. Compared with prices charged by district-level retail shops, the survey found that on average every FSP pack cost ZMK 123,787 (USD 32) more. Of the five provinces sampled, only Western Province reported higher average retail prices than the amount paid by FSP. Individual farmers in all parts of Zambia still paid less than the private sector benchmark because of the subsidy. Based on the full allocation for the 2007/08 season, however, the total additional cost to Zambia compared with private sector was around ZMK 15.5 billion (USD 4.03 million).

***Qualitative Service Delivery Results***

- xix. The survey found that the program has had a positive impact on total input use as the FSP set out to achieve. Across the sample, 45% of farmers reported they did not use any fertilizer on maize before participating in the program whereas 91% said they used at least one bag of basal and one bag of top dressing (1x1) per hectare with FSP. The data also show that 3% did not use any fertilizer in the year they received FSP support because the program only managed to deliver seed. Moreover, in recent years before receiving FSP inputs, the data show that 13% of beneficiaries already used as much or more than the recommended 4x4 level so were apparently not constrained by limited private sector access. Other qualitative highlights include the following.

**Many farmers did not get what they expected.**

- xx. The 2007/08 input distribution was characterized by large differences in farmer expectations and actual receipts. When signing up for FSP assistance, 70% of interviewed beneficiaries said they expected the full 4x4 input pack advertised by the program; 17% said they expected less than 4x4, and 14% said they expected more. When the inputs arrived, however, only 44% of farmers actually received the 4x4 fertilizer allowance; 55% of farmers received less, and 2% received more. These widespread differences in expectations and receipts point to serious negative consequences for a farmer's ability to plan and make wise production decisions including whether or not to buy inputs outside the program.
- xxi. One apparent reason for this outcome was a significant over subscription of farmers by participating coops before they knew their actual allocation. Although the FSP design anticipated an orderly process of informational meetings and farmer selection to ensure the right people got the inputs, many of these procedures were either not followed or happened too late in the season to be effective.

**Most inputs arrived late.**

- xxii. Although most farmers said the quality of FSP inputs was good, the 2007/08 season was marked by serious problems with late delivery. Across the sample, less than 4% of beneficiaries said they received their inputs by the end of October and 69% said they did not get their inputs until after the start of the rains. Timeliness of

planting is extremely important with maize and there is no doubt this record had a significant negative impact on yields. Overall, 63% of interviewed households said they received their FSP inputs in November; 31% said they received the inputs in December; and 2% said they received the inputs in January.

**Beneficiary selection criteria are too loose for the program to have meaningful strategic focus.**

- xxiii. According to the survey, a farmer's membership of the cooperative and his or her ability to pay for inputs were the two main factors that determined who benefitted from the subsidy. Stated criteria such as the requirement that FSP beneficiaries should have the capacity to cultivate from 1-5ha of maize and must not be a defaulter from any previous credit program were largely ignored. Graduation requirements are not specified in the FSP guidelines and mechanisms do not exist to consider strategic factors such as whether the farmer has used fertilizer in recent years or is able to access inputs through a local shop. As a result, beneficiary selection appears arbitrary and opportunities for the program to build increased use of fertilizer and improved seed in the long run are diminished.

**Regional targeting also lacks strategic focus.**

- xxiv. Thus far, the allocation of subsidized inputs across the country has been based primarily on the proportional distribution of farmers in each district. Because the most populous areas usually also have the best developed private supply networks, therefore, a large amount of the total subsidy has gone to areas where there is already reasonable private supply capacity while less populous areas, where farmers have fewer private sector alternatives, are left behind. The universal recommendation to apply a 4x4 maize input pack is also inconsistent with important differences in climate, market access, and individual farmer objectives. In the sampled areas, for example, 6% of beneficiaries said they relied more heavily on cassava for their staple food than maize and would likely have benefitted more from other kinds of support than the FSP was designed to provide.

***Impact on Maize Production***

- xxv. Volume increases are not specifically listed as one of the program's main objectives, but this is an indicator routinely reported by MACO and is useful for assessing one dimension of the impact of the program.

**The 2007/08 FSP can be considered to have produced 82,000 to 146,000 tons of incremental maize.**

- xxvi. Previous estimates of FSP production by MACO have overlooked the question of how much maize beneficiary farmers would have produced without the program. Although many factors make a definitive calculation of incremental production nearly impossible, careful analysis of the survey data suggests that somewhere between 82,000 to 146,000 tons of new (incremental) maize can be fairly attributed to the 2007/08 FSP in all parts of Zambia depending on the change in area cultivated. This estimate is 61-78% less than MACO's estimate of 375,000 tons of incremental maize.

**The cost of FSP maize was generally competitive when grown for food security in outlying areas, but not when grown for commercial markets or for export.**

- xxvii. Using the figure of ZMK 182.61 billion (USD 47.43 million) total FSP costs including staff salaries and farmer contributions, each ton of FSP maize cost somewhere between USD 325 to 579 to produce at farm gate with and without the

effects of area increase respectively. Compared with import parity, the analysis therefore shows the FSP provided reasonable value for money if the sole objective were to promote food self-sufficiency at the village level, but was otherwise uncompetitive in commercial markets compared with the price of importing an equivalent amount of food for urban consumers or for export.

### ***Impact on Private Sector Development***

xxviii. When the FSP was launched, one of the two main objectives of the program was to enhance the capacity of private companies to supply inputs to smallholder farmers. Despite the importance attached to private sector development, little has been done by MACO to monitor the impact on private firms and people interviewed for this study reported mixed effects on the private sector. For example, 50% of FSP beneficiaries said they had bought private inputs before receiving FSP inputs compared with only 43% who continued to use private supplies with FSP support.

### **Private networks are now stronger in many locations than when the program was launched.**

xxix. Private supply networks are reported to be stronger now in many locations than in 2002 when the program was launched. In Central, Copperbelt, and Eastern Provinces, 89% of beneficiaries said that there are reliable private input shops they can reasonably get to and count on to sell good quality inputs before the start of the rains. These results do not show how many farmers could afford private inputs, but there is apparently enough business in these locations to sustain private vendors. In Northern and Western Provinces, on the other hand, many farmers reported that there were not any reliable and accessible input shops.

xxx. The geographic allocation of FSP inputs has been determined without consideration for the level of private sector development in different parts of Zambia. The risk of displacement of the nascent private sector could be reduced by including geographic criteria relating to the presence of private suppliers in the targeting of the FSP program.

### ***Recommendations***

xxxi. A number of recommendations that the Government and other stakeholders may wish to consider emerge from this analysis.

### **Start with a clear definition of objectives of the FSP.**

xxxii. The Government may wish to clarify whether the program is to be more about promoting agricultural growth or livelihood security. These objectives are not mutually exclusive, but have important implications for beneficiary targeting, regional allocations, implementation arrangements, exit strategy, and complementary investment needed for a successful outcome. If the program is to be more about growth, for example, then targeting should focus on farmers with good market access and proven capacity to grow a surplus. If, on the other hand, the program is to be about livelihood support, then selection criteria should focus on a farmer's poverty status and ability to obtain inputs through private channels.

### **Implement a dual approach with differences between remote and non-remote areas.**

xxxiii. In deciding which approach to follow, one option would be for Zambia to split the FSP into two sub-programs with different strategic objectives and implementation arrangements depending on the level of private sector development in each district.

In areas where private networks are severely constrained, direct supply through something like the existing system may still be required. The analysis shows that the cost of incremental maize production is generally competitive with import parity in remote locations meaning there is a reasonably strong efficiency argument for continued support to these areas. In other parts of Zambia where private supply networks are emerging on their own, however, new arrangements should be introduced that seek to engage these suppliers to the fullest extent possible.

**In non-remote areas, the FSP should move away from direct procurement.**

xxxiv. In non-remote areas, a voucher approach that allows farmers to buy inputs from private retailers and apply the subsidy to whatever inputs they require would be one way to achieve this objective. The operational details of a voucher program including procedures for beneficiary targeting would need careful consideration to achieve maximum impact. Rather than operate a parallel system that does not involve local retailers, however, such an arrangement would be a direct way to support genuine capacity development as the original FSP set out to do. Such a system could also help avoid the excessive delays with delivery of inputs that characterized the 2007/08 season. A voucher approach would be unlikely to work in remote districts where demand is low and private suppliers are not present.

**Chose selection criteria that are meaningful, easy to apply, and verifiable.**

xxxv. The Government may wish to establish clear, easy to apply, and verifiable beneficiary selection criteria. To date, beneficiary targeting has been undermined by very loose selection criteria that are vague and all encompassing. This has contributed to the FSP being pulled in different directions thereby diluting potential strategic impact. New selection criteria and procedures should be consistent with the clarified objectives of the program.

**Problems of late delivery should be addressed, as should gaps between farmers' expectations and actual deliveries.**

xxxvi. Problems of late delivery and differences in farmer expectations and receipts that characterized the 2007/08 season seriously undermine the impact of the program. From 2010, the GRZ fiscal year will shift to follow the calendar year effectively giving FSP administrators an additional three months after the budget is approved to complete the distribution. Because the new budget year means that FSP planning will have to be done while the current distribution is still ongoing, however, the time for effective action could easily slip by if not carefully managed.

**Institute a clear and workable system for monitoring and evaluation.**

The Government may wish to introduce a routine system for rigorous auditing, accounting, and results-based monitoring and evaluation of the FSP. Presently, there is no system to track FSP spending in any one agricultural year or to report on other performance indicators needed to make informed budget and policy decisions.

GRZ may wish to consider engaging farmers themselves in the monitoring. Participatory monitoring has been used in many sectors and countries as a way to increase social accountability. The Farmer's Report Card developed as part of the survey instruments for this study offers a practical starting point for GRZ to track the FSP's performance.

# **Zambia**

## **Impact Assessment of the Fertilizer Support Program, Analysis of Effectiveness and Efficiency**

### **I. INTRODUCTION**

1. This research report examines the technical efficiency and impact of the Zambia Fertilizer Support Program (FSP). The FSP was launched by the Government of the Republic of Zambia (GRZ) in 2002 as a temporary measure to provide subsidized hybrid maize seed and fertilizer packages to smallholder farmers and to promote the participation of private traders in supply. When the FSP was announced, the Government indicated that farmers would be eligible to receive support for two consecutive seasons only and that the subsidy level would be reduced by 25% per year. The program was meant to run for three years to the end of the 2004/05 farm season.<sup>1</sup> Contrary to these initial plans, the scale of FSP operations has grown significantly since the program was launched with large additions to the numbers of farmers targeted in some years, a change in the subsidy level from 50% to 60%, little attention to the intended two-year “graduation” requirements, and a significant escalation of total costs and cost per beneficiary. The budgeted amount for 2007/08 was ZMK 150 billion.

2. Given the strategic importance of agriculture to Zambia and high level of expenditure on the FSP, the Government of Zambia expressed an interest to the World Bank in better understanding the efficiency of its allocations to the sector. The Ministry of Finance and National Planning (MoFNP) and MACO seek jointly to understand the value-for-money of current expenditures. How has the FSP contributed to agricultural growth and other national priorities such as poverty reduction, improved food security, and private sector development? This assessment was prepared to help answer these questions and provide an improved basis for discussing the current and future role of agriculture input subsidies in Zambia. The request for this attests to the Zambian Government’s commitment to transparent decision making. The analysis focuses specifically on the 2007/08 agriculture season.

#### **Brief overview of the FSP**

3. The FSP is meant to build the “capacities of both the private sector and smallholder producers” as part of “a well-managed transition to full market liberalization.”<sup>2</sup> The FSP Implementation Manual notes that several positive developments have been recorded in agriculture since the introduction of economic reforms, but that the capacity of private firms has remained constrained in providing essential marketing services including the ability to supply inputs to smallholders in adequate and timely amounts. The FSP was therefore conceptualized as a program that would improve the access of smallholder farmers to inputs and enhance the participation and competitiveness of the private sector to supply these farmers in the future.<sup>3</sup>

4. To achieve these objectives, the FSP was designed to distribute 1ha maize input packs to qualifying farmers at subsidized prices. Each FSP pack was meant to consist of 20kg hybrid maize seed plus four 50kg bags of Compound D basal fertilizer and four 50kg bags of Urea top

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<sup>1</sup> FSP Internal Evaluation, 2008; ZNFU, 2008.

<sup>2</sup> MACO, 2007, p. 1.

<sup>3</sup> MACO, 2007.

dressing fertilizer (i.e. 20kg seed + 4x4 fertilizer).<sup>4</sup> FSP inputs were to be accessed only through approved farmer cooperatives and other farmer groups who would apply through local District Agricultural Committees (DACs) for their members to receive support. According to the original design, farmers were to be “graduated” from the FSP after two consecutive years by which time it was believed they would be able to stand on their own. Farmer payments were to be collected by the sponsoring cooperative or farmer group and deposited in local bank accounts as a condition for the inputs being released. Table 1 provides an overview of budgeted amounts and number of households planned as beneficiaries since the program was launched. As indicated, MACO expects every 1ha FSP pack it budgets for to result in three tons of maize being produced.

**Table 1: Budgeted Amounts and Planned Number of Beneficiary Households**

	<b>Budgeted cost (ZMK billion)</b>	<b>Number of 1ha packs (farmers)</b>	<b>Fertilizer amount (MT)</b>	<b>Seed amount (MT)</b>	<b>Expected production (MT)</b>
2002/03	100.0	120,000	48,000	2,400	360,000
2003/04	114.5	150,000	60,000	3,000	450,000
2004/05	112.6	125,000	50,000	2,500	375,000
2005/06	140.0	125,000	50,000	2,500	375,000
2006/07	252.0	210,000	84,000	4,200	630,000
<b>2007/08</b>	<b>150.0</b>	<b>125,000</b>	<b>50,000</b>	<b>2,500</b>	<b>375,000</b>
2008/09	492.0	200,000	80,000	4,000	600,000
<b>Total</b>	<b>1,361.1</b>	<b>1,055,000</b>	<b>422,000</b>	<b>21,100</b>	<b>3,165,000</b>

Source: MACO, 2007; FSP Study Team, 2009.

5. Except in the first two years, all contracts for Compound D have been awarded on a single-source basis to the parastatal firm, Nitrogen Chemicals of Zambia (NCZ). With Urea, all contracts since inception have been awarded to two private firms, Omnia Small Scale Limited and Nyiombo Investments Limited, which also shared the contracts for Compound D with NCZ in the beginning.<sup>5</sup> With seed, seven private firms were awarded FSP contracts in 2007/08. At the district-level, numerous warehouses and small-scale transporters have been contracted each year to manage the onward distribution of inputs to approved cooperatives and farmer groups.

### Recent concerns and reforms

6. Since the program was launched, various questions have been raised over the FSP's actual achievements and effectiveness in building agricultural capacities. In addition to the concerns raised by MoFNP for high program costs, MACO administrators along with private stakeholders and members of the donor community have voiced concern for how the FSP has been allowed to drift from the original concept of being a short term program to an open ended feature of agriculture policy. Rather than reduce FSP support systematically each year as originally intended, the total size of the program and levels of assistance have been allowed to fluctuate and grow thereby creating uncertainty for farmers and private supply companies alike. Graduation requirements have not been enforced and the apparent lack of strategic direction

<sup>4</sup> Beginning with the 2009/10 agricultural season, MACO reduced the pack size by half (i.e. 10kg seed + 2x2 fertilizer) to cater for 0.5ha maize production per beneficiary.

<sup>5</sup> This was because NCZ lacked the capacity to produce all the Compound D required by FSP so that other firms needed to be involved. During this time, the contracts to NCZ were still awarded on a single-source basis to the maximum amount it believed it could produce.

has exposed the program to various allegations of political interference, corruption, and waste of public resources.

7. During a kick-off workshop held at the start of this research, private fertilizer and seed companies voiced particular concern for the late announcement of the size and scope of the FSP program each year. As a result of not knowing the number of input packs allocated to each district, or at what price the FSP inputs would be sold for, private companies said they limit their own distribution plans to avoid the risk of being displaced by FSP. Rather than promote private sector development and help break monopolies, therefore, many private stakeholders felt the program was having the opposite effect of only benefitting tender winners at the expense of tender losers and competitive market development more generally.

8. At the farm level, concerns have been expressed over the effectiveness of FSP in achieving production increases. MACO works with the assumption that each 1ha FSP input pack it budgets for results in three tons of maize. In actual fact, 2004 Supplemental Survey data from MACO's Crop Forecast Survey collected by the Central Statistical Office (CSO) show that FSP beneficiaries achieved an average yield of 2.04 MT/ha and that this was 5% lower compared with the average yields for farmers who used commercial inputs.<sup>6</sup> Moreover, average maize yields have remained more or less flat since the program was launched suggesting there has been little if any total improvement in smallholder productive capacity as the FSP set out to achieve.<sup>7</sup>

9. Concerns have also been voiced by civil society organizations about the efficiency of program administration. In a 2008 Position Paper, the Zambia National Farmers' Union (ZNFU) wrote that its members, and small scale producers in particular, have expressed serious concerns with regard to: (i) the opaqueness of criteria used to select FSP beneficiaries; (ii) the large amount of time MACO district staff spend in administering the program, which diverts them from providing critical extension support; and (iii) the late delivery of inputs leading to avoidable production losses.<sup>8</sup> Similarly, at the community level, a monitoring exercise of the 2007/08 FSP by the Chipata District Farmers' Association identified a large number of problems including: (i) the late announcement of input prices making it difficult for farmers to plan; (ii) distribution of more inputs to urban coops than to rural coops; (iii) inclusion of non-genuine coops and farmer groups formed by family members; and (iv) a lack of transparency and accountability leading to allegations of corruption and theft.<sup>9</sup> Some people have been arrested and convictions have been secured for some in instances where discrepancies between inputs collected and inputs received have been discovered to be a result of theft or negligence. The local papers have also carried articles charging the FSP with systemic problems of implementation and lack of effectiveness.<sup>10</sup>

10. This report provides the first serious qualitative and quantitative assessment of the FSP in 2007/08 as an empirical basis for discussing the FSP's impact and how the FSP could be improved. Early thinking about the design of the study started in 2008. Consultations with MACO and MoFNP staff, Cooperating partners and the private sector at a Kick-off workshop in July 2008 built consensus around the key issues

11. To gain additional information, the Ministry of Agriculture and Cooperatives (MACO), working with the Agricultural Consultative Forum and the Food Security Research Project,

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<sup>6</sup> Lungu, et. al. 2009.

<sup>7</sup> Lungu, et. al. 2008, FSRP, 2008 and 2009.

<sup>8</sup> ZNFU, 2008.

<sup>9</sup> Chipata District Farmers Association, 2008.

<sup>10</sup> For an assortment of local news clippings see FSRP, 2009a.



undertook a joint study tour and visited Kenya, Tanzania and Malawi to look at the implementation of agricultural input programmes in those countries in January 2009.

12. Concerns voiced about the process to select FSP beneficiaries and opportunities for leakage at district level were addressed by the recommendations following the study tour. With effect from 2009/10 season the selection is done at the community level, instead of the district level, by Camp Agriculture Committees, which involve chiefs and religious leaders, while District Agriculture Committees are only responsible for allocating the district input allocations to blocks and camps.

13. This report finds evidence of leakage by comparing the amounts district officials reported cooperatives deposited in FSP bank accounts and the amount that cooperatives themselves reported depositing (ref para **Error! Reference source not found.**). As a result MACO has noted the need to monitor farmer deposits at national level. Starting from the 2009/10 season, only one account for each participating bank is used to deposit funds under the Programme and these are immediately available for scrutiny. MACO finds that this has improved FSP revenue monitoring.

### Analytical approach

14. This analysis follows a unique public sector expenditure tracking and qualitative service delivery approach. Public expenditure tracking surveys (PETS) are increasingly being used in developing and developed countries to make budget flows more transparent to beneficiaries. They follow a systematic approach to trace the flow of allocated resources through different layers of government bureaucracy to demonstrate how much of the intended budget reaches each layer and how long the service delivery takes.

15. Qualitative service delivery surveys (QSDS), on the other hand, are focused more broadly on the quality of frontline service delivery and program outcomes. In similar ways to PETS, QSDS provide insight to the efficiency of government expenditure and returns to investment by collecting information from service providers, beneficiaries, and other agents in the system. The main distinction is that the QSDS approach is not solely concerned with narrow matters of public expenditure and financial resource flows like a traditional PETS. By applying these two instruments jointly, therefore, it is possible to obtain a more complete picture of the efficiency and effectiveness of public service delivery. The dual objective of the PET/QSDS approach is to assess and track the flow of financial and other resources going to a program and to assess the quantity and quality of service delivery at the beneficiary level.

16. Previous PETS studies have been carried out in Zambia covering the health and education sectors.<sup>11</sup> PETS work is less common in agriculture and this study is one of the first times anywhere that PET/QSD methods have been used together for analysis of an agriculture sector program. Further details on the methodology and complete set of questionnaires used for the PET/QSD survey are given in Annex 1.

17. In applying these methods to the FSP, the study team took a consultative approach. Stakeholder meetings were held at each stage of the research project beginning with inception, through to the design and testing of survey instruments, data collection, data analysis, and presentation and discussion of results. In addition to meetings with key figures in the Ministry of Finance and National Planning, consultations were also held with major stakeholders in MACO including all members of the FSP Project Coordination Office (PCO) who provided guidance on specific information gaps and how the research could best serve their own management needs.

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<sup>11</sup> Das, et. al. 2004 (education), World Bank, 2006 (health).

Similar consultations were held with members of the Agriculture Consultative Forum (ACF), Food Security Research Project (FSRP), donor organizations, private supply firms, and NGOs.

18. In terms of survey coverage, it was agreed that primary data collection would take place in 20 districts across five provinces (i.e. four districts per province). By random selection, the following locations were chosen.

**Central Province** – Kabwe, Mkushi, Mumbwa, Serenje  
**Copperbelt Province** – Chililabombwe, Masaiti, Mufulira, Ndola  
**Eastern Province** – Chadiza, Lundazi, Nyimba, Petauke  
**Northern Province** – Kasama, Luwingu, Mporokoso, Nakonde  
**Western Province** – Kalabo, Mongu, Senanga, Sesheke

19. In each district, it was decided that standard questionnaires would be used to interview the following FSP stakeholders. Data collection focused exclusively on the 2007/08 agricultural season. Like the survey locations, cooperatives and farmers in each district were chosen randomly.

1	DACO
0 – 2	Warehouse managers
0 – 2	Local transporters/distributors
2 – 3	Private input dealers
3 – 4	Co-operative leaders
40 – 50	Farmers

20. Before the main survey, the instruments were tested in three districts around Lusaka (Chongwe, Kafue, and Chibombo). In addition to a “dry-run” of the survey instruments and training of field enumerators, this process involved open ended discussions by team leaders with District Agriculture Coordinators (DACOs), warehouse managers, local transporters, cooperative leaders, and beneficiary farmers to help focus the final questionnaires on areas that matter most to frontline stakeholders. Six farmer focus group meetings were held during this process that involved FSP beneficiaries and non-beneficiaries in the farm area.

21. The main survey itself took place in November and December 2008. The total numbers of expected and actual respondents at each level of the survey are shown below.

**Table 2: Expected and Actual Number of Completed Survey Instruments**

Type of Respondent	Expected Number of Respondents	Actual Number of Respondents
DACO	20	20
Warehouse manager	10 - 30	15
Local transporters/distributor	10 - 30	38
Cooperative leaders	60 - 80	84
Beneficiary farmers	800 – 1,000	844
Private input dealers	40 - 60	49
<b>Total Questionnaires</b>	<b>940 – 1,220</b>	<b>1,049</b>

22. Beyond the PET/QSD survey itself, in-depth interviews were conducted with Provincial Agricultural Coordinators (PACOs) in each sampled province, and in Lusaka with the Food Reserve Agency (FRA), Auditor General’s Office, Zambia National Tender Board, ZNFU, National Association for Peasants and Small Scale Farmers in Zambia, fertilizer and seed companies, and other relevant program participants.

23. One perceived shortcoming of this kind of methodology is the absence of a control group at the farmer level. From an academic point of view, a comparison of beneficiary farmers and non-beneficiary farmers would have been optimal for the analysis of beneficiary characteristics and the impact of FSP on maize production. However, as the primary focus of this study was to track the flow of funds and fertilizer along the different levels of bureaucracy, and to provide practical policy advice on how to improve the quality of actual service delivered to farmers in terms of improved access to timely and adequate inputs, the study team decided not to include a control group. This was a strategic and careful decision given the limited resources available and the need to maximize the number of questionnaires at each stage of the fertilizer chain for robust results on potential inefficiencies. Moreover, the study benefitted from the wealth of information and data already available in Zambia on smallholder characteristics and maize production that could be used for baseline comparisons.

24. Data entry and analysis were carried out in January and February 2009 and preliminary results were presented in various briefings that included a presentation to donor partners at the World Bank Country Office and at MACO Headquarters for the Minister of Agriculture and other high-ranking GRZ officials in March 2009.

25. The table below shows the number of FSP packs allocated to sampled districts in the 2007/08 agricultural season. As indicated, the survey covered districts scheduled to receive very large and small amounts of FSP inputs ranging from just 20 FSP input packs to more than 4,000. Across the entire sample, the average allocation to each district was 1,786 packs, which is just slightly more than the national average of 1,712 packs per district.

26. The survey covered a wide variety of locations including major maize growing areas close to Zambia's towns and cities, remote locations far from the major markets, areas without a strong tradition of maize production or consumption, and locations near to and far from Zambia's international borders where FSP inputs could potentially leak across to neighboring countries (see map). The sample does not include a valley district. Valley districts' agro-ecological characteristics are different from plateau districts. The study made use of the wealth of information and other survey results already available in Zambia on smallholder characteristics and maize production, and was designed to look broadly at program impact. The specific valley/plateau characteristics do therefore not affect overall results and recommendations of the study.

**Table 3: Number of FSP Packs Allocated to Sampled Districts (2007/08 season)**

		<b>Packs Allocated</b>
<b>Central</b>	Kabwe	2,500
	Mkushi	3,750
	Mumbwa	3,275
	Serenje	3,000
<b>Copperbelt</b>	Chililabombwe	1,155
	Masaiti	2,310
	Mufurila	1,155
	Ndola	1,155
<b>Eastern</b>	Chadiza	2,225
	Lundazi	3,685
	Nyimba	925
	Petauke	4,290
<b>Northern</b>	Kasama	2,500
	Luwingu	825
	Mporokoso	850
	Nakonde	1,500
<b>Western</b>	Kalabo	20
	Mongu	230
	Senanga	125
	Sesheke	250
<b>Total</b>		<b>35,725</b>
as % of Zambia		28.6%

### **Organization of the report**

27. This report is presented in seven sections. Following the current introduction, Section II gives a brief overview of the FSP's objectives, major design features, and details of the 2007/08 allocation. Section III then looks in more detail at the record of program expenditures. This part begins with a review of Zambia's public expenditure in agriculture to help locate the importance of the FSP in the national budget then looks more specifically at the implication of the annual budget cycle for FSP programming, FSP tendering and procurement in 2007/08, what share of the inputs reached beneficiary farmers, and total 2007/08 program costs.

28. The next three sections look at the quality of service delivery. Section IV considers the extent to which the FSP achieved its stated objectives of providing smallholder farmers with timely and affordable access to good quality inputs. This part looks specifically at beneficiary characteristics, the quantities of inputs farmers expected to receive and what they got, when the inputs arrived, and the quality of inputs. Next, Section V uses survey data to look at program impact measured by incremental maize production that can be fairly attributed to FSP support. Section VI then considers the impact of the FSP on private sector development including farmer access to private retailers in various parts of the country. The discussion concludes in Section VII with a summary of major findings and recommendations for program improvement.

## **II. BACKGROUND TO THE FSP**

29. Before turning to the detailed analysis of the 2007/08 program, it is important to look at the reasons why the FSP was launched, what it is meant to achieve, and how the FSP was meant to function in the season under examination.

### **A. Program Motivation**

30. Zambia has a long history of input price controls and subsidy programs for maize. Before the introduction of structural reforms, input prices and distribution were controlled through the National Agricultural Marketing Board (NAMBOARD) with the objective of keeping the prices as low as possible for smallholder farmers. Pan-territorial prices were maintained through subsidies to promote equity in fertilizer use and food production around the country. During this period, the state-owned firm, Nitrogen Chemicals of Zambia (NCZ) was the sole supplier and distributor of fertilizer in the country.

31. With the introduction of market reforms from the early 1990s, private traders and distributors were allowed to enter the sector. Input prices were deregulated and allowed to reflect seasonal and spatial differences in the cost of supplying inputs to different locations. A number of private firms were quick to arrive to supply the commercial farm sector, but Government saw that not enough capacity existed to serve smallholder producers in all parts of Zambia. Especially in outlying areas, it was perceived that private firms had little incentive to supply these markets due to the limited purchasing power of smallholder farmers and high cost of transportation to reach Zambia's many remote locations. In MACO's view, private sector could not effectively fill the gap left by Government's withdrawal from fertilizer markets resulting in problems with high prices, inadequate quantities, poor quality, late delivery, and formation of cartels among the few firms that did exist.<sup>12</sup>

32. To improve on this situation, various programs were launched in the early liberalization period including the Agricultural Inputs Credit Revolving Fund, Fertilizer Loan Supplier Fund, and the Trader/Agency Training Facility, which ran during the 1992/93 and 1993/94 farming seasons. Due to poor credit recovery and other shortcomings, however, Government soon abandoned these efforts and launched the Agricultural Credit Management Program (ACMP) in 1994. Like the FSP, the ACMP was justified as a transitional program to deliver inputs to the small-scale farming sector and to enhance private sector capacity in agricultural input marketing and credit recovery. The ACMP provided credit through appointed credit managers, but suffered from very low credit recovery equal to less than 10% of total disbursements and was terminated in 1997.<sup>13</sup>

33. When the ACMP was abandoned, the Food Reserve Agency (FRA) took over the function of input distribution. This activity was not among the roles prescribed by the FRA Act of 1995 and it was expected that the FRA would disengage from input marketing as soon an alternative mechanism was identified or private sector capacity was developed. In practice, the FRA continued to play the role of importing fertilizer and distributing supplies to smallholder farmers for five years until 2002 when the FSP was launched. During this period, credit recovery through the FRA was less than 5%.<sup>14</sup>

34. In 2001, MACO estimated that only about 30% of smallholder households had access to improved seed and just 20% of farmers had access to fertilizer. By the end of the first decade of liberalization, therefore, Government saw that the small scale farmers were too weak

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<sup>12</sup> MACO, 2007, FSP Internal Evaluation, 2008.

<sup>13</sup> FSP Internal Evaluation, 2008.

<sup>14</sup> FSP Internal Evaluation, 2008.

economically to provide adequate demand for fertilizer and that this was leading to the erosion of Zambia's resource base, low productivity, and increased cases of food insecurity and poverty at the household and national levels. GRZ was also concerned that private input dealers operated in an unpredictable policy environment, leading to further uncertainties about private sector expansion into the input markets and ability to take over the input supply function from Government.<sup>15</sup>

35. In this context, Government decided that a new program was needed to take over input distribution from the FRA that would (i) improve on the very poor rates of credit recovery that had plagued Government's efforts in input marketing since liberalization; (ii) ensure transparency and competitiveness in input supply thereby breaking cartels and monopolies; (iii) be more predictable in order to create favorable conditions for private sector expansion; and most of all (iv) guarantee the timely delivery of good quality, affordable inputs to smallholder farmers in all parts of Zambia.<sup>16</sup>

## **B. Program Design Features<sup>17</sup>**

36. The Fertilizer Support Program was launched at the start of the 2002/03 agricultural season. Unlike previous input marketing programs, the FSP sought to disengage Government from credit provision by selling inputs on a direct cost-sharing basis. The move from credit provision to direct cost sharing basis under FSP was a plus. Under this arrangement, there is no room for defaulting, which characterized the agro credit facility in the past. In addition to the direct benefits to smallholder farmers, it was anticipated the new program would create additional demand for inputs and open new market opportunities for private dealers to supply the rural areas.

37. To achieve these aims, the FSP was designed to supply standardized input packs consisting of eight bags of fertilizer (i.e. four 50kg bags of basal fertilizer and four 50kg bags of top dressing), and 20kg of hybrid maize seed which is the amount Government recommends to plant 1ha of maize. FSP inputs were to be accessed only through approved farmer cooperatives and other farmer groups who would apply through their local District Agricultural Committee (DAC) for members to receive support. Farmer payments were to be collected by the sponsoring cooperatives or farmer groups and deposited in local bank accounts as a condition for the inputs being released.

38. Under the program, inputs are delivered up to the district level by private firms selected through a national tender. Thereafter, local transporters are used to distribute the inputs to satellite depots for release to approved beneficiaries through cooperatives and other farmer organizations selected by the DAC in each district. In districts without an active DAC, Provincial Agricultural Coordinators (PACOs) were instructed to facilitate the formation of "ad hoc committees" to perform the DAC functions in administering the FSP. Monitoring of the program was to be done by District Agricultural Coordinators (DACOs), DAC members, extension officers, and local NGOs.

39. Originally, farmers were allowed to access up to five 1ha packs each, but this rule was changed within the first two years. For the 2007/08 season, the FSP Implementation Manual categorically states that each beneficiary was to be "allocated only one input pack for the

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<sup>15</sup> FSP Internal Review, 2008.

<sup>16</sup> MACO, 2007; FSP Internal Review, 2008

<sup>17</sup> This section draws extensively on the 2007/08 FSP Implementation Manual (MACO, 2007). The selection mechanism has changed recently and is now done at the community level by Camp Agriculture Committees, which involve chiefs and religious leaders, instead of at district level.

cultivation of one hectare of maize.”<sup>18</sup> When the FSP was first launched, the subsidy level was set at 50%, but was increased to 60% from the 2006/07 season.<sup>19</sup> In the initial design, farmers were supposed to be “graduated” from the program after two consecutive years, and the lifespan of the program was to be three years only.

40. Other key design features of the FSP are set out below.

### **Program objectives**

41. The 2007/08 FSP Implementation Manual identifies seven specific objectives for the program as follows.

- (i) To increase private sector participation in the supply of agricultural inputs to smallholder farmers thereby reducing government involvement;
- (ii) To ensure timely, effective and adequate supply of agricultural inputs in the country;
- (iii) To improve access of smallholder farmers to agricultural inputs (fertilizer and hybrid maize seed);
- (iv) To ensure competitiveness and transparency in the distribution of inputs, thereby breaking monopolies;
- (v) To serve as a risk-sharing mechanism for smallholder farmers to cover part of the costs for improving agricultural productivity;
- (vi) To expand markets for private sector input suppliers/dealers and increase their involvement in the distribution of agricultural inputs in rural areas, thereby reducing the direct role of Government; and
- (vii) To facilitate the process of farmer organization, dissemination of knowledge and creation of other rural institutions that will contribute to the development of the agricultural sector.

### **Eligible cooperatives and farmer groups**

42. Cooperatives and other farmer organizations are the main channels for distribution of FSP inputs. In collaboration with Members of Parliament, the District Administrator, NGOs, and village headmen, the FSP guidelines say that the DACs will pre-select farmer groups and coops to participate in the program whereby each organization must have the following characteristics.

- (i) Written by-laws to manage their funds and have appropriate accountability mechanisms;
- (ii) Have an executive committee structure and should operate a bank account;
- (iii) Demonstrate the need and ability to use the inputs well;
- (iv) Should be duly registered by the Registrar of Cooperative Societies and Registrar of Societies;
- (v) Should have no outstanding loans from the past seasons, FRA, or any other lending institution;

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<sup>18</sup> MACO, 2007, p. 5.

<sup>19</sup> In 2008/09, the +subsidy went beyond 80% because of the spike in global fertilizer prices.

- (vi) Should be located in an agricultural area and should be engaged in agricultural activities; and
- (vii) Should demonstrate knowledge in cooperative and agribusiness management.

#### **Farmer selection criteria**

43. Individual beneficiaries, in turn, are required to be a member of the pre-approved cooperative or farmer organization. As set out in the FSP Implementation Manual, the executive committee of each organization should recommend farmers according the following criteria for formal DAC approval. Notably, graduation requirements are not included in the farmer selection guidelines.

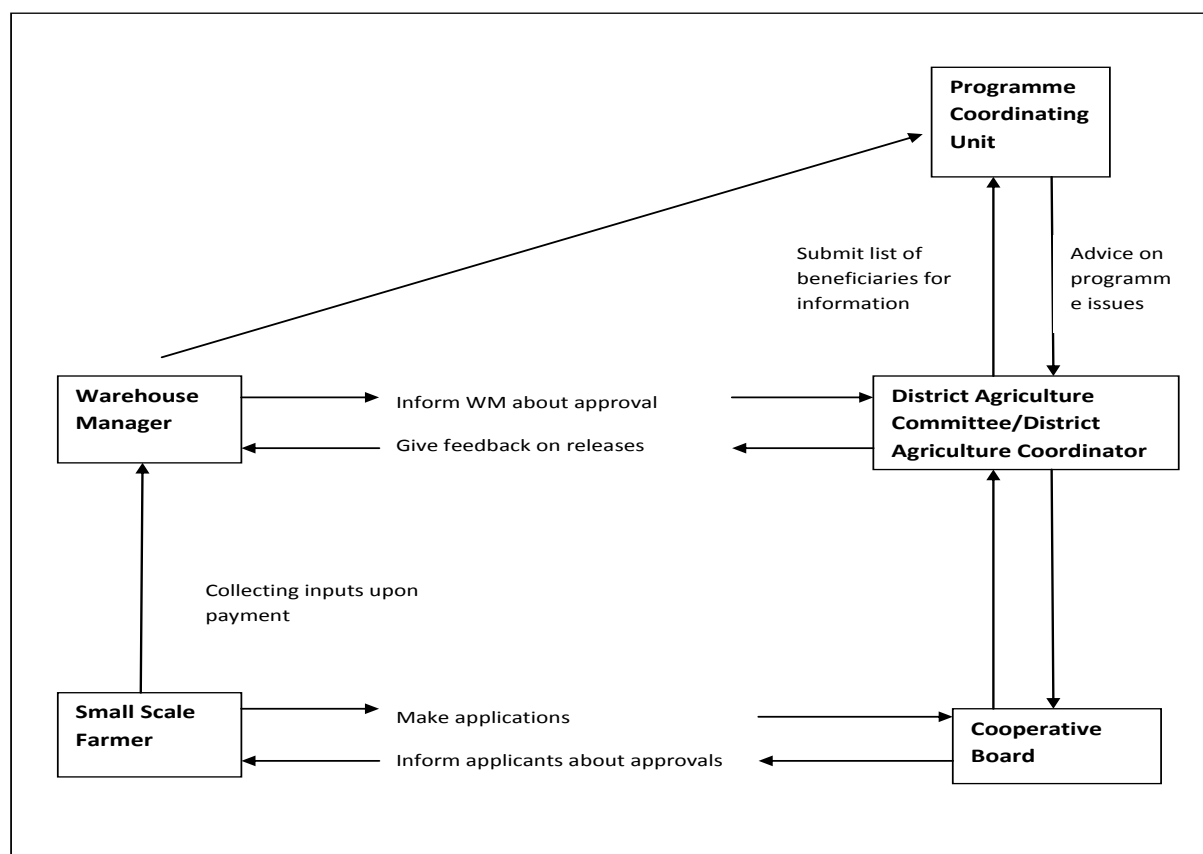
- (i) Should be a small scale farmer and actively involved in farming within the cooperative coverage area;
- (ii) Has the capacity to grow 1-5 hectares of maize;
- (iii) Should have the capacity to pay 40% of the cost of inputs;
- (iv) Should not concurrently benefit from the Food Security Pack; and
- (v) Should not be a defaulter from Food Reserve Agency and/or any other agricultural credit program whether belonging to an eligible cooperative or not.

#### **Application process**

44. The application process is described in the 2007/08 FSP Implementation Manual. The Programme does not have any provisions to distribute the Implementation Manual to all cooperatives. Instead, members of cooperatives are supposed to be sensitized through their leaders who attend sensitization meetings at both the provincial and district levels. .



**Figure 1: FSP Application Process**



45. In effect, this shows that the application process begins afresh each year when the MACO announces the rules for that year's FSP program. The DACO is meant to communicate the rules to pre-selected cooperatives and farmer organizations at a district-wide "announcement meeting" attended by cooperative board members, camp extension officers, village headmen, and other local leaders. In turn, the cooperative board members are meant to inform their members about the rules and modalities governing the program.

46. Next, individual farmer applications are to be screened by cooperative board members to ensure that farmers conform to the FSP selection criteria. Camp extension officers are meant to sit in on the review meeting and be involved in the process of appraising and considering applications. Upon counter checking the list of recommended farmers to ensure that all applicants conform to the stated criteria, the camp extension officer is to endorse the list and deliver the application to the DACO for final review and approval by the DAC.

47. At the district level, the FSP guidelines state that the DAC may be assisted by the Senior Agricultural Officer (SAO), Block Extension Officers (BEOs), representatives from the Office of the President, and senior representative of the FRA in reviewing applications from cooperatives and other farmer organization. During its review, the DAC and other participants are meant to ensure (i) that all cooperatives, farmer organizations, and individual beneficiaries conform to the prescribed selection criteria; (ii) that all the application process has been correctly followed; (iii) that inputs are rationally allocated to all participating cooperatives and other farmer organizations within the district; and (iv) that the total sum of inputs approved does not exceed the district allocation.

48. Finally, at the national level, the DACs are meant to inform the FSP Program Coordinating Office (PCO) about the details of its decision. The PCO, in turn, is meant to create

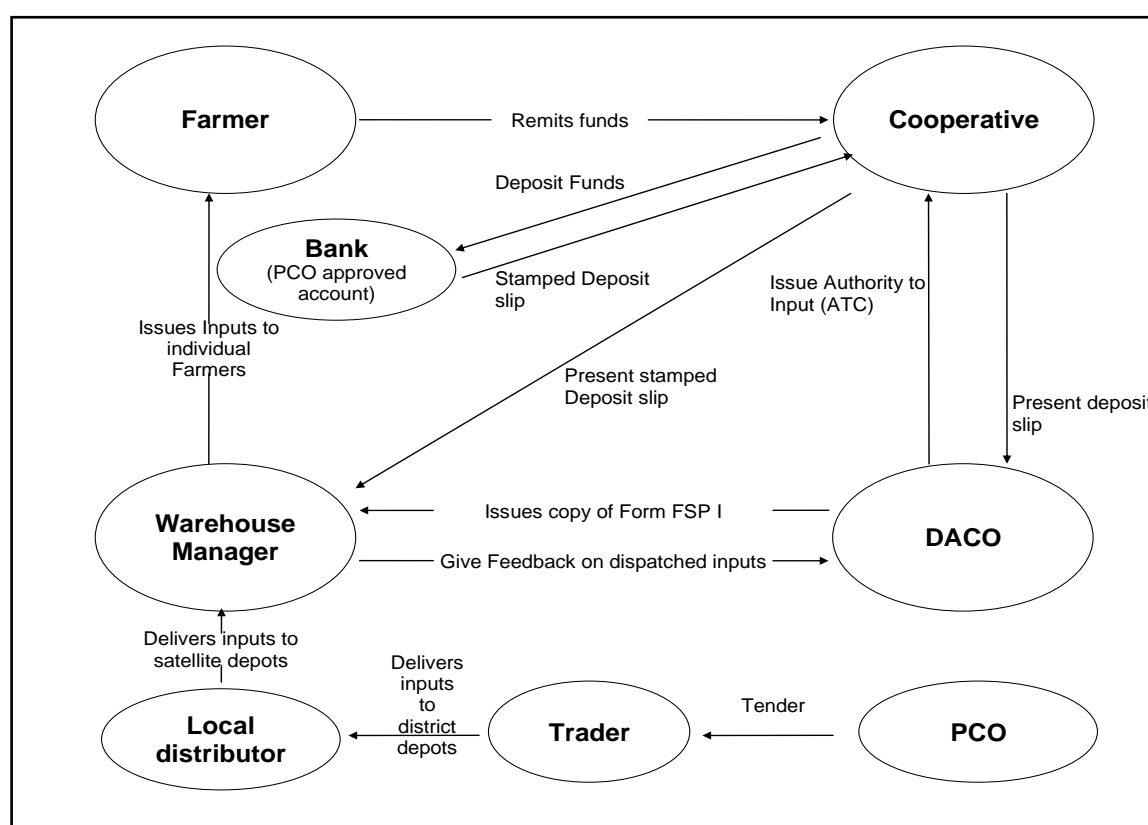
a database of all approved applicants so that it can ensure the right types of inputs are distributed to all districts on a timely basis.

### Delivery of inputs

49. Once the application process is complete, the FSP Implementation Manual states that DACOs will inform each approved cooperative board so that individual members can be told whether to expect FSP inputs. At this stage, when the approval process is complete, the FSP guidelines instruct cooperative boards to: (i) collect the required amounts of money from all approved farmers; (ii) collect the required forms and blank deposit slips from the DACO; (iii) deposit the money in a specified account approved by the PCO; (iv) submit evidence to the DACO that funds have been remitted; and (v) organize and inform all approved applicants when and at which depot each applicant will receive his or her inputs.

50. These arrangements are summarized in the next diagram. In this flow chart, DACOs are to issue cooperative and farmer group leaders a stamped and signed Authority to Collect (ATC) form upon their presentation of a deposit slip as proof of farmer contributions. At the same time, the DACO is meant to issue a signed and stamped a copy of the form FSP-1 to the warehouse manager with names of all approved beneficiary farmers. Upon receipt of the ATC and FSP-1 by the warehouse manager, the inputs may be released. Program rules state that each beneficiary must sign for and collect their inputs in person upon presentation of their identity card.

**Figure 2: Payment Procedure and Collection of Inputs**



### C. The 2007/08 FSP Allocation

51. In the 2007/08 agricultural season, MACO planned to distribute 125,000 FSP input packs to 125,000 eligible farmers. The total number of packs allocated to each province is shown in [Table 4](#) below. Full details of the allocations to individual districts are given in

Appendix 1. The budgeted cost for the 2007/08 exercise was ZMK 150 billion (USD 39 million) covering 25,000 tons of basal and top dressing fertilizer each (i.e. 50,000 tons total fertilizer), 2,500 tons of hybrid maize seed, logistics, and other direct costs including publicity and sensitization materials. In 2007/08, the price to farmers for one FSP input pack was meant to be ZMK 500,000 (USD 130) equal to a 60% subsidy from the commercial price.

**Table 4: Total FSP Packs Allocated by Province in 2007/08**

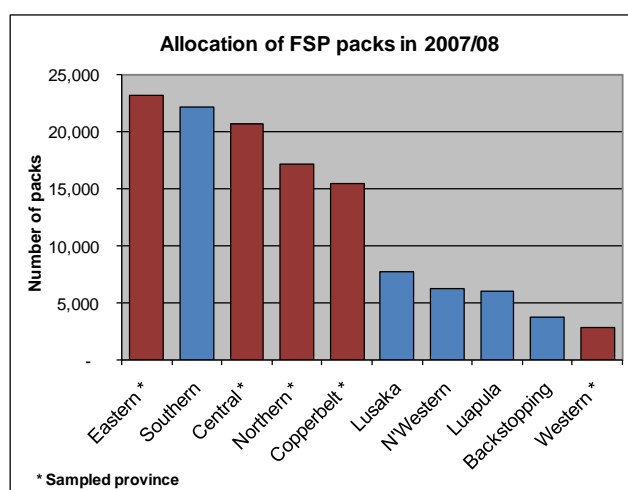
	Number of Packs
Eastern *	23,100
Southern	22,135
Central *	20,685
Northern *	17,090
Copperbelt *	15,400
Lusaka	7,750
N'Western	6,225
Luapula	5,975
Western *	2,890
Backstopping	3,750
<b>Total</b>	<b>125,000</b>

\* Sampled province

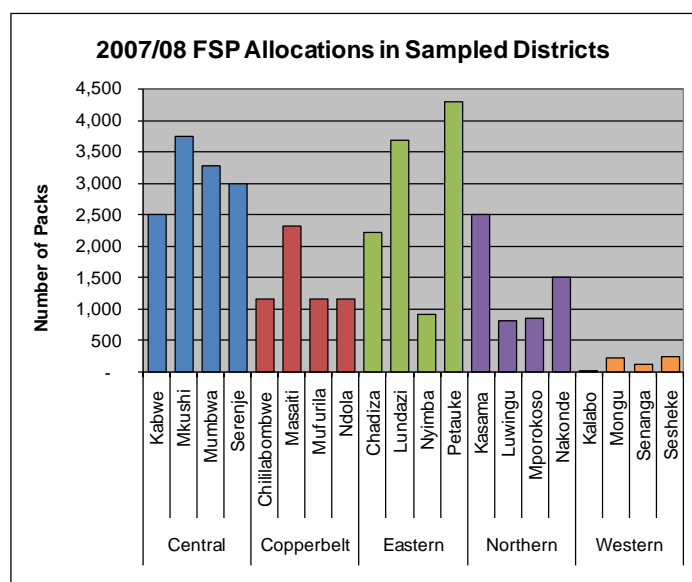
52. According to MACO administrators, the regional allocations are based on the number of smallholder farmers in each district. While this approach may be attractive to ensure an equitable distribution of inputs, other strategic considerations such as the level of private sector development in different parts of Zambia, the level of FRA maize marketing activities, suitability of different areas to maize production, and farmer demand for maize inputs compared with inputs for other food crops are not taken into account.

53. [Figure 3](#) illustrates the total 2007/08 allocation on a provincial basis. [Figure 4](#) shows the number of inputs allocated to districts covered by the survey.

**Figure 3: Total FSP Packs Allocated by Province in 2007/08**



**Figure 4: Allocation of FSP Packs to Sampled Districts in 2007/08**



### III. PROGRAM EXPENDITURE

54. This section of the report addresses the program's financial record, total costs, and cost effectiveness compared with private sector benchmarks. The discussion begins with an overview of Zambia's public expenditure in agriculture to help locate the importance of the FSP in the national and agriculture budget. The analysis then looks more specifically at the annual budget cycle, FSP tendering and procurement procedures, evidence of leakage and waste, and total program costs in the 2007/08 season. The next part of the report considers the qualitative aspects of FSP service delivery.

#### A. Public Agriculture Expenditure

55. Historically, the agriculture sector in Zambia has received a relatively large share of the national budget. In the period before liberalization from 1981-1990, agriculture received 18.47% of the national budget on average. Most resources went for the provision of inputs and credit, grain market interventions, and operation of agricultural parastatals. The high share of budget resources allocated to agriculture, however, contributed to large fiscal deficits and general macroeconomic instability. These policies did not generate expected growth rates partly because of the desire of GRZ to provide cheap staple food for the urban population and the uniform pricing of inputs and outputs throughout the country. On the whole, it became apparent that government's policies biased agriculture incentives in favor of maize to the disadvantage of other crops and long-term diversification opportunities. The average agricultural GDP growth rate from 1981 to 1990 was 2.7% per year compared with annual population growth of 3%.

56. During the economic reforms of the 1990s, Government reduced its role and budget for agriculture. The average share allocated to the sector from the national budget declined from 24.6% in 1991 to only 4.5% in 2000. In real 2006 terms, public resources for agriculture plummeted from a peak of ZMK 3.1 billion in 1991 to just ZMK 327 million in 1999 as the state cut back on its fertilizer and maize marketing operations. Real agricultural growth rates were very volatile during the 1990s.

57. More recently, the trend in agricultural sector's share of the national budget is positive. Agriculture's share rose from 7.4% in 2000 to 12.5% in 2008. At the time of signing the Maputo Declaration in 2003, which committed Zambia to raising its share of agriculture's expenditure to 10% by 2008, Zambia was committing 6.1% of its national resources towards agriculture. Following signing of this declaration, Zambia's share of national resources going to agriculture rose significantly and surpassed the 10% target set by the leaders of the Africa Union<sup>20</sup> [Table 5](#) lists eleven functions that government of Zambia performs in the agricultural sector. Against each function, the average share of the budget and the trends in spending since 2000 are shown. On average, the dominant function (38% of spending) of government in agriculture is to provide farm requisites to subsistence producers. Smallholder farmers are given fertilizers and seeds by government (including FSP). These expenditures show a strong positive trend and recorded a phenomenal growth of 16% per year over the last nine years. 20% of expenditures support incomes of smallholder maize producers and consumers (including FRA). This is the second largest government function in agriculture in terms of spending. The trends in maize and farm income support show a high growth of 12.7% per year.

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<sup>20</sup> Based on FSRP (2009b). Agriculture was defined by the Africa Union's (AU) New Economic Partnership for Agricultural Development (NEPAD) to include crops, livestock, fisheries and forestry activities ranging from: administration of commodity affairs and services; operation or support programs or schemes; production and dissemination of information; compensation, grants, loans or subsidies; administration and operation of government agencies engaged in research activities. This analysis follows the AU/NEPAD's approach which is based on the classification of functions of government (COFOG) developed by the Organization for Economic Cooperation and Development (OECD).

**Table 5: Functional Classification of Discretionary Expenditure, Zambia, 2000-2008 (constant 2008 values)**

Function	Annual average value (ZMK million)	Per cent of Total Annual Average Value	Average Annual Growth (%)
Support to farmers (including FSP)	201,239	38.1	16
Maize price and income support (including FRA)	106,765	20.2	12.7
Support to extension	88,071	16.7	8.9
Agric administration	40,309	7.6	-3.1
Crops research	26,170	5.0	1.4
Forestry	21,518	4.1	2.6
Livestock research & development	17,387	3.3	5.3
Agric investments	8,608	1.6	0.3
Agrarian reform	6,571	1.2	6.3
Fisheries	5,687	1.1	6.3
Agric information	5,259	1.0	4.8
<b>Total Agriculture Sector</b>	<b>527,584</b>	<b>100</b>	<b>5.6</b>

Source: FSRP (2009b)

58. Despite the high level of spending on input and output subsidies, Zambia's Fifth National Development Plan (FNDP) places the FSP and strategic food reserve (FRA) as numbers 11 and 12 on the list of priorities for the agriculture sector respectively. Broadly speaking, therefore, the high budget allocations to these subsidy programs are inconsistent with Zambia's stated development priorities and risk undermining MACO's vision for agriculture investment and growth. Irrigation development, agriculture infrastructure, land development, livestock development, and agriculture technology are each ranked higher than the FSP and strategic food reserve in the FNDP but have received significantly fewer resources.

59. Moreover, despite the high spending on FSP input subsidies and FRA price support, very little attention has been given to how these two parts of Zambia's larger subsidy program work together. Each year the total size of the FSP and level of input price support is decided separately from funding decisions for the FRA and what price it will pay for maize. Farmer profitability is a function of input costs and output prices and these variables need to be considered together in deciding on effective subsidy policy. Particularly, if the objective is to "graduate" farmers from the FSP after two years, there needs to be a clear focus on input and output prices to know if farmer profits make this goal realistic.

60. While the overall performance of Zambia's total subsidy program is not a subject for investigation of the present study, these observations suggest that Zambia may be missing an important opportunity to get better value for its spending on agriculture.

## **B. Trends in FSP Expenditure**

61. In terms of specific expenditure on the FSP, [Table 6](#) below looks at the record of budgeted costs in Zambian Kwacha and U.S. Dollar terms since the program was launched.

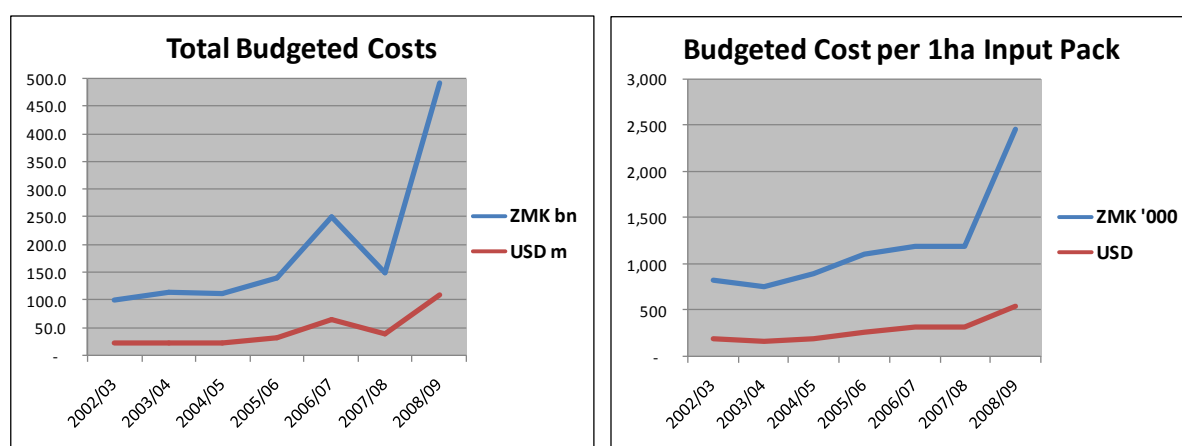
**Table 6: FSP Budgeted Costs and Budgeted Costs per Pack since Inception**

	Total Budgeted Cost		Number of 1ha packs (farmers)	Budgetd Cost per Pack	
	ZMK bn	USD m		ZMK	USD
<b>2002/03</b>	100.0	22.2	120,000	833,333	185.2
<b>2003/04</b>	114.5	24.1	150,000	763,333	160.7
<b>2004/05</b>	112.6	23.5	125,000	900,800	187.7
<b>2005/06</b>	140.0	31.8	125,000	1,120,000	254.5
<b>2006/07</b>	252.0	66.3	210,000	1,200,000	315.8
<b>2007/08</b>	150.0	39.0	125,000	1,200,000	311.7
<b>2008/09</b>	492.0	109.3	200,000	2,460,000	546.7

USD values calculated at the average exchange rate during each farm season.

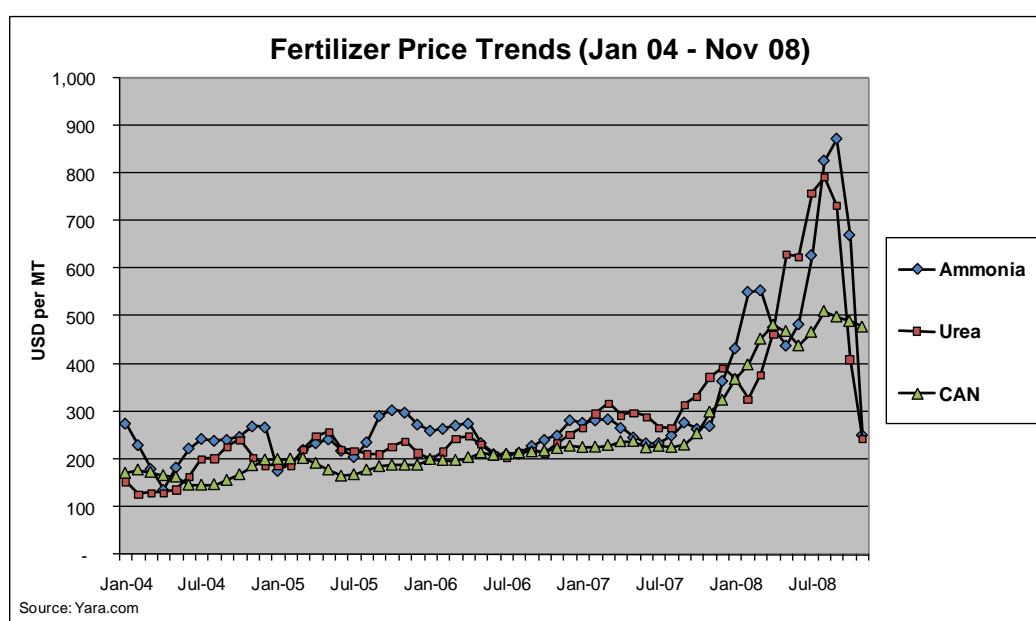
62. The data in [Table 6](#) show that total FSP costs have increased significantly since the program was launched. These trends in the program's budgeted costs are illustrated in the pair of graphs below that look at total budgeted costs and budgeted cost per pack in ZMK and USD terms since the beginning of the program respectively. With regard to international comparisons, the Black Sea reference price of Urea rose by roughly 32.5% from August 2004 to August 2007 whereas the budged cost of one FSP pack rose by 66% over the same approximate period (i.e. between the 2004/05 and 2007/08 agricultural seasons bearing in mind that most FSP tenders have been awarded in August).

**Figure 5: Trends in FSP Budgeted Costs (2002/03 – 2008/09)**



63. Of particular note, the sharp increases in total costs in the 2006/07 and 2008/09 both were due, in part, to large jumps in the numbers of smallholder farmers targeted in these seasons. Beyond the spike in number of farmers, the very large rise in costs in 2008/09 also reflects the sharp rise in global fertilizer prices that occurred at almost the same time MACO was in the market to buy FSP fertilizer for the 2008/09 season (see [Figure 6](#)).

**Figure 6: Global Fertilizer Price Trends, January 2004 – November 2008**



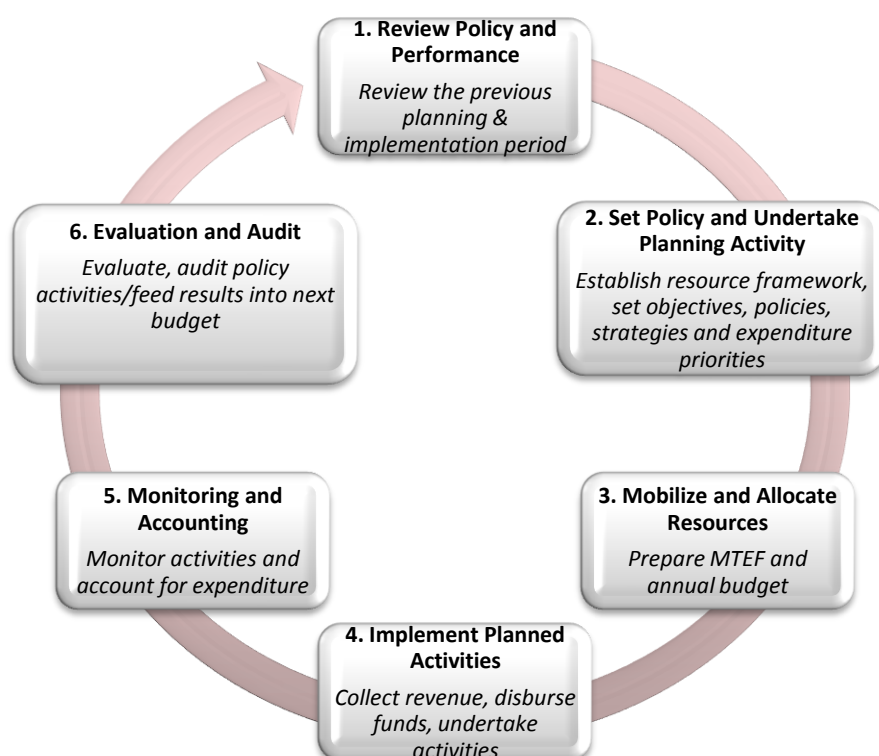
64. While the sharp rise in global fertilizer prices on the eve of the global financial crisis in 2008 may be unprecedented, these events point to a constraint of the FSP in terms of the restrictions imposed by Government's annual budget cycle. Because of the legal requirement to tender for FSP inputs each year, FSP administrators say they do not have an option to enter into long-term supply contracts or engage in various kinds of hedging arrangements and forward options that could have helped protect Zambia from the kinds of market volatility experienced in 2008.

### C. The FSP Budget Cycle

65. Because of rules on Government funding, procurement of FSP inputs has to be done every year. The annual budget cycle in Zambia is a consultative process between MoFNP and line ministries as shown in [Figure 7](#). MACO states that the budgeting process originally improved with the introduction of Medium Term Expenditure Framework (MTFE), but has since deteriorated with serious delays in its engagement with the MoFNP. At the time it engages its own sub-national structures for input to FSP, for example, MACO says it is unaware of the ceiling from the Ministry of Finance. Until now, the budget ceiling for FSP is only communicated to MACO after submission of its proposed budget and MoFNP has had chance to scrutinize the initial proposals. MACO has no chance to get back to the various cost centers for adjustment to their submissions and program administrators say the budget ceiling has been communicated as late as November in some years and not August or September as it should.



**Figure 7: The Annual Budget Cycle in Zambia**



66. Even though the MTFE Green Paper covers three years, the actual funding of activities must be done annually meaning the tendering for FSP inputs has to be repeated every year. FSP administrators point to this as a major cause on the late delivery of inputs in recent years. The Ministry of Finance, however, reports the view that the budget cycle is a problem, since the program is not subjected to major adjustments in budget negotiations and that the amount allocated does not change substantially from the initial ceiling.

67. The timeline for FSP budgeting, tendering, and implementation is shown in [Table 7](#) in which key dates in the GRZ budget calendar are marked with an “X”. In interpreting this timeline, it is important to note that from 2010 the Zambian fiscal year will change to follow the calendar year instead of the April 1 to March 31 budget year that has applied until now. This will affect the dynamics of FSP budgeting and tendering considerably, essentially giving program administrators an extra three months from the time the budget is approved by Parliament until the inputs must be in place at the farm level before the start of the farm season. Nevertheless, lessons from the previous timeline are still relevant in terms of the need to avoid inordinate delays with the procurement process so that the system works effectively. Shifting the budget year three months earlier also means that FSP administrators will have little or no time to evaluate the previous year’s efforts before having to plan the next FSP cycle. In the new calendar, GRZ budget submissions will be reviewed during the peak period of FSP operations when the input distribution is ongoing.

**Table 7: Annual FSP Timeline (before the change in fiscal year)**

	Rains start >>																Ag Season			
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb		
Pre-planning and budgeting																				
Provisional FSP budget ceiling			X																	
Detailed planning																				
Budget speech					X															
Budget presentation to Parliament																				
Parliament approves budget							X													
Prepare tender																				
Open tendering												A								
Tender review																				
Announce tender winner													A							
Arrival of inputs												Pre-arrival	Goal	...Continue						
Release to co-ops and farmers														Goal	...Continue					

X = Fixed date in GRZ budget cycle; A = actual date in 2007/08 FSP season.

68. The upcoming change in the GRZ's fiscal year notwithstanding, [Table 7](#) shows that in 2007/08 MoFNP announced the provisional budget ceiling to MACO in November; the Budget speech to Parliament was made in January; and the Budget was approved in late March. During this process, MACO says that it engaged in pre-planning from September to November and detailed planning from November to January. These preparations were said to include: (i) collecting information for allocations to districts and provinces and eventually determining the number of beneficiaries and cooperatives; (ii) making revisions to the FSP Implementation Manual as needed; (iii) reconstituting DACs where this was required; and (iv) preparation of draft tender documents.

69. Although MACO reports that it began to work on tender documents during the pre-planning and detailed planning stages of the FSP cycle as early as September, it also reports that detailed preparations and drafting of tender documents continued into April and May. For the 2007/08 season, the Zambia National Tender Board (ZNTB) published the tender documents in June, more than two months after the FSP Budget was approved by Parliament. The tender period was left open for one month, which was scaled down from the usual six weeks because of time pressure. Suppliers submitted their tender bids in July and an evaluation committee consisting of 9-11 members then scrutinized the bids. The decision on tender winners for the 2007/08 FSP was announced in August, barely two months before the start of the agricultural season.

70. According to the FSP Implementation Manual, all inputs supplied by tender winners should arrive at the district level by the end of September so that release to individual farmers can be completed by the end of October. As indicated, however, MACO did not meet these objectives and inputs continued to arrive at the district level as late as November and distribution to farmers continued into February.

71. Putting aside the question of intra-ministerial communication, the timeline clearly demonstrates that the period for planning, detailed planning, and preparation of FSP tender documents was not used efficiently. Given that MoFNP says the final budget for FSP barely changes from the ceiling it announces in November, there is little reason why the tender documents could not have been released almost immediately after the Parliamentary vote. The only thing MACO and ZNTB should have had to do was to adjust the final numbers so the documents could be sent to the printers and released as early as April without two and a half months further preparation.

72. At least two other features of the FSP timeline are worth noting. First, the FSP cycle is a continuous process. Before one season is finished, planning and preparations for the next season are already meant to begin. In reality, of course, MACO administrators find they are very busy with the current season and have little time for detailed planning of the next season

(let alone evaluation of the present season) until December or January when most inputs have been distributed. Even in this regard, however, there is little reason why the tender documents could not be ready for release almost immediately after Parliament approves the budget. If the PCO does not have time to attend to all of these tasks, then additional resources should be allocated by MACO so that the program can be implemented efficiently.

#### D. The 2007/08 Procurement

73. In 2007/08 seven fertilizer companies bid for FSP contracts. To achieve this large number, several private companies that had not previously bid for FSP contracts were specifically asked by MACO to participate in the 2007/08 tender. Despite these overtures, the contracts for fertilizer were ultimately awarded to the same firms that had always participated in the program, namely Nitrogen Chemicals of Zambia (which was awarded the contract for Compound D on a single-source basis), Omnia Small Scale Limited, and Nyiombo Investments Limited. MACO administrators report that the main reason for this outcome is the other fertilizer companies that bid to supply Urea were judged to lack the physical capacity to deliver the required volumes and/or could not mobilize the necessary finance.

74. The GRZ also bought from seven seed companies in the 2007/08 season. Unlike fertilizer, seed is single-sourced because of the special traits of each type of seed and because farmers ideally are supposed to specify the type of seed they want. The seed companies were MRI Seed, Prime Agric Centre, Kamano Seed Company, Pannar Seed, Zamseed, and Croppack Zambia.

#### Fertilizer procurement

75. Details of the quantities and prices involved in each of the three fertilizer contracts awarded by the FSP for the 2007/08 season are shown in [Table 8](#). The award to NCZ for Compound D was made on a single source basis; Omnia and Nyombo supplied Urea. Historically in Zambia, Urea has sold for about 7% more than Compound D in the free market.<sup>21</sup> Under the FSP procurement, however, the situation was reversed and MACO data show that it paid the parastatal firm almost 18% more per ton of basal fertilizer than it did to Omnia and Nyiombo for top dressing.

**Table 8: 2007/08 Fertilizer Contracts**

			Total Contract		Cost per 50kg bag	
			ZMK bn	USD m	ZMK	USD
Nyiombo *	Top (Urea)	17,695 tons	40.07	10.27	113,230	29.03
Omnia *	Top (Urea)	7,305 tons	16.13	4.14	110,434	28.32
NCZ	Basal (Comp. D)	25,000 tons	66.00	17.14	132,000	34.29
<b>Total Fertilizer</b>		<b>50,000 tons</b>	<b>122.21</b>	<b>31.55</b>		

\* Contracts settled at ZMK 3,900 = USD1.

MACO data

76. Private suppliers had to organize finance from commercial banks to cover the costs of meeting the FSP contracts. These arrangements were based on the belief that Government would meet its contractual obligations and pay for the fertilizer on time. In reality, however, Government did not meet this obligation and an amount around ZMK 30 billion (USD 7.8

<sup>21</sup> Keyser, Grey, and Scott, 1996; Saasa, et. al., 1999; Keyser, Heslop, and Able, 2001; ZNFU, 2007; Keyser 2007.

million) was still owed to the private suppliers at the end of October by which time the distribution should have been complete. This situation prompted the private suppliers to suspend the release of both Urea and the Compound D they had transported leading to delays with the onward distribution of inputs to farmers. After lengthy negotiations with Government, the private suppliers eventually agreed to release the fertilizer and receive their outstanding payments from the 2008 FSP budget release.<sup>22</sup>

## Seed procurement

77. Details of the seven seed contracts from the 2007/08 season are given in the next table below.

**Table 9: 2007/08 Seed Contracts**

			Total Contract		Cost per 20kg bag	
			ZMK bn	USD m	ZMK	USD
<b>Seedco</b>	891.00	tons	2.43	0.63	54,440	14.14
<b>MRI</b>	438.34	tons	3.51	0.91	160,223	41.62
<b>Croppack</b>	432.00	tons	3.51	0.91	162,454	42.20
<b>Pannar</b>	420.52	tons	3.16	0.82	150,360	39.05
<b>Zamseed</b>	299.20	tons	8.74	2.27	584,176	151.73
<b>Kamano Seed Company</b>	48.89	tons	0.17	0.04	68,568	17.81
<b>Prime Agric Centre</b>	22.12	tons	0.22	0.06	208,200	54.08
<b>Total Seed</b>	<b>2,552</b>	<b>tons</b>	<b>21.74</b>	<b>5.65</b>		

MACO data

78. These data show very large variations in unit prices. While some variation is to be expected with seed because of differences in the cost of producing each variety (royalties, in-field costs, etc), the very wide range of prices paid by MACO is difficult to understand. On the one hand, this outcome may point to problems with the single source procurement arrangements for seed. On the other hand, any bulk-buyer purchasing several hundred tons of seed should expect the very best wholesale price.

79. Another plausible explanation is that the figures provided by MACO are not exclusive to the 2007/08 season. Because the agricultural season in Zambia overlaps two budget cycles, PCO administrators say that cost figures are not easy to relate to a specific FSP cycle since they may be settled in a different budget year. Significant problems, therefore, were encountered throughout the entire study to obtain reliable information from the PCO, both in terms of the time taken for MACO to produce a record of its spending and then because of mistakes, errors, and lack of clarity with the numbers when they were received. It is possible therefore, that some of the money paid to Zamseed (a privatized former parastatal) was used to settle debts from the previous FSP season. Moreover, detailed information on the types of seed supplied by each manufacturer was not available and the values could not be crosschecked with prevailing market prices.

## E. 2007/08 Tracking Analysis

80. In line with the PETS approach, the first part of tracking analysis was to determine how much of the inputs MACO procured actually reached beneficiary farmers and whether the required procedures for input distribution were followed. Other parts of the analysis look more closely at questions of farmer selection, timeliness of delivery, and other qualitative variables.

<sup>22</sup> ZNFU, 2008. p. 9

### Discrepancy between inputs allocated and inputs received

81. In terms of inputs received at the district level, the PETS work found only minor differences in the quantities of inputs MACO allocated to each district and the amounts warehouse managers and DACOs say they received. The study was not designed to audit tender winner contracts, but survey data and other information from key informant interviews revealed no evidence of systematic leakage before the inputs reached the district level.

82. Significant problems, however, were encountered throughout the entire study to obtain reliable information from the PCO, both in terms of the time taken for MACO to produce a record of its spending and then because of mistakes, errors, and lack of clarity with the numbers when they were received.

83. As FSP inputs filtered from district warehouses to cooperatives and to farmers, considerable evidence of leakage was discovered. In the first instance, for 69 of the 84 cooperatives interviewed where corresponding data on inputs allocated and inputs received were available, district officials stated they sent a total of 1,856 input packs while the cooperatives claimed they received only 1,487 input packs. In other words, the study found a 20% discrepancy across the sample in the number of input packs DACOs say they released to cooperatives and the number of packs the cooperatives report they received.

84. These average results, however, are heavily skewed because of very large discrepancies in four of the 20 surveyed districts. In Chililabombwe, Chadiza, Mumbwa, and Petauke, the number of packs cooperative leaders confirmed they received was only 54% of the amount DACOs said they sent. In the other 16 districts, the discrepancy was far less significant. [Table 10](#) below summarizes the results for the troubled districts.

85. Further evidence of leakage was found by comparing the amounts district officials reported cooperatives deposited in FSP bank accounts and the amount that cooperatives themselves reported depositing. In this case, district officials across the sample reported a total sum of ZMK 741.7 million (USD 193,000) was deposited whereas the cooperatives reported they deposited ZMK 736.5 million (USD 191,000). This differs by only ZMK 5.2 million (USD 1,350) and could easily be attributed to minor errors in record keeping on both sides. What is interesting, however, is that this difference does not mirror the 20% discrepancy in inputs sent by district officials and received cooperatives as discussed above.

**Table 10: Discrepancy in Packs Sent to and Received by Cooperatives in Selected Districts**

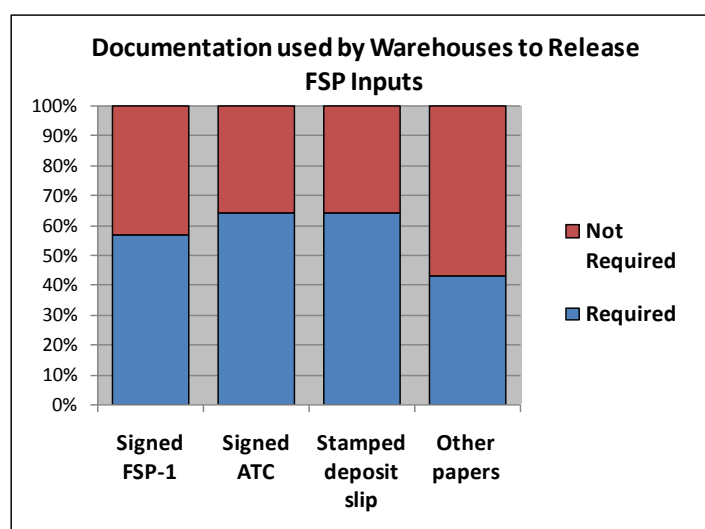
District	Cooperative	Number of Packs District Officials Claimed to Have Sent to Coops	Number of Packs Coops Claimed to Receive
Mumbwa	Coop 1	56	14
	Coop 2	37	14
	Coop 3	27	10
	Coop 4	38	15
Chililabombwe	Coop 1	23	15
	Coop 2	19	13
	Coop 3	5	0
	Coop 4	10	5
Chadiza	Coop 1	80	40
	Coop 2	88	50
	Coop 3	77	50

	Coop 4	85	55
Petauke	Coop 1	19	10
	Coop 2	63	33
	Coop 3	20	20
	Coop 4	40	27
<b>Total</b>		<b>687</b>	<b>371</b>

### Procedures and documentation

86. Some explanation for the discrepancies in inputs allocated and inputs received can be had by looking at whether the district administrators and district warehouse operators followed the prescribed procedures for inputs to be released. As described, stamped and signed deposits slips together with copies of the FSP-1 and ATC forms were to be presented as a requirement for releasing inputs. As shown in [Figure 8](#), however, roughly one-third of warehouse managers interviewed for the survey said these procedures were not followed as spelled out in the FSP Implementation Manual. Other papers identified by the warehouse managers include lists with farmer names, national registration cards, and bank statements.

**Figure 8: Actual Documentation Required by District Warehouses to Release FSP Inputs**



Survey data (warehouse managers)

### Leftover stocks

87. Further insight to how much of FSP's total allocation reached beneficiary framers can be had by looking at the quantities of leftover stocks. These PETS results are shown in [Table 11](#).

88. As indicated, the problem of leftover stocks was much more widespread with regard to seed than in the case of fertilizer. Of the 285,800 total bags of fertilizer allocated to sampled districts, DACOs reported that just 11 bags of basal and 401 bags of top dressing could not be distributed by the end of the FSP season. That any fertilizer should have gone undistributed, of course, represents a cost, but at less than 0.2% of the planned allocation, the total loss at this stage is barely significant compared with other management problems. In two districts in Western Province, however, the study found that a very large share of Urea equal to 50% and 38% of the allocations for Kalabo and Mongu respectively were leftover and could not be distributed.

89. With respect to seed, on the other hand, the data show a much more serious and widespread problem. In this case, a total 36.76 tons seed went undistributed which is equal to 5.1% of the allocation to sampled districts and 1.5% of the total seed purchase for all of Zambia. The fact that so much seed went undistributed is a particular worry since it likely to have contributed to some farmers using FSP fertilizer together with low-yielding recycled seed. This is especially true in outlying areas where farmers have less access to private input shops. Late arrival of seed was the main reason cited by DACOs for this problem whereby many farmers had already planted their 2007/08 crop by the time the FSP inputs arrived so were no longer interested to collect the subsidized FSP supplies. Based on the total amount the PCO says it paid for the seed in 2007/08, the value of leftover stocks in sampled districts was approximately ZMK 313.3 million (USD 81,400).

**Table 11: FSP Leftover Stocks not distributed to Farmers**

		Packs Allocated	Leftover Quantities			% of Allocation		
			Seed (20kg)	Basal (50kg)	Top (50kg)	Seed	Basal	Top
Central	Kabwe	2,500						
	Mkushi	3,750						
	Mumbwa	3,275	238			7.3%		
	Serenje	3,000	347			11.6%		
Copperbelt	Chililabombwe	1,155						
	Masaiti	2,310						
	Mufurila	1,155	10			0.9%		
	Ndola	1,155						
Eastern	Chadiza	2,225	128	11	12	5.8%	0.1%	0.1%
	Lundazi	3,685	138			3.7%		
	Nyimba	925	169			18.3%		
	Petauke	4,290	122			2.8%		
Northern	Kasama	2,500	245			9.8%		
	Luwingu	825						
	Mporokoso	850	427			50.2%		
	Nakonde	1,500						
Western	Kalabo	20	14		40	70.0%		50.0%
	Mongu	230			349			37.9%
	Senanga	125						
	Sesheke	250						
<b>Total</b>		<b>35,725</b>	<b>1,838</b>	<b>11</b>	<b>401</b>	<b>5.1%</b>	<b>0.0%</b>	<b>0.3%</b>
as % of Zambia		28.6%	1.5%	0.0%	0.1%			

Survey data (DACO)

## F. 2007/08 Total FSP Costs

90. The next part of the expenditure analysis looks at total program costs. In preparing these estimates, every effort was made to ensure the numbers reflect actual spending by MACO to the best extent possible. Nevertheless, due to various data problems and inconsistencies in the numbers supplied by the PCO and MACO Financial Management Unit it is basically impossible to know with 100% certainty exactly how much was spent on the 2007/08 program. As noted, one of the problems is that the agricultural calendar spans two budget years, which MACO says makes it difficult to report on total spending in any one FSP cycle. Despite the size and importance of the FSP to Zambia, MACO has not developed a system in the years since the program was launched to track its actual spending on the FSP in any one agricultural year. This section first closely examines the actual expenditure record as reported by MACO and then reports budget allocations received from MoFNP.



91. Summing up reported expenditures for fertilizer and seed input procurement, logistics, and administration shows that, for the 2007/08 season, total core spending by MACO was ZMK 167.94 billion (USD 43.62 million) or 12% more than planned ([Table 12](#)~~Table 12~~). [Table 8](#)~~Table 8~~ and [Table 9](#)~~Table 9~~ provide the amounts spent on fertilizer and seed for 125,000 input packs and are the figures reported by MACO. The costs of logistics and administration are also the numbers reported by MACO. Logistics covers local warehousing and onward distribution of inputs to farmers; administration covers publication of the FSP Implementation Manual and sensitization and monitoring allowances it says were paid to each district.<sup>23</sup>

**Table 12: Total Estimated Expenditures of the 2007/08 FSP Program**

	ZMK bn	USD m
<b>Core spending by MACO</b>		
Fertilizer	122.21	31.55
Seed	21.74	5.65
Logistics	20.02	5.20
Administration	3.97	1.03
<b>Sub-total</b>	<b>167.94</b>	<b>43.62</b>
<b>Other FSP costs</b>		
Staff salaries, benefits & costs	4.89	1.27
DAC meetings	0.04	0.01
Extras paid by farmers	9.75	2.53
<b>Sub-total</b>	<b>14.67</b>	<b>3.81</b>
<b>Grand Total</b>	<b>182.61</b>	<b>47.43</b>

92. In addition to core spending, other FSP expenditures need to be recognized for an appreciation of the total costs of the program. These include the salaries and benefits paid to the staff in the PCO, a proportional share of the salaries and benefits paid to district administrators (DACOs, SAOs, BEOs, etc) to reflect the time spent on FSP, the cost of convening DAC meetings as required by the FSP guidelines, and the costs of cooperative membership and other expenses paid by farmers. Although considerable, these costs have so far not been taken into account by MACO.

93. When the cost of staff salaries, DAC meetings, and extras paid by farmers for cooperative membership and other incidental expenses are taken into account, the total cost is estimated to be not less than ZMK182.6 billion (USD 47.4 million) or 22% more than planned.

94. The estimated cost of staff salaries and benefits were derived with reference to the GRZ salary scale. For district administrators, the estimates are based on survey results in which DACOs were asked to specify how much time they and their staff spend on FSP business from August to January (i.e. the peak window for FSP activity). Highlights of these results include:

- 7 of 20 interviewed DACOs said they spend 75% of their time or more on FSP business between August and January each year. On average, the 20 DACOs said they spend 63% of their time on FSP between these months.

<sup>23</sup> According to the DACO survey, however, only 11 out of 20 districts say they received an allowance for sensitization and just 6 districts received a budget for monitoring. For the DACOs that said their district received specific allowances, the amounts ranged from ZMK 300,000 (USD 78) to ZMK 10 million (USD 2,600).



- Over the same period, DACOs said that the District Marketing and Cooperatives Officer (DMCO) in their district spends 77% of their time on FSP business; 8 of 19 DACOs said the DMCO spends more than 90% of their time on FSP.
- Also between August and January, DACOs said the Senior Agriculture Officer (SAO) spends 51% of their time on FSP business and 5 of 19 DACOs (one did not have an SAO) said the SAO spends 80% of their time or more on FSP.

95. DAC involvement is also a costly and time-consuming process.

- All sampled districts had an operational DAC in 2007/08.
- Each district held from 1 to 8 DAC meetings to discuss FSP business (3.4 meetings on average) with anywhere from 6 to 30 people participating in each DAC meeting (15 members on average)
- 4 of 20 districts paid sitting allowances to DAC members for each meeting (ZMK 50,000 to 70,000 per person per meeting = K8.76m total spent on allowances = USD 2,275 in 4 of 20 districts)

96. In terms of farmer extras, surveyed beneficiaries reported they paid an average of ZMK 87,000 (USD 22.59) to join and remain a member of their cooperative or farmer group as required by the FSP guidelines. Although cooperatives have the potential to provide many other benefits to their members apart from access to FSP inputs, 74% of beneficiaries said the main reason they joined their cooperative was to receive FSP inputs and fewer than 30% said the coop provides other services apart from access to FSP. Moreover, 29% of farmers said they had to pay additional costs from ZMK 1,000 to 200,000 (USD 0.25 to 51.94) to receive FSP inputs including contributions for storage, security guards, and additional transportation up to the satellite depot level. The estimated total of ZMK 9.75 billion (USD 2.53 million) for farmer extras, therefore, is based on 75% of the average total cost paid by surveyed beneficiaries for cooperative membership and annual subscription plus 100% of the costs for storage, guards, etc. extrapolated against the 125,000 total FSP packs allocated in the 2007/08 season.

97. In terms of budget allocation, the original approved budget for the 2007/08 FSP was ZMK 150 billion (USD 39 million). MACO received a supplementary allocation of ZMK 54 billion (USD 14.0 million) for the FSP on top of the original ZMK 150 billion (USD 39 million) budget allocation. According to the PCO, however, ZMK 35 billion (USD 9.1 million) of this supplement was immediately diverted to the FRA and ZMK 19 billion was paid to Nitrogen Chemicals of Zambia for inputs supplied as part of additional 20,000 metric tons procured under the 2006/07 season. The 2007 Zambia Financial Report prepared by MoFNP shows that the ZMK 54 billion supplement was paid to MACO for the FSP, but does not show that ZMK 35 billion were reallocated to the FRA as reported by FSP administrators.

## **G. Comparison with Private Sector Benchmarks**

98. To assess the cost efficiency of the FSP distribution system, some straightforward comparisons of the total cost of each FSP pack with average commercial retail prices can be made. Towards this end, [Table 13](#) shows average survey results from the private retailer questionnaire in which shopkeepers were asked how much they charged for hybrid seed and fertilizer in the 2007/08 season. Provincial averages can then be calculated to give a private sector benchmark against which the cost of FSP inputs can be compared.

99. In [Table 13](#), the large differences in price between some surveyed districts primarily reflect differences in transport costs, specific kinds of inputs being quoted for, and the degree of private sector development (i.e. competition in the local market). On a more

speculative basis, it is also interesting to note that private prices in some districts far away from Zambia's major markets were much lower than the sample average (for example, Kasama, Nakonde, and Chadiza). This is counterintuitive to what one would expect because of differences in transport costs, suggesting that other factors are at work that may include private dealers re-selling subsidized FSP inputs. Across the sample, 9 out of 24 private retailers that responded to the question said they had either heard of or seen FSP inputs being bought and sold by private traders and that these deals usually involved large amounts.

**Table 13: Average 2007/08 commercial retail prices for FSP inputs in surveyed districts (ZMK)**

		Seed (20kg)	Basal fertilizer (50kg)	Top dressing (50kg)
<b>Central</b>	Kabwe	110,222	125,000	117,500
	Mkushi	112,722	130,000	135,000
	Mumbwa	163,000	120,000	115,000
	Serenje	203,333	148,333	128,333
<b>Copperbelt</b>	Chililabombwe	135,222	147,500	150,000
	Masaiti	195,000	160,000	145,000
	Mufurila	155,000	137,500	140,000
	Ndola	153,333	148,333	143,333
<b>Eastern</b>	Chadiza	98,222	111,000	116,000
	Lundazi	107,722	150,000	150,000
	Nyimba	75,444	105,000	100,000
	Petauke	150,000	152,500	146,000
<b>Northern</b>	Kasama	65,389	125,000	122,500
	Luwingu	n/a	n/a	n/a
	Mporokoso	240,000	165,000	150,000
	Nakonde	80,389	125,000	125,000
<b>Western</b>	Kalabo	130,000	300,000	300,000
	Mongu	138,200	150,000	150,000
	Senanga	184,000	n/a	140,000
	Sesheke	n/a	n/a	n/a
<b>Average Sample</b>		<b>133,089</b>	<b>142,594</b>	<b>138,485</b>
Central		147,319	130,833	123,958
Copperbelt		159,639	148,333	144,583
Eastern		107,847	129,625	128,000
Northern		128,592	138,333	132,500
Western		150,733	225,000	196,667

Survey data (private retailers)

100. The next table compares the private sector benchmarks for each province with the total cost of each FSP pack. For this analysis, the FSP price per pack is derived by dividing the total program costs (including the cost of DAC meetings, farmer contributions, MACO salaries, cooperative membership, etc.) by the 125,000 total packs procured by MACO (i.e. ZMK 182.61 billion total program costs ÷ 125,000 packs = ZMK 1,460,880 per pack). The commercial price, on the other hand, is derived from the average prices in each province for 20kg seed, four bags of basal, and four bags of top dressing reported by district-level retailers (i.e. an FSP input pack equivalent).

**Table 14: Comparison of private sector prices for a 1ha pack with the total cost of providing inputs through FSP**

	Commercial price of 4x4 pack	Cost of FSP pack at farm gate	Extra cost of one FSP pack for Zambia*
Central	1,166,486	1,460,880	294,394
Copperbelt	1,331,306		129,574
Eastern	1,138,347		322,533
Northern	1,211,926		248,954
Western	1,837,400		(376,520)

\* Excluding transport of commercial pack to farm gate.

101. From these calculations, the analysis shows that FSP inputs were more expensive than the private sector benchmark in 4 out of 5 provinces. Of course, FSP beneficiaries still paid less than the private sector price because of the subsidy, but the data show that the private sector was generally able to deliver inputs up to the district level for less cost than FSP. The average extra cost was around ZMK 123,787 (USD 32) per pack or ZMK 15.5 billion (USD 4.03 million) for the total allocation of 125,000 packs in the 2007/08 season.

102. Corresponding figures were also estimated for an assumed total cost of FSP of ZMK 164.67 billion, which would be derived from the originally allocated budget (ZMK 150 billion) in addition to the other FSP cost (ZMK 14.67 billion) so far not taken into account by MACO. In such a case FSP would still deliver inputs up to the district level for less cost than the private sector in only one out of 5 provinces.

103. Because the FSP is budgeted and paid for as a national program, disaggregated numbers showing the cost of delivering subsidized inputs to each province were not available. It is possible therefore that the average FSP cost for Zambia as a whole may conceal important variability between locations. This, however, does not change the overall result that the private sector can deliver inputs for less once all of the costs of FSP operations and farmer contributions are taken into account. The study team was not able to confirm whether the private sector was able to procure at a cheaper fertilizer price during a time of rising world market prices than FSP, which may have been another contributing factor to the difference in cost.

## IV. QUALITATIVE SERVICE DELIVERY

104. This section of the assessment looks at the quality of service delivery. As described, the FSP set out to build the capacity of qualifying smallholder farmers by ensuring producers have timely and adequate access to maize inputs. To show whether the FSP was successful in this objective, the report looks at the process of beneficiary targeting and selection, the quantities of inputs farmers expected to receive and what they got, when the inputs were delivered, and whether the inputs were of acceptable quality.

### A. Beneficiary Targeting and Selection

105. According to the FSP Implementation Manual, beneficiary farmers should be selected by approved agricultural cooperatives and farmer groups according to the following criteria.

- (i) Should be a small scale farmer and actively involved in farming within the cooperative coverage area;
- (ii) Has the capacity to grow 1-5 hectares of maize;
- (iii) Should have the capacity to pay 40% of the cost of inputs;
- (iv) Should not concurrently benefit from the Food Security Pack; and
- (v) Should not be a defaulter from Food Reserve Agency and/or any other agricultural credit program whether belonging to an eligible cooperative or not.

106. These criteria have not been updated since the program was launched. The only modification is that the statement on farmers having the capacity to grow 1-5 hectares of maize was originally interpreted to mean that farmers could apply for up to five 1ha FSP input packs. For the 2007/08 season, however, the FSP guidelines specifically state that farmers should be “allocated only one input pack for the cultivation of one hectare of maize.”<sup>24</sup>

107. Overall, the study team found that the beneficiary selection criteria are too loose and do not provide sufficient clarity as to what kind of farmer should receive FSP support. Consequently, most cooperatives largely ignore the selection criteria and the strategic focus on building long-term capacities is lost.

108. As an example, FSP guidelines state that beneficiaries should have the capacity to cultivate from 1-5 hectares of maize. According to survey data, however, 51% of farmers grew less than 1ha of maize in seasons before they received FSP support and 28% still grew less than 1ha of maize with FSP. At the other end of the spectrum, 5% of beneficiaries grew more than 5ha of maize before they received FSP inputs and 4.5% grew more than 5ha with FSP. Moreover, many farmers reported that they requested for less than a full input pack and/or engaged in sharing of inputs with neighbors because they could not afford a full pack even at the 60% subsidy. 12% of beneficiaries said farming was not their main source of income, 22% said they were retired, and 6% said they were 70 years old or above.

109. [Table 15](#) summarizes the actual “selection criteria” used by the cooperative leaders themselves. As shown, a farmer’s membership of the cooperative and ability to pay for the inputs were the dominant considerations. Whether or not the farmer was a defaulter from the FRA and/or any other agricultural credit program was not identified by any of the farmer organizations as a factor in the selection process.

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<sup>24</sup> MACO, 2007, p. 5.

**Table 15: Reasons cited by Cooperative Leaders for Choosing FSP Beneficiaries**

	<b>Number of Co-ops</b>	<b>% of total</b>
Paid-up members with shares	18	41%
Most able to pay for FSP	9	20%
Best farmers	4	9%
Poor households	4	9%
Female headed households	3	7%
Active co-op members	2	5%
Had not received FSP before	2	5%
Households with large farm size	1	2%
Households with bad soil	1	2%

Survey data (cooperative leaders)

110. It is also apparent from the survey results that cooperative leaders did not have anything like the time needed to make an orderly selection of farmers as envisioned by the FSP Implementation Manual. According to program design, coops are supposed to be told about the season's rules well in advance so they can inform their members of the program, begin taking individual applications, screen the applications, and then submit lists of approved farmers through their camp extension officer for final screening and approval by the DAC. At the end of the application process, coop leaders are meant to be informed how many FSP packs the group has been allocated so they can begin to collect farmer payments and make the required deposits in district-level FSP bank accounts.

111. In actual practice, only 59% of cooperative leaders said they were ever informed about the 2007/08 FSP rules and procedures (i.e. 41% were not informed). Moreover, of those that were informed; 39% said they learned the rules in October; 27% said they learned the rules in November; and 4% said they learned the rules in December. Across the sample, just 21% of cooperatives said they received a printed copy of the 2007/08 FSP Implementation Manual<sup>25</sup> and most coops only learned of their final allocation when the inputs arrived.

112. In order to make the system work, therefore, many cooperatives began to collect money for inputs well before they were told how many input packs to expect. This led to a vast oversubscription of the FSP program and need for sharing of inputs between members because the quantities allocated to each group were not sufficient to cater for everyone. Apart from the problem of vague selection criteria, this outcome further diluted the program's strategic focus and opportunities for impact on long-term capacity development. It also meant that farmer resources were tied up in the FSP making it difficult to afford alternative (private) inputs if/when the FSP supplies were late or delivered in insufficient amounts thus taking away from the business that might have otherwise gone to emerging district-level retailers and leading to problems with lower maize production and capacity losses for farmers and private input dealers alike.

113. Moreover, because the FSP rules specify that FSP beneficiaries can only receive inputs through registered cooperatives and farmer groups, most beneficiaries had to pay the full joining-up fee and annual membership costs to belong to the organization to get a share of the FSP supplies. Across the sample, these fees amounted to an average of ZMK 87,000 (USD 22.59) per beneficiary thus adding 17% to the published price of ZMK 500,000 (USD 130)

<sup>25</sup> As described in paragraph 44 the programme does not have any provisions to distribute the implementation manual to all cooperatives.

MACO intended to charge for each 1ha pack. For farmers who received less than a full pack because of oversubscription, fixed membership fees accounted for an even greater share of total farmer costs. Across the sample, 74% FSP beneficiaries said they joined their coop to receive FSP inputs; 88% said they joined since 2002 when the FSP was launched; and 25% said they joined in 2007 to receive inputs in the specific season under examination.

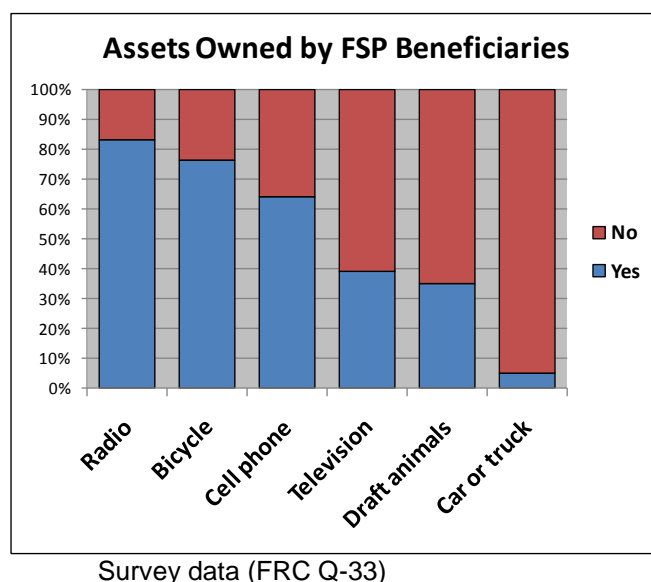
### Who got the inputs?

114. Further evidence of the ad hoc approach to beneficiary selection is provided by the following survey results. One widely repeated criticism of the FSP is that “undeserving beneficiaries” have been allowed to access inputs. Without a better definition of who should and should not be entitled to FSP support, however, it is very difficult to know exactly who these “undeserving” beneficiaries are. Is the program truly meant to focus only on building long-term capacities of serious farmers in the cooperative area, or should the FSP have other functions to protect poor and vulnerable households?

- 63% of beneficiaries were male; 37% were female
- Average age = 46 years (youngest = 20; oldest = 85)
- 45% did not use fertilizer on maize before FSP.
- 10% produced at full 4x4 before FSP.
- 6% said maize is not their main staple food.
- 41% of farmers said there is a reliable private input shop within 20km of the farm.
- 50% of farmers bought inputs from private shops before receiving FSP support.
- 75% joined the coop in order to receive FSP inputs.
- Coop executive members pretty much always got FSP inputs.
- 12% said farming was not their main source of income.
- Most recipients appear somewhat “better-off” judging by asset base and area cultivated.

115. [Figure 9](#) takes a closer look at asset ownership among surveyed households. In terms of productive assets, 35% of farmers interviewed owned draft animals, 31% owned an ox plow, and 18% owned an ox cart. By comparison, CSO/MACO Supplemental Survey data found that only 11% of smallholder farmers in Zambia owned draft power. While these results cannot be compared directly because of differences in coverage and methodology, the difference is still significant and points to FSP beneficiaries having a generally higher asset base compared with other rural Zambians.

**Figure 9: Assets Owned by FSP Beneficiaries**



116. The next data table shows that 6% of sampled FSP beneficiaries did not rely on maize for their main staple food. This was particularly true of respondents in Northern Province and parts of Western Province that are not well suited to maize and have increased production of alternative crops since economic liberalization.

**Table 16: Primary Staple Food of FSP Beneficiaries**

	Number farmers	% of total
Maize	791	94%
Cassava	50	6%
Sorghum or millet	1	0.1%
Rice	1	0.1%
Other	1	0.1%

Survey data (FRC-Q22)

117. As shown, cassava is the most widely grown alternative staple. Cassava does not require fertilizer and can be propagated easily from local cutting so has gained significant importance since the end of fertilizer subsidies and pan-territorial pricing before liberalization. Although merely 6% of sampled beneficiaries said they rely more heavily on cassava for their staple food than maize, there is risk the FSP could encourage these producers to switch back to maize and away from their discovered comparative advantage in cassava. In such locations, other kinds of Government investment would likely go much further to building long-term farmer capacities and new market linkages than input and output subsidies for maize.

118. The next table looks at the degree to which FSP beneficiaries were involved with farming as a business. As noted already, 12% of beneficiaries said farming was not the household's main source of income; 44% did not sell maize before receiving FSP inputs; and 28% did not sell maize with FSP inputs. Although it is possible these households could still be considered "actively involved" in farming and therefore eligible for program support according to the formal criteria, the fact that farming was not the main source of income for so many beneficiaries points to a kind of leakage from the FSP's stated objective of building capacity among smallholder households. Of the households that sold maize before receiving FSP, 70%

sold half a ton or less and just 18% sold one ton or more; with FSP 43% of beneficiaries that sold maize still sold half a ton or less while 36% sold one ton or more.

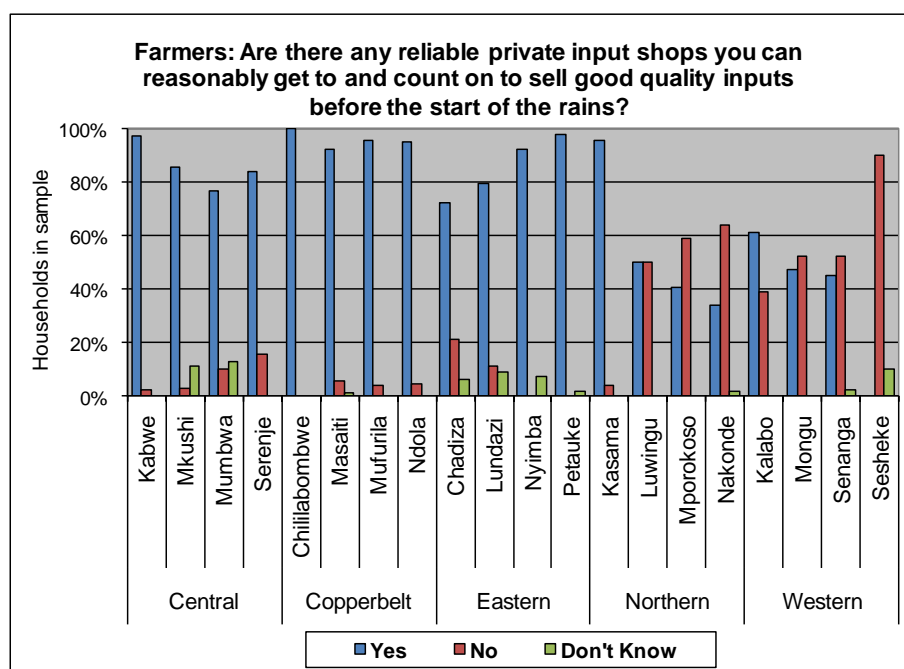
**Table 17: Farming as Source of Income among FSP Beneficiaries**

	YES	NO
Was farming the household's main source of income in 2007/08?	88.0 %	12.0 %
Did the household sell maize before receiving FSP support?	56.2 %	43.8 %
Did the household sell maize in 2007/08?	71.9 %	28.1 %

Survey data (FRC-Q13, 48, and 68)

119. The next chart looks at the question of beneficiary access to private input shops. As shown, most farmers in Central, Copperbelt, and Eastern Provinces said that there are reliable private input shops they can reasonably get to and count on to sell good quality inputs before the start of the rains. Although the data do not show whether small farmers could afford private inputs, there is apparently enough business to support private retailers in these locations suggesting the private sector has more capacity than described in 2002 when the FSP was originally launched. In Northern and Western Provinces, however, a very different picture emerged from the survey with many (but not all) farmers in these locations saying there were not any reliable private input shops they could reasonably reach.

**Figure 10: Farmer Physical Access to Reliable Private Input Shops**



Survey data (FRC-Q63)

120. These results are not a surprise in that it is widely known that private retail networks are much less developed in outlying areas than in major farm locations. Until now, however, the allocation of FSP inputs has been determined primarily by the number of smallholder farmers in each district without apparent consideration for the level of private sector development. Therefore, because the areas with the best developed private networks are usually also the most populous, this means that large shares of FSP inputs have gone to districts that already



have well-developed private supply networks while less populous areas, where there are fewer private sector alternatives, end up left behind.

121. The results also suggest that different kinds of support are likely to be required in various parts of Zambia depending on the level of private sector development. The challenge of long-term capacity development cannot be approached with one solution only and there is an obvious need to account for the different kinds of constraints and opportunities farmers and private retailers face around the country in terms of physical access, affordability, and risk of displacing private sector sales.

### **Graduation requirements**

122. Besides the eligibility criteria stated above, the FSP's original design included the need for farmers to graduate after two years. The subsidy was meant to decrease from 50% in the first year to 25% in the second year, after which it was expected that farmers' eroded asset base would have recovered sufficiently for them to stand on their own. The graduation principle, however, has been put aside. The FSP is about to begin its eighth season and the subsidy element has never dropped.

123. MACO's current position is that cooperatives are the ones who are supposed to wean farmers off the program who have benefitted for more than two years. This is ignored by cooperatives. Graduation is not a key aspect of their actual selection criteria. Only 18 cooperatives (21.4% of sample) said they factored graduation into their selection of beneficiaries. And out of 2,456 farmers reported to have benefited from FSP in sampled cooperatives in 2007/08, only 17 were actually identified as needing to graduate, again illustrating how graduation is such an insignificant aspect of the selection process at the cooperative level.

## **B. Quantities Expected and Received**

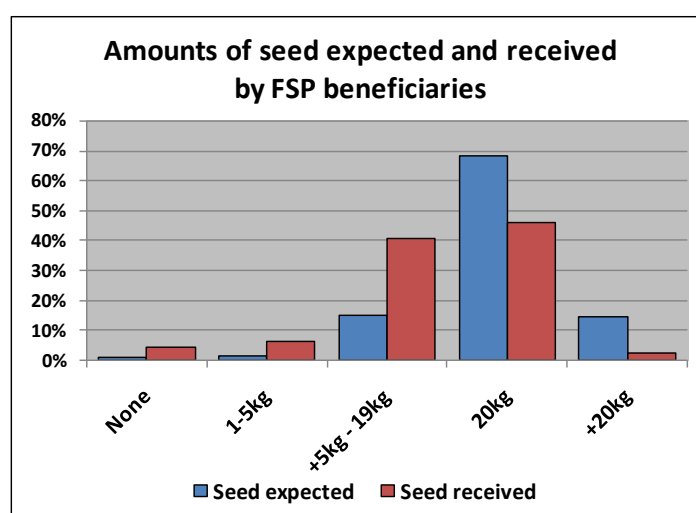
124. The next part of the study investigates the amounts of inputs farmers expected to receive and actually got. This aspect of FSP performance is critically important to farmer planning and has obvious implications for long-term capacity development and annual production.

125. Across the sample, the survey found significant gaps between the inputs farmers expected and what was eventually delivered. This outcome is explained by many factors that include (i) over subscription of farmers by participating coops before they knew the actual allocation; (ii) inputs that went missing between the district warehouse and the cooperative collection point; and (iii) failure to inform farmers what the FSP actually provided for. Ultimately, for reasons of cost and availability, many farmers were required to share FSP input packs and the survey results show that only 44% of farmers received the 4x4 fertilizer allowance anticipated in the program design. In terms of how the fertilizer was applied, only 26% of FSP recipients actually produced at the recommended 4x4 level per hectare meaning that many households spread the fertilizer more thinly than the level recommended by MACO.

### **Seed expectations and receipts**

126. [Figure 11](#) looks at the amounts of seed farmers expected and received. In this chart, 68% of beneficiaries said they expected to receive 20kg of seed as the program advertized, but that only 46% actually received this amount. 51% of beneficiaries received less than 20kg of seed and 3% received more. Even before the inputs were received, 17% said they expected less than 20kg and 14% said they expected more. Most alarmingly, 4% of beneficiary households did not receive any seed from the FSP and only got fertilizer.

**Figure 11: Amounts of Seed Expected and Received by Individual Beneficiaries**



Survey data (FRC Q39 and 46)

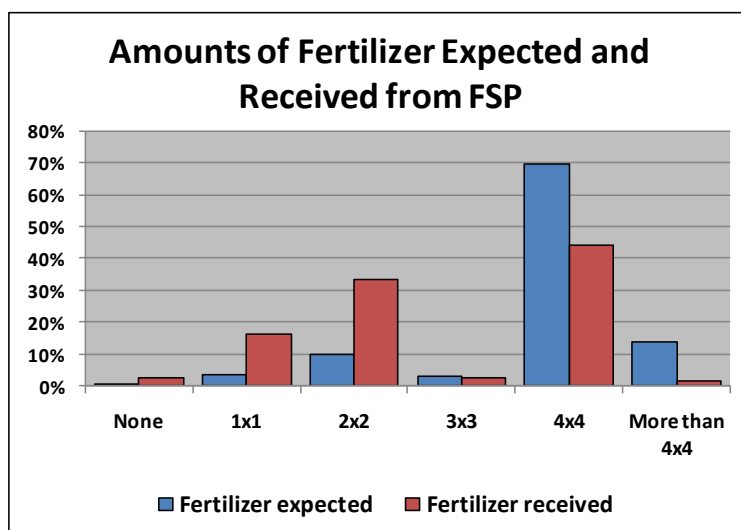
127. Other than supply an exact 20kg pocket of seed for farmers to cultivate 1ha of maize, the FSP also sought to provide a choice of seed type. According to the PCO, this part of the design was intended to promote competitiveness in the seed market and to help ensure that farmers got the variety that is most appropriate to their local growing conditions with regard to length of maturity, drought tolerance, and other factors of technical and financial importance to individual producers and Zambia's total maize output more generally.

128. In this respect, the survey data show that the FSP did reasonably well in delivering farmers the correct variety. Overall, 71% of households had a choice of seed (29% did not) and of those given a choice, 81% received the type they requested (19% did not). With regard to timeliness of delivery, however, there were significant problems. For the type of seed farmers received, only 44% said it arrived at the correct time while 56% said it arrived at the wrong time.

### **Fertilizer expectations and receipts**

129. Next, [Figure 12](#) shows the amounts of fertilizer farmers expected and what they actually received. As indicated, 70% of interviewed beneficiaries expected the full 4x4 allocation; 17% expected less than 4x4, and 14% expected more than 4x4. In terms of actual receipts, however, only 44% of beneficiaries received the correct 4x4 allocation according MACO's plan, 55% received less than 4x4, and 1% received more than 4x4. Moreover, 2% of interviewed beneficiaries said they did not receive any fertilizer because the FSP only supplied seed. Nine households in the sample received two input packs each (i.e. 8 bags of basal and 8 bags of top).

**Figure 12: Amounts of Fertilizer Expected and Received by Individual Beneficiaries**

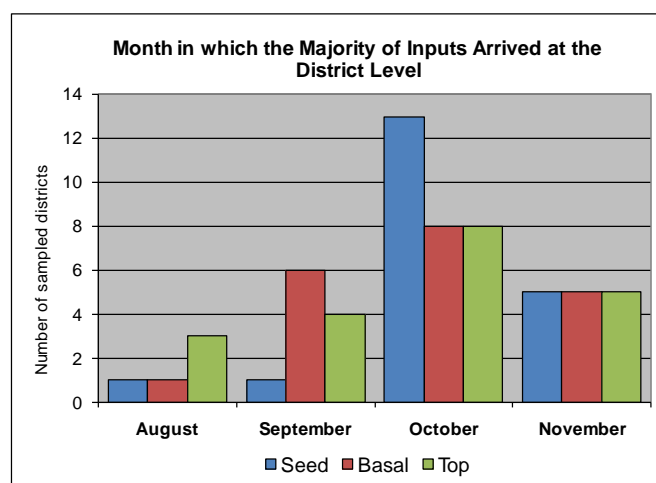


Survey data (FRC Q39 and 46)

### C. Timeliness of Delivery

130. The next set of charts looks at the timeliness of delivery. First, [Figure 13](#) shows when the majority of inputs arrived in each district. Whereas MACO's plan shown in the FSP timeline ([Table 7](#)) was for all inputs to be positioned at the district level by the end of September, a majority of DACOs said that inputs were still being received in October and November. Five DACOs (25% of the sample) said that the majority of seed, basal, and top dressing was received in November after the start of the agricultural season.

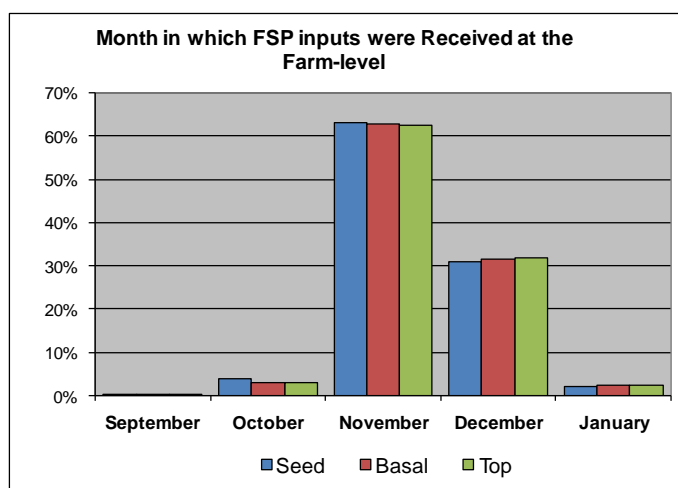
**Figure 13: Arrival of FSP Inputs at the District Level**



Survey data (DACO Q-47)

131. Next, [Figure 14](#) shows when the majority inputs were actually received by the farmers. In this case, 63% of interviewed households said they received the FSP inputs in November; 31% said they received the inputs in December; and 2% said they received the inputs in January. Less than 4% of the FSP allocation was distributed by the end of October and 69% of beneficiaries said they did not get their inputs until after the start of the rains.

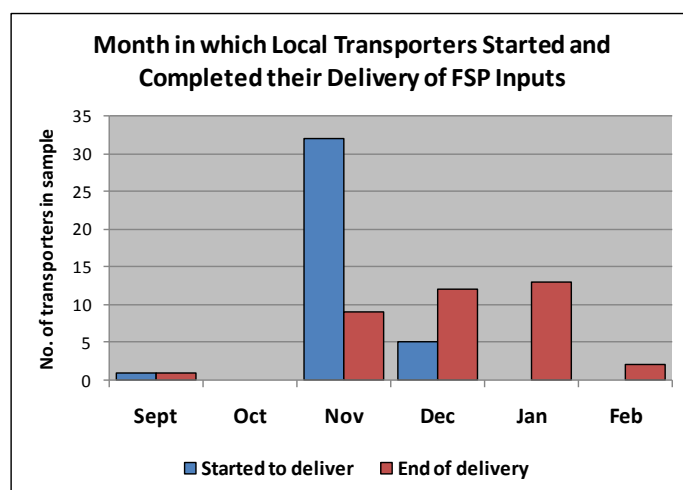
**Figure 14: Receipt of FSP Inputs at the Farm Level**



Survey data (FRC Q-47)

132. An additional view on the timeliness of farm level delivery is provided in Figure 15, which shows when local transporters/distributors said they began and finished delivery of inputs to farmer cooperatives. These results are especially important for farmers in outlying areas, since beneficiaries close to the district capital could collect inputs direct from the local warehouse. In this regard, the survey results show that 84% of transporters said they did not begin to deliver FSP inputs until November and 68% said they did not finish until December or January. Moreover, 5% of local transporters said they did not finish delivering FSP inputs until February by which time more than three-quarters of the 2007/08 growing season was already gone.

**Figure 15: Delivery of Inputs by Local Transporters**



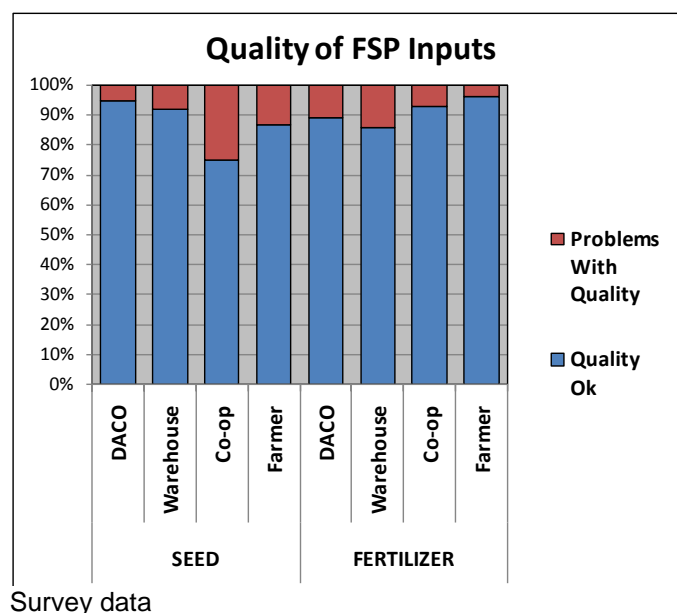
Survey data (Distributor, Q-14 and 15)

133. In terms of MACO's objective to provide farmers timely access to inputs, these results are very unsatisfactory. According to the Conservation Farming Unit and other crop experts, two percent of a given maize crop is lost for every day it is not planted, meaning that delays experienced in 2007/08 likely killed a significant share of the potential crop. Even for farmers who received inputs in the first part of November shortly after the start of the rainy season, the last minute delivery is a significant problem since most farmers did not know what quantities they would receive or when the inputs would arrive thus making it very difficult to plan.

## D. Quality of Inputs

134. In addition to providing farmers timely and adequate access to inputs, the FSP also sought to ensure that the inputs were of good quality. In this regard, the program seems to have done reasonably well as indicated by the survey data in [Figure 16](#). Nevertheless, 25% of the cooperatives in the sample stated that there had been some problems with the quality of seed. Surprisingly, this reduces to 13% in the case of farmers, perhaps because some of the seed would have been rejected before giving it to farmers. In the case of fertilizer, warehouse managers mostly expressed concern with the quality followed by DACOs while farmers themselves were least concerned.

**Figure 16: The Quality of FSP Inputs**



135. More specifically, [Table 18](#) shows that 86% of farmers regarded the quality of seed to be acceptable. Poor germination was the most commonly cited problem followed by weevils, crushed seed, and rotten seed in that order. Only one farmer complained of the seed pocket being underweight.

**Table 18: Quality of Seed According to Farmers**

	Number of farmers	% of total
Seed OK	703	86%
Poor germination	65	8%
Weevils	24	3%
Crushed seed	11	1%
Rotten seed	8	1%
Late maturing	1	0.1%
Small grains	1	0.1%
Underweight	1	0.1%

Survey data (FRC-Q54)

136. With regard to fertilizer, [Table 19](#) shows that 96% of the supplies were satisfactory according to the farmer survey. In this case, incorrect weight was the most commonly cited problem and most likely reflects small-scale pilferage by drivers, warehouse operators, and others involved with handling the supplies (i.e. removing a cup or two from each

bag before resealing the bag and giving the supplies to farmers). Similarly, torn bags were the next most commonly cited problem and is also likely to be an indication of pilferage. Three farmers in the sample reported that the fertilizer they received was expired.

**Table 19: Quality of Fertilizer According to Farmers**

	<b>Number of farmers</b>	<b>% of total</b>
Fertilizer OK	796	96%
Incorrect weight	18	2%
Torn bags	5	1%
Wet bags	3	0.4%
Expired	3	0.4%
Dirty/stones	2	0.2%
Powdery/clumped	2	0.2%
Poor performance	1	0.1%
Survey data (FRC-Q56)		

## **V. IMPACT ON MAIZE PRODUCTION**

137. One of the most direct ways to assess whether the FSP provides good value for money is to look at the program's impact on maize production. Although volume increases are not specifically listed as one of the FSP's main objectives, this is the only output indicator routinely reported by MACO and is a perfectly reasonable (if incomplete), basis for measuring the program's overall impact on smallholder capacity. From a public expenditure point of view, the question of how the value of incremental maize attributed to the program compares with FSP costs has important implications for future budget allocations and types of reform that may be needed to achieve greater impact and value for money.

138. The analysis in this section aims to provide an improved understanding of how the FSP has affected maize production so that policymakers can make better-informed decisions on the size and structure of any future subsidy program. While many factors militate against a definitive calculation of the FSP's impact on maize production, the survey instruments were designed to provide broad insight to this question by asking farmers, DACOs, and cooperative leaders about fertilizer used on maize, maize yields, and area planted to maize with the 2007/08 FSP and in recent seasons before receiving program support. Together with information on the number of packs allocated to each province, these data are sufficient to make a broad estimate of incremental production that can be attributed to the program in areas covered by the survey. These findings are then extrapolated for other parts of Zambia based on known similarities and differences in growing conditions and maize yields around the country to derive an overall estimate of total impact.

139. This approach does not address all the factors that influence FSP's impact on maize production, such as seasonal and local weather conditions and farmer response to FRA price signals, but does at least provide an empirical basis for gauging the kind of impact FSP has had and is a significant improvement over past calculations by MACO. As mentioned in the methodology section, a comparison of beneficiary farmers and non-beneficiary farmers would have been optimal for the analysis of the impact of FSP on maize production. However, in the absence of control group data, the study made use of the wealth of information and other survey results already available in Zambia on smallholder characteristics and maize production. Furthermore, by asking farmers about "recent seasons before participating in FSP" the survey instruments were designed to look more broadly at program impact rather to just measure differences from one specific year to the next.

140. Bearing these limitations in mind, the calculations suggest that somewhere in the range of 82,000 to 146,000 MT of incremental maize can be attributed to 2007/08 FSP depending on area increase resulting from the program. Compared with MACO's projection of 375,000 MT, this is equal to just 22-39% of the official production estimate.

141. In terms of total cost, therefore, the analysis concludes that each ton of FSP maize cost Zambia somewhere between USD 325 to 579 to produce at the farm gate. Given that import parity in Lusaka over the past 22 months has ranged from around USD 295 to 406 per ton, it thus appears that FSP was reasonable value for money if the program's sole objective was to increase food security in outlying areas, but was otherwise uncompetitive as a measure to promote long-term market development and enhanced trade competitiveness.

### **MACO's estimates**

142. Thus far, MACO has measured the program's impact on maize production working from the assumption that every 1ha input pack it budgets for results in three tons of maize at the farm level. This approach is based on a rule of thumb estimate in Zambia that a smallholder farmer who uses 20kg hybrid seed together with 200kg of basal fertilizer and 200kg of top

dressing (i.e. an exact 1ha FSP input pack) can expect a maize yield around 3.0 MT per hectare (see [Table 20](#)~~Table 20~~).

**Table 20: MACO's Estimates of FSP Maize Production since Inception**

	Number of 1 hectare input packs budgeted for	Expected maize production as a result of FSP (MT)
2002/03	120,000	360,000
2003/04	150,000	450,000
2004/05	125,000	375,000
2005/06	125,000	375,000
2006/07	210,000	630,000
<b>2007/08</b>	<b>125,000</b>	<b>375,000</b>
2008/09	200,000	600,000
<b>Total</b>	<b>1,055,000</b>	<b>3,165,000</b>

**Source:** MACO, 2007; FSP Study Team, 2009 (2008/09 figures).

143. The approach has a number of shortcomings. Most notably, the approach assumes that all input packs MACO budgets for actually reach beneficiary farmers in time to be used effectively. Allowances for leakage, late delivery, or differences in yield between high and low potential agriculture areas of Zambia are not accounted for. As noted already, the supplemental data from the 2004 MACO/CSO Crop Forecast Survey show that FSP recipients only produced an average yield of 2.04 MT/ha which is barely two-thirds of the figure MACO has used to report FSP impact.<sup>26</sup> Moreover, MACO's estimates ignore the question of how much maize beneficiary farmers would have produced without FSP support. Clearly, a more reliable estimate of incremental production that can be fairly attributed to the program is needed to make informed budget decisions.

#### **A. Impact on Fertilizer Use**

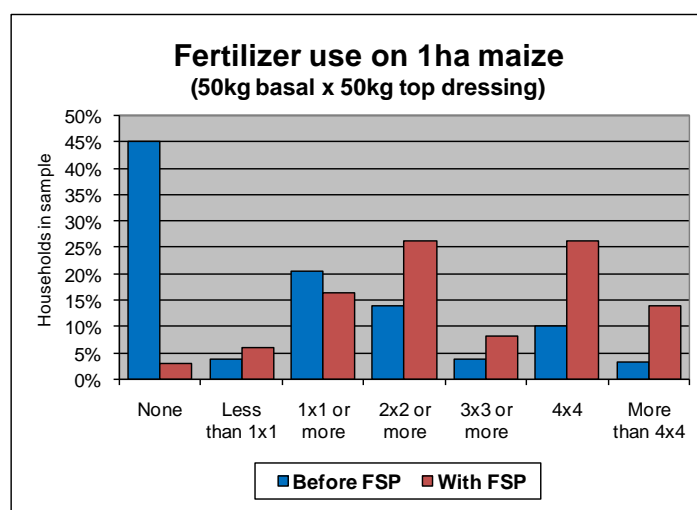
144. To improve on past calculations, the first step of the analysis was to look at how much fertilizer farmers actually used per hectare of maize with the 2007/08 FSP and in recent seasons before participating in the program. As described already, 55% of surveyed households received less than a full 4x4 input pack due to sharing of inputs and other reasons. Moreover, 28% of recipients produced less than a full hectare of maize and 45% produced more than one hectare.

145. To account for these complexities, the approach taken was to divide the total amounts of basal and top dressing fertilizer each household reported using by the area cultivated in 2007/08 with FSP support and in recent seasons before receiving support respectively. With these calculations, beneficiary households could be grouped according to different levels of per hectare fertilizer use as illustrated in [Figure 17](#)~~Figure 17~~. Detailed calculations for each district covered by the survey are given in Appendix 2 (Table A2-1).

<sup>26</sup> CSO/MACO Supplemental Survey 2004 cited in FSRP 2009.



**Figure 17: Levels of Fertilizer use by Sampled Households with and without FSP Support (50kg bags per ha)**



Survey data

146. At first look, these data show that FSP has had a positive impact on overall fertilizer use. Across the entire sample, 45% of interviewed farmers reported they did not use any fertilizer on maize before participating in FSP whereas 91% said they used at least one bag of basal and one bag of top dressing (1x1) per hectare with FSP. Alarming, however, the data also show that 3% did not use any fertilizer in the year they received FSP support because the program only managed to deliver seed. Moreover, in recent years before receiving FSP inputs, the data show that 13% of households already produced at or beyond the recommended 4x4 level so were apparently not constrained by limited private sector access. In terms of the recommended 4x4 fertilizer application envisioned by MACO, the data show that only 26% of interviewed beneficiaries actually produced at an equivalent 4x4 level per hectare whereas 59% of beneficiaries produced at less than a 4x4 and 14% went beyond and applied more than 4x4 equivalent per hectare.

147. The next table shows the amounts of fertilizer used with and without FSP on a provincial basis. From these data, the approximate way each FSP pack was used can be derived for the five provinces covered by the survey. This is done by multiplying the share of farmers producing at each level by the number of FSP packs allocated to each province respectively.

**Table 21: Levels of Fertilizer use with and without FSP Support in Sampled Provinces**

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4
<b>Before FSP</b>	Central	31%	4%	19%	19%	6%	14%	7%
	Copperbelt	31%	5%	20%	21%	5%	14%	4%
	Eastern	61%	1%	8%	14%	2%	10%	4%
	Northern	50%	5%	22%	9%	3%	10%	1%
	Western	50%	2%	34%	8%	3%	1%	1%
	<b>Average sample</b>	<b>45%</b>	<b>4%</b>	<b>21%</b>	<b>14%</b>	<b>4%</b>	<b>10%</b>	<b>3%</b>
<b>With FSP</b>	Central	0%	5%	14%	30%	10%	24%	16%
	Copperbelt	1%	0%	6%	18%	13%	36%	25%
	Eastern	2%	5%	24%	33%	5%	21%	10%
	Northern	3%	7%	13%	24%	11%	30%	13%
	Western	9%	14%	27%	28%	1%	18%	4%
	<b>Average sample</b>	<b>3%</b>	<b>6%</b>	<b>17%</b>	<b>27%</b>	<b>8%</b>	<b>26%</b>	<b>14%</b>

## Survey data

148. In Central Province, for example, 14% of interviewed recipients produced at a 4x4 equivalent before receiving FSP inputs and 24% of recipients produced at a 4x4 equivalent with FSP. Based on Central Province's total allocation of 20,685 input packs, this works out to 2,807 packs going to farmers who were already at 4x4 before FSP and 4,959 packs going to farmers who produced at 4x4 with FSP. According to this method, the data show that 1,393 packs within the provincial sample frame were allocated to farmers who ultimately did not use any fertilizer at all because of late delivery or outright leakage and waste. The full set of calculations is presented in Appendix 2 (Table A2-2).

### B. Impact on Maize Yield

149. The next step of the analysis was to know how much yield farmers actually got at each level of fertilizer use. In this case, the approach began by calculating provincial averages from the farm-level survey data for farmers at each corresponding level of fertilizer use. These results were then cross-checked for overall consistency and adjusted to reflect other information from the DACO and co-operative-level interviews, as well as CSO/MACO survey data, and crop budget information from ZNFU and other sources that specify maize yields at different levels of fertilizer use in various regions of Zambia.<sup>27</sup> This approach helps to minimize seasonal differences and provides a longer-term indication of program impact than by looking at yield conditions in the 2007/08 season only. The resulting yield estimates are shown in [Table 22](#). Unlike previous measures of FSP impact, these data are based on actual farmer experiences in different parts of Zambia rather than one universal assumption.

**Table 22: Average Maize Yields (MT/ha) at Different Levels of Fertilizer Use with and without FSP Support in Sampled Provinces**

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4
<b>Before FSP</b>	Central	0.65	0.73	1.13	1.70	1.69	2.58	3.87
	Copperbelt	1.37	0.74	1.11	1.35	1.99	2.12	2.88
	Eastern	0.48	0.81	1.04	1.86	2.40	2.66	4.48
	Northern	0.99	0.83	1.24	1.97	2.31	3.13	3.65
	Western	0.19	0.46	0.58	0.70	0.75	0.85	1.14
<b>With FSP</b>	Central	0.60	0.70	1.07	1.62	1.61	2.46	3.69
	Copperbelt	1.30	0.70	1.06	1.28	1.89	2.02	2.74
	Eastern	0.46	0.77	0.99	1.77	2.28	2.53	4.27
	Northern	0.94	0.79	1.18	1.87	2.20	2.98	3.47
	Western	0.18	0.43	0.56	0.67	0.72	0.81	1.08

**Source:** Own estimates from survey data (average yields for each district from FRC at different levels of fertilizer use, DACO and co-op chairperson estimates of yield at each level of fertilizer use), and other crop budget data and analysis including ZNFU, 2007 and Keyser, 2007. **Note:** In most cases, have assumed 5% extra yield without FSP to account for late delivery of inputs. This assumption is supported by survey results and CSO/MACO data reported by Lungu, et. al. 2008.

150. In preparing these estimates, one particularly important finding was that farmers generally received 5% less yield on a per hectare basis at each equivalent management level with FSP than they did before participating in the program. Maize yields are highly dependent on the timeliness of planting and this outcome is most likely a direct reflection of the problems

<sup>27</sup> CSO/MACO data reported by Lungu, 2008; other sources include Keyser, 2007; ZNFU, 2007; Saasa, et. al, 1999.

with late delivery experienced in 2007/08 FSP season. Supplemental survey data from the 2004 CSO/MACO Crop Forecast Survey support this finding and show a similar pattern whereby farmers who identified FSP as their main source of fertilizer received an average yield of 2.04 MT/ha nationwide compared with 2.09 MT/ha for households that identified commercial outlets as their main source of supply.<sup>28</sup> Even for farmers who did not use fertilizer, this outcome is still believed to apply because of the delays caused by waiting for FSP inputs that never arrived.

### **C. Impact on Area Planted**

151. The last variable needed to estimate total impact on maize production is to look at how FSP affected total area cultivated. Like volume increases, growth in area cultivated is not specifically listed as one of the FSP's strategic objectives, but is an outcome one would expect from a system that delivers subsidized inputs to the farm level and seeks to build producer capacities.

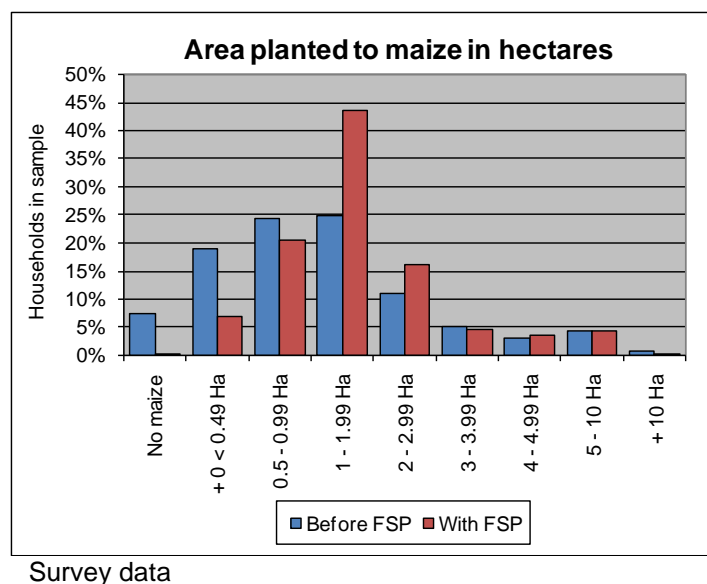
152. To assess the kind of impact FSP has had in this regard, survey data were used to calculate district averages of area planted to maize in 2007/08 and recent seasons before farmers participated in the program. The detailed results for each district are given in Appendix 2 (Table A2-3) and show that sampled households planted an average of 0.26ha extra area to maize with FSP than they did before. The area results, however, vary considerably with farmers in some districts barely increasing the area planted to maize at all. In four districts, the survey results actually show farmers planted less area to maize with FSP than they did in recent seasons before receiving support. The reasons for this are not entirely clear, but one explanation would be that farmers decided they could produce the same amount of maize from a smaller area as a result of access to subsidized the seed and fertilizer. It is also reasonable to believe that the FSP would have an even greater impact on area planted if more of the inputs had arrived on time and in the quantities that were promised. Because many farmers were required to share input packs, it is only natural to expect that these households had to adjust their overall farm plan in line with the amount of inputs actually received from the FSP.

153. The chart below provides a visual representation of the area individual beneficiaries gave to maize with FSP and in recent seasons before receiving FSP across the entire sample.

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<sup>28</sup> Lungu, et. al., 2008.

**Figure 18: Total Area Planted to Maize in Hectares by Surveyed Households with and without FSP Support in Sampled Provinces**



#### D. Incremental Maize

154. Having used the survey data to determine the kind of effects FSP had on per hectare fertilizer use, what kind of yields farmers can expect at each level of fertilizer use, and average effects on total area cultivated, the only remaining step of the analysis is to calculate incremental production. By focusing on the FSP's impact on farm management and expected yields, this approach does not require further knowledge of individual cropping patterns or specific areas cultivated by individual households to produce an overall picture of FSP's incremental effects on maize production.

155. The first step of this analysis was to calculate incremental maize in sampled provinces with and without the effects on area cultivated. Realistic assumptions can then be made about the levels of fertilizer use and maize yields in other parts of Zambia to arrive at a total estimate of incremental maize that can be attributed to the program. By calculating incremental production with and without area increase, the analysis gives a range of possibilities between which the actual total impact on maize production is most likely to fall. As with other parts of this analysis, the detailed calculations are presented in Appendix 2 (Table A2-5).

#### Incremental Maize in Sampled Provinces

156. First, with regard to sampled provinces, the calculations show that up to 93,756 MT of incremental maize were produced including the 0.26ha area increase per pack. This is equivalent to an 89.5% total increase in maize production compared with what participating households produced in recent seasons before receiving FSP support. Without any area expansion, the total increment works out to 52,791 MT new maize that can be attributed to FSP, which is equivalent to a 50.4% increase compared with the maize beneficiaries produced before participating in the program.

157. [Table 23](#) provides a summary view of the results and helps to show regions where the FSP had the greatest (and least) amount of impact on a per unit basis. Although many other factors need to be considered in deciding where to allocate FSP resources, these calculations can help in deciding on future allocations by showing where to expect the greatest (and least) return from the spending on subsidized inputs. For example, according to these data, each pack allocated to Western Province only produced between 200kg to 360kg of

incremental maize depending on the change in area cultivated compared with 870kg to 1,460kg incremental maize for every FSP pack allocated to Northern Province.

**Table 23: Calculation of Incremental Maize per FSP Pack in Sampled Provinces**

		FSP Allocation (packs)	Before FSP		With FSP		Increment	
			MT total maize	MT per pack	MT total maize	MT per pack	MT total maize	MT per pack
<b>Without Area Increase</b>	Central	20,685	31,019	1.50	41,997	2.03	10,978	0.53
	Copperbelt	15,400	22,717	1.48	30,421	1.98	7,703	0.50
	Eastern	23,100	25,984	1.12	44,650	1.93	18,666	0.81
	Northern	17,090	23,865	1.40	38,736	2.27	14,870	0.87
	Western	2,890	1,182	0.41	1,756	0.61	574	0.20
	<b>TOTAL</b>	<b>79,165</b>	<b>104,767</b>		<b>157,559</b>		<b>52,791</b>	
<b>With Area Increase</b>	Central	20,685	31,019	1.50	52,916	2.56	21,897	1.06
	Copperbelt	15,400	22,717	1.48	38,330	2.49	15,613	1.01
	Eastern	23,100	25,984	1.12	56,258	2.44	30,274	1.31
	Northern	17,090	23,865	1.40	48,807	2.86	24,942	1.46
	Western	2,890	1,182	0.41	2,212	0.77	1,030	0.36
	<b>TOTAL</b>	<b>79,165</b>	<b>104,767</b>		<b>198,524</b>		<b>93,756</b>	

Calculated from survey data

158. One conclusion that may be drawn from the summary data is that MACO's estimate of 3.0 MT expected production maize per pack greatly overestimates the FSP's true impact. Without the 0.26ha average area increase, in fact, the analysis shows that each FSP pack only yielded 0.61 to 2.27 MT total maize depending on where it was used. In incremental terms, however, this is equivalent to just 0.20 to 0.87 MT of additional maize from the program. With the benefits of area increase, [Table 23](#) shows that each FSP pack yielded just 0.77 to 2.86 MT total maize depending on where it was used which is equivalent to 0.36 to 1.46 MT in incremental terms and is far less than the amounts predicted by MACO.

### Incremental Maize in the Rest of Zambia

159. Having estimated the FSP's impact on maize production in sampled provinces, the next step of the analysis was to calculate the impact on maize production in parts of Zambia not covered by the survey.

160. For this analysis, a similar approach was used based on known similarities and differences in growing conditions and maize yields around the country. These adjustment factors are summarized in [Table 24](#) and provide all the additional information needed to work out the approximate impact of the program on maize production in locations not covered by the survey. The assumptions are based on CSO/MACO post-harvest data that show how yields vary in different parts of Zambia and crop budget information from ZNFU and other sources on yield response to fertilizer in different parts of Zambia. Like the approach of asking farmers about recent seasons before participating in FSP, this method helps to minimize seasonal differences and provides a longer-term picture of incremental program impact than comparing one season to the next.

**Table 24: Main Assumptions Used to Estimate FSP Impact on Maize Production in Areas not Covered by the Survey**

Province	Incremental Fertilizer Use	Yield Expectations
Luapula	Like Northern	Like Northern
Lusaka	Average Central, Eastern, Copperbelt	Average Central, Eastern, Copperbelt

Northwestern	Like Northern	Like Northern
Southern	Average Central, Eastern, Copperbelt	85% of Lusaka Province
FSP backstopping (available in all provinces as needed)	National average	National average

161. From these assumptions, it is possible to estimate how each FSP input pack was used (i.e. actual application of fertilizer per hectare) and corresponding yield per hectare at each level of fertilizer use. With these data, it is then possible to estimate incremental maize production that can be attributed to FSP in regions not covered by the survey. Because these other provinces were not sampled, the estimates should be treated with particular caution, but still help provide a general picture of total program impact. The detailed calculations are presented in Appendix 2 (Tables A2-6 to A2-8) and the highlights are summarized in Table 25 below.

**Table 25: Calculation of Incremental Production per FSP Pack in Other Areas**

		FSP Allocation (packs)	Before FSP		With FSP		Increment	
			MT total maize	MT per pack	MT total maize	MT per pack	MT total maize	MT per pack
Without Area Increase	Luapula	5,975	8,344	1.40	13,543	2.27	5,199	0.87
	Lusaka	7,750	10,957	1.41	15,718	2.03	4,761	0.61
	N'Western	6,225	8,693	1.40	14,109	2.27	5,417	0.87
	Southern	22,135	26,601	1.20	38,160	1.72	11,558	0.52
	Backstopping	3,750	4,764	1.27	6,936	1.85	2,172	0.58
	TOTAL	45,835	59,359		88,466		29,107	
With Area Increase	Luapula	5,975	8,344	1.40	17,064	2.86	8,720	1.46
	Lusaka	7,750	10,957	1.41	19,805	2.56	8,848	1.14
	N'Western	6,225	8,693	1.40	17,778	2.86	9,085	1.46
	Southern	22,135	26,601	1.20	48,081	2.17	21,480	0.97
	Backstopping	3,750	4,764	1.27	8,740	2.33	3,976	1.06
	TOTAL	45,835	59,359		111,468		52,108	

Calculated from survey data according to specified assumptions

162. As shown, total production per pack ranged from 1.72 to 2.86 MT depending on location and whether or not the effects of area increase are taken into account. This is considerably less than MACO's universal estimate of 3.0 MT per pack in all areas of Zambia. In incremental terms, each pack produced an estimated 0.58 to 1.46 MT more maize than would have been produced without program support.

#### **Total incremental maize**

163. A summary of the incremental production analysis for sampled provinces and other locations is given in Table 26.

**Table 26: Summary of Incremental Production Estimates (MT maize) with and without Area Increase**

	Before FSP	With FSP		Increment	
		Same area	Extra area	Same area	Extra area
<b>Sampled provinces</b>					
Central	31,019	41,997	52,916	10,978	21,897
Copperbelt	22,717	30,421	38,330	7,703	15,613
Eastern	25,984	44,650	56,258	18,666	30,274
Northern	23,865	38,736	48,807	14,870	24,942
Western	1,182	1,756	2,212	574	1,030
<b>Total sample</b>	<b>104,767</b>	<b>157,559</b>	<b>198,524</b>	<b>52,791</b>	<b>93,756</b>
<b>Other locations</b>					
Luapula	8,344	13,543	17,064	5,199	8,720
Lusaka	10,957	15,718	19,805	4,761	8,848
N'Western	8,693	14,109	17,778	5,417	9,085
Southern	26,601	38,160	48,081	11,558	21,480
Backstopping	4,764	6,936	8,740	2,172	3,976
<b>Total other locations</b>	<b>59,359</b>	<b>88,466</b>	<b>111,468</b>	<b>29,107</b>	<b>52,108</b>
<b>TOTAL ZAMBIA</b>	<b>164,127</b>	<b>246,025</b>	<b>309,991</b>	<b>81,898</b>	<b>145,865</b>

164. In total, these estimates show that the 2007/08 FSP resulted in somewhere between 82,000 and 146,000 MT of new (incremental) maize being produced that would not have otherwise been grown without the program. Compared with MACO's claim of 375,000 MT of maize production from the 2007/08 FSP, therefore, the analysis suggests that the program's true impact was 61%-78% less than reported by Government.

### E. Cost Effectiveness of FSP Increment

165. From these estimates of incremental production, total cost per ton can be derived as a measure of the FSP's cost effectiveness. These calculations are shown in [Table 27](#) with and without area increase using the figure of ZMK 167.94 billion (USD 43.62 million) core spending reported by MACO and total estimate of FSP costs of ZMK 182.61 billion (USD 47.43 million) including staff salaries, DAC meetings, and farmer payments for cooperative membership and other extra costs respectively. As shown, each ton of incremental maize that can be attributed to the program including production in sampled provinces and the rest of Zambia is estimated to have cost somewhere from USD 325 (ZMK 1.25 million) to USD 579 (ZMK 2.23 million) per ton for un-bagged grain at the farm gate with and without area expansion respectively. These values exclude the costs of farm labor and other production and marketing costs that apply equally to FSP and non-FSP maize.

**Table 27: Estimated FSP Cost per ton of Incremental Maize at the Farm Gate**

Total costs exclude labor and other on-farm costs except seed and fertilizer.

Cost per MT incremental maize	No area increase		With area increase	
	ZMK	USD	ZMK	USD
Core spending (K 167.94 bn)	2,050,599	532	1,151,338	299
Total FSP cost (K 182.61 bn)	2,229,724	579	1,251,911	325



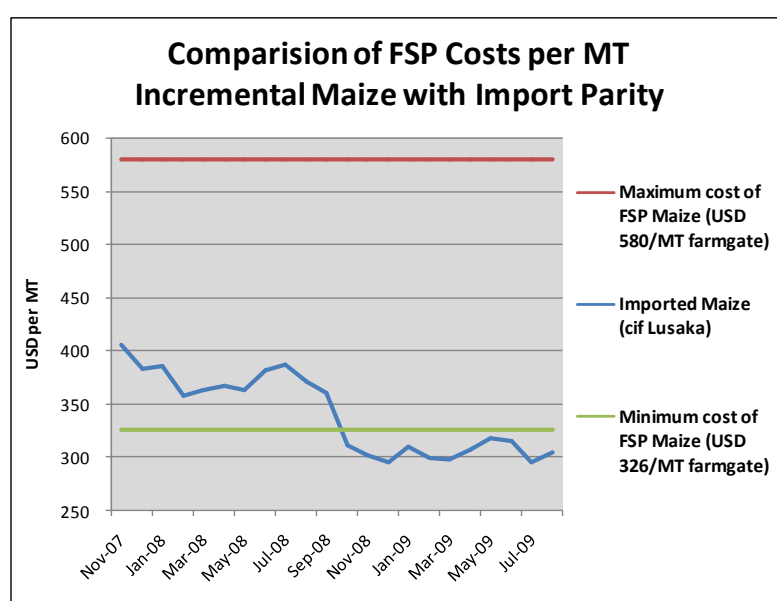
166. To assess whether this spending represented good value for money, it is useful to compare the per ton cost of FSP maize with import and export parity prices. In reality, of course, GRZ policymakers need to consider many other things in deciding whether and how to support an input subsidy program. Zambia has many reasons to prioritize self-sufficiency and to invest in programs that promote improved capacity among small-scale farmers. A direct comparison of FSP costs with international parity values, however, is a clear way to assess the program's cost effectiveness and contribution to long-term growth objectives. If Zambia could have imported more grain with the same money than the FSP managed to produce, then there is a strong imperative to look at how GRZ could better address Zambia's self-sufficiency objectives. Similarly, on the export side, if the cost of producing FSP maize is above the international benchmark, then other investments in new capacity development are likely to be required to achieve long-term growth and competitiveness objectives.

### Comparison with import parity

167. On the import substitution side, the most direct way to assess the cost-effectiveness of FSP production is to compare the cost of one ton incremental FSP maize with the import parity price for white maize purchased on the South African Futures Exchange (SAFEX). Although a large share of the maize produced by 2007/08 FSP would have entered the market around June or July 2008, commodity prices were extremely volatile at the time and it is useful to take a longer-term view of regional price conditions.

168. Towards this end, Figure 19 compares the cost of SAFEX maize landed in Lusaka for the past 22 months from August 2009 with the estimated minimum and maximum cost of producing one ton of incremental FSP maize in 2007/08 at the farm gate. For this analysis, transport costs from South Africa were held constant based on a rule of thumb figure for mid-2008 quoted by local commodity traders of USD 120 per MT total freight from Randfontein (where SAFEX prices are quoted) to Lusaka plus 1% for insurance and 1.5% for customs clearing (see Table A2-9). Since the estimated costs of FSP maize are for un-bagged grain, these charges do not need to be added to make a direct parity price comparison. In this figure, the specific dates are included only to give a long-term perspective on the cost effectiveness of FSP production. The actual competitiveness of FSP grain as an import substitute depends on the prevailing price point when each ton of commodity enters the market.

**Figure 19: Comparison of FSP Costs with Import Parity**



Import parity prices derived from SAFEX data (see Appendix 2)



169. Bearing the nature of this approach in mind, several conclusions may be drawn from the figure above. As shown, import parity to a Lusaka mill ranged from around USD 406 to 295 per MT over the period covered. On this basis, therefore, the analysis demonstrates that the cost of producing one ton of FSP maize without area increase (i.e. USD 579 per MT at the farm gate) was significantly more than import parity suggesting that the FSP did not represent good value to Zambia from this perspective. Put differently, even before the costs of assembling domestic maize at a Lusaka mill, Zambia could have imported 30% to 49% more grain than FSP managed to produce for the same amount it spent on the program.

170. With regard to the estimated minimum cost of producing one ton of FSP maize with the effects of area increase (i.e. USD 325 per MT at the farm gate), on the other hand, the data show that FSP maize was marginally competitive and cost Zambia less than import parity for about half the period covered. In this regard, the estimates of FSP costs end at the farm gate and the cost of reaching these locations with imported maize in case of a food shortage would be higher than the cif price shown in Figure 19 depending on where the grain must go. As a strategy to promote improved food security in outlying areas, therefore, the data suggest that the FSP provided reasonable value for money if the sole objective were to promote food self-sufficiency at the village level.

171. As far as serving urban consumers, however, the exact opposite conditions would apply. As a general rule of thumb, domestic assembly costs in the 2008 marketing season were around USD 0.20 per ton per kilometer including warehousing, transportation, and handling.<sup>29</sup> With only a USD 81.00 differential between the highest import parity price (USD 406 in Nov-07) and best case (lowest) FSP cost (USD 325 per MT), therefore, this means that any FSP maize grown more than about 400km from Lusaka (or other major market location) was uncompetitive with import parity. With lower import parity prices (such as those that prevailed from about mid-2008), FSP maize would be even less competitive as a food source for urban consumers. In this regard, the data show that for about half the period covered, Zambia could have imported more grain for the same money it spent on the program than the FSP managed to produce.

172. Corresponding figures were also estimated for an assumed total cost of FSP of ZMK 164.67 billion, which would be derived from the originally allocated budget (ZMK 150 billion) in addition to the other FSP cost (ZMK 14.67 billion) so far not taken into account by MACO. Such a calculation leads to a maximum cost of USD 522 and a minimum cost of USD 293, which does not significantly change the above results.

### **Comparison with export parity**

173. It is also useful to look at the competitiveness of FSP maize with export parity as a measure of capacity development. On the export side, the effectiveness of the FSP again depends on the price selected for analysis. In this case, however, the closer Zambian maize travels to South Africa, the lower the ex Randfontein import parity price will be thus increasing the challenge to Zambia of supplying those markets. Notwithstanding special deals that may sometimes be available through savings on backload freight going south, the best export opportunities for Zambia are naturally found further to the north in places like the Democratic Republic of Congo (DRC).

174. Even in this case, however, the extra cost of delivering FSP maize to Lubumbashi, for example, must be added to the farm gate value. Because these costs will parallel the additional price of shipping South African maize a greater distance to reach the DRC market, the same overall results would apply as described above meaning that FSP is unlikely to be a competitive route to export development without other investments in on-farm production, marketing, and storage.

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<sup>29</sup> Updated from CCAA Zambia Competitiveness Report (Keyser, 2007).

## VI. IMPACT ON PRIVATE SECTOR

175. The next area for analysis was to look at the FSP's impact on private sector development. When the FSP was launched, one of the major objectives identified by MACO was to enhance the capacity of private companies to supply agricultural inputs to smallholder farmers on time and in adequate amounts. The FSP Implementation Manual specifically emphasizes the GRZ's commitment to full liberalization of agricultural markets and describes the program as a transitional operation needed to build the private sector's capacity in input marketing. By sharing the cost of inputs with smallholder farmers, it was anticipated that the FSP would "expand markets for private sector input dealers and increase their involvement in the distribution of agricultural inputs in rural areas thereby reducing the direct role of government."<sup>30</sup>

176. Despite the importance attached to private sector development, MACO has not really monitored the program's impact on private supply firms other than taking account for the number of national-level seed and fertilizer companies contracted to supply subsidized inputs for its own internal records. Given the open ended nature of FSP input subsidies, there needs to be much clearer understanding of how the program has affected competitive market development and emerging private supply networks.

177. Far from increasing private sector participation in the supply of agricultural inputs to smallholder farmers, many people met during this study raised concerns that the program is having the exact opposite effect. To date, Omnia and Nyiombo are the only private companies ever contracted to supply Urea and all basal fertilizer has been single-sourced from the state owned firm, Nitrogen Chemicals of Zambia (NCZ) except in the first two years when Omnia and Nyiombo shared the contracts for Compound D with NCZ.

178. MACO administrators acknowledge this as a major shortcoming of the program and say they would have preferred to involve more fertilizer companies, but that the other suppliers either did not tender for FSP contracts and/or were judged to lack the necessary capacity due to limited access to commercial finance and other inherent constraints. With respect to seed, the FSP is regarded to have done much better in involving many private firms.

179. Another criticism that has been leveled against the FSP is that the program has negatively affected the availability of private inputs. According to comments by private suppliers at the kick-off workshop, some retailers tend to delay stocking fertilizer until the FSP supplies have been distributed such that farmers cannot easily access commercial fertilizer as an alternative to late deliveries under the FSP. To understand how FSP has affected the use of private inputs by farmers and trends in input availability at the district level, several questions were included in the survey questionnaires for farmers, DACOs, local transporters, and private retailers.

180. Overall, the analysis finds that FSP has displaced at least 7% of private sector customers at the district level. Whereas 50% of farmers reported buying commercial inputs from a private shop before FSP, only 43% of respondents continued to use private inputs with FSP. Additionally, 13% of FSP beneficiaries reported that they already produced at or above the recommended 4x4 level before receiving FSP inputs so presumably did not face a supply constraint. Importantly, however, these results only apply to farmers who received FSP inputs and the figures do not report on whether the program had negative consequences for sales to non-beneficiaries.

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<sup>30</sup> MACO, 2007, p. 1.

181. From a somewhat different perspective, the survey also found that 72% of beneficiaries said there were reliable private input shops in the district they could reasonably get to and count on to sell good quality inputs before the rains. Although these results were highly skewed by location (see [Figure 10](#)~~Figure 10~~), the data show that private networks are available in many areas and are apparently much stronger now than in 2002 when the program was launched. From the private retailer survey, 49% of shopkeepers said sales of hybrid seed have increased over the past five years and 37% said sales of fertilizer have increased despite competition from FSP.

182. For program design, the finding that private sector development is more advanced in some areas than others suggests that different approaches may be needed to build private sector capacities depending on local conditions. Thus far, the FSP has not accounted for these complexities and the allocation of total resources (FSP packs) is based mainly on the number of farmers in each district without regard for the current level of private sector development. As a result, a large share of the annual input allocation goes to areas where farmers already report having good access to private supply networks while farmers in other areas with little access to private dealers are left behind.

### **A. Total Fertilizer Supply**

183. For the 2007/08 season, there were about 12 private sector companies producing/blending and/or distributing imported fertilizer in the country.<sup>31</sup> Most of these firms targeted the commercial farm sector, but many firms had also taken specific steps to build market linkages with smallholders through local retail shops and dealer networks at the district level. The state-owned firm Nitrogen Chemicals of Zambia (NCZ) has not yet been privatized and is the only domestic manufacturer of basal (Compound D) fertilizer.

184. Notably, NCZ has been operating at below capacity for some time due to lack of capitalization. For the 2007/08 season, NCZ expected to produce 75,000 to 80,000 MT of fertilizer including 25,000 MT for the FSP, 25,000 to 30,000 MT for commercial sales within Zambia, and 25,000 MT to be exported to the DRC following an export marketing initiative. As the season turned out, however, NCZ was only able to produce about 32,000 MT of fertilizer for the 2007/08 season of which 25,000 MT was taken under the FSP contract leaving just 7,000 MT for commercial sales and export.<sup>32</sup>

185. To locate the overall importance of FSP in Zambia's national fertilizer supply, [Table 28](#)~~Table 28~~ and [Figure 20](#)~~Figure 20~~ below look at the scale of private sector and FSP supply in different regions of the country. According to these data, a total of 171,126 MT of fertilizer were supplied nationwide in 2007/08, of which 29% (50,000 MT) was from the FSP and 71% (121,126 MT) was from commercial sources.

186. More detailed information on total fertilizer sales to smallholders compared with commercial farmers were not available to show how the FSP compares with private suppliers in this particular market. A large share of private sales in Lusaka, for example will be to large commercial farmers rather than the smallholder maize producers targeted by FSP. In Northern, Northwestern, Luapula, and Western Provinces, where there are very few large commercial farmers, the data show that FSP accounts for the majority of total supply suggesting that private firms either have little interest in these markets and/or have been displaced by FSP competition.

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<sup>31</sup> ZNFU, 2008

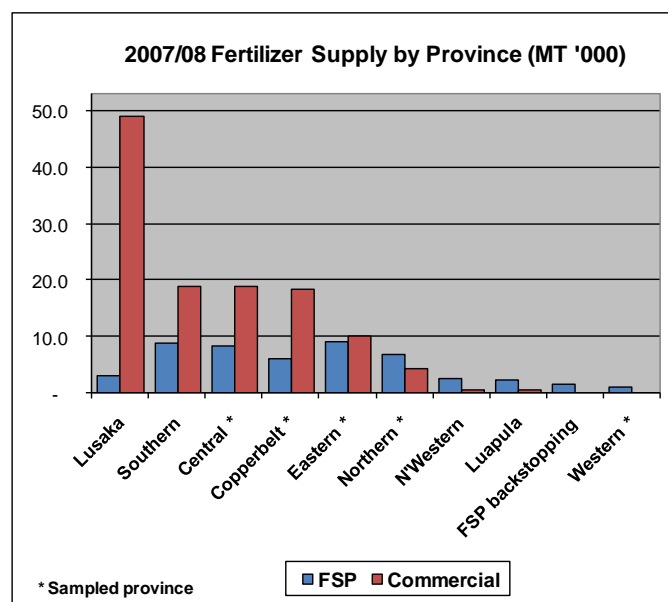
<sup>32</sup> ZNFU, 2008

**Table 28: Total Fertilizer Supply in Zambia by FSP and Commercial Distributors in 2007/08**

	FSP			Commercial Sales		Total		FSP as % Com. Sales
	1ha packs	MT fertilizer	% total	MT fertilizer	% total	MT fertilizer	% total	
Central	20,685	8,274	17%	18,850	16%	27,124	16%	44%
Copperbelt	15,400	6,160	12%	18,495	15%	24,655	14%	33%
Eastern	23,100	9,240	18%	10,187	8%	19,427	11%	91%
Northern	17,090	6,836	14%	4,292	4%	11,128	7%	159%
Western	2,890	1,156	2%	111	0.1%	1,267	1%	1041%
<b>Total Sample</b>	<b>79,165</b>	<b>31,666</b>	<b>63%</b>	<b>51,935</b>	<b>43%</b>	<b>83,601</b>	<b>49%</b>	<b>61%</b>
Luapula	5,975	2,390	5%	618	0.5%	3,008	2%	387%
Lusaka	7,750	3,100	6%	49,152	41%	52,252	31%	6%
N'Western	6,225	2,490	5%	571	0.5%	3,061	2%	436%
Southern	22,135	8,854	18%	18,850	16%	27,704	16%	47%
Backstopping	3,750	1,500	3%	-	0.0%	1,500	1%	
<b>Total Zambia</b>	<b>125,000</b>	<b>50,000</b>	<b>100%</b>	<b>121,126</b>	<b>100%</b>	<b>171,126</b>	<b>100%</b>	<b>41%</b>

Source: MACO, 2007 (FSP data); ZNFU, 2008 (private sector data).

**Figure 20: Total Fertilizer Supply in Zambia by FSP and Commercial Distributors in 2007/08 (graph of data from [Table 28](#))**



## B. Development of Private Retail Networks

187. A useful way to look at the FSP's impact on private sector development is to consider recent trends in private retailing at the district level. The perceived lack of capacity of private input dealers to supply district-level shops with adequate inputs was one of the main reasons cited by the GRZ for launching the FSP in 2002 and it is important to look at whether actual conditions still justify Government's spending on direct input provision. A number of questions were included in the survey to show how the FSP has affected private sector sales at the district level and whether or not local conditions warrant direct government spending on input provision.

## DACO-level survey results

188. First, [Table 29](#) looks at how DACOs described the availability of private input shops in the administrative capital and outlying areas of surveyed districts. As shown, nearly every district was said to have at least one private input shop in the administrative capital and five districts (25%) were also said to have private input shops in outlying areas. Because these results come only from the DACO questionnaire, they must not be interpreted as the definitive measure of how many of private shops in each district (let alone how well stocked these shops are)<sup>33</sup>, but are sufficient to show that farmers in most parts of the country have a reasonable choice of private input suppliers so long as they can reach the district capital.

**Table 29: Number of Private Input Shops at District-level according to DACOs**

		Number of private shops within district capital	Number of private shops outside district capital
Central	Kabwe	12	8
	Mkushi	6	0
	Mumbwa	12	0
	Serenje	5	0
Copperbelt	Chililabombwe	4	0
	Masaiti	0	2
	Mufurila	5	1
	Ndola	10	dk
Eastern	Chadiza	3	0
	Lundazi	2	0
	Nyimba	2	0
	Petauke	11	0
Northern	Kasama	3	3
	Luwingu	0	0
	Mporokoso	1	0
	Nakonde	2	0
Western	Kalabo	5	4
	Mongu	2	0
	Senanga	2	0
	Sesheke	0	0

Survey data (DACO-Q76)

189. DACOs were also asked to describe how the availability of district-level retail shops has changed over the past five seasons. These results are summarized in [Table 30](#) and show that 10 out of 19 DACOs said that the number of inputs shops had either increased a lot or increased some within the past few years. Only one DACO described the number of private shops as having decreased. One DACO did not answer.

<sup>33</sup> The DACO's claim that there are no private input shops in Masaiti, for example, seems incorrect since this is a medium size town less than 20km from Luanshya.

**Table 30: Change in Availability of District-level Retail Shops in the past Five Years according to DACOs**

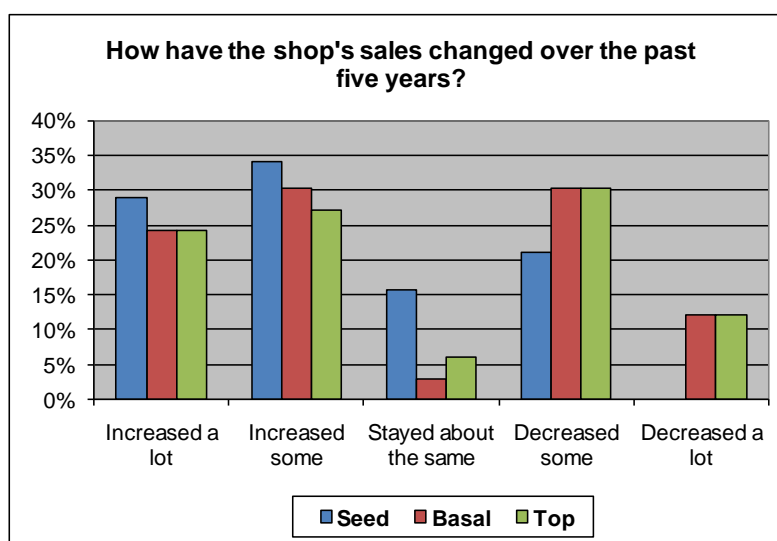
Increased a lot	Increased some	Stayed about the same	Decreased some	Decreased a lot
Kabwe Ndola Chililabombwe Petauke	Mkushi Mumbwa Serenje Nakonde Senanga Kalabo	Masaiti Lundazi Chadiza Nyimba Kasama Mporokoso Luwingu Sesheke	Mufurila	

Survey data (DACO-Q77)

### Private-retailer survey results

190. At the private retailer level, shopkeepers were likewise asked to say how sales have change over the past five years. These results are summarized below and show that 58% of shops said that fertilizer sales had either increased or stayed about the same compared with 42% that said sales had decreased. With respect to seed, 79% of shops said that sales had increased or stayed about the same compared with 21% that said sales have decreased. Although many other factors are likely to influence these results, the fact that more shops identified a positive trend with respect to seed sales than fertilizer could be indicative of the particular problems with late delivery of FSP seed described in Section IV.

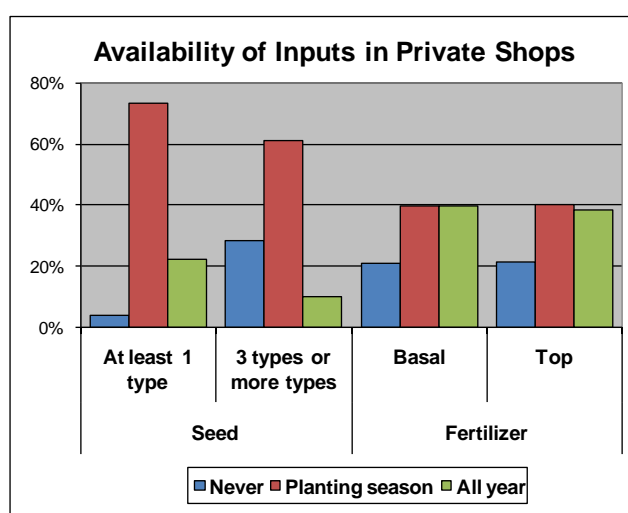
**Figure 21: Change in Private Sales by District-level Retail Shops**



Survey data (District retailer Q-23, 24, 25)

191. District retailers were also to say what time of year the store can guarantee to have adequate stocks of hybrid seed and fertilizer available to sell to farmers. These results are summarized in [Figure 22](#) and show that 96% of interviewed shop owners were confident of having at least one type of hybrid seed available during the planting season and that 79% of shops were confident of having at least one type of basal or top dressing fertilizer available during the planting season.

**Figure 22: Availability of Inputs in Private Shops throughout the Year**



Survey data (Private retailer Q-17)

192. The fact that 20% input shops said they do not stock fertilizer during the planting season could be an indication of shops delaying their stocking of inputs because of FSP. Even so, the data also show that this problem is not particularly widespread like some reports criticizing the FSP have claimed. Equally, the survey results are also inconsistent with the kind of widespread lack of capacity MACO has used to justify its spending on FSP. Overall, in fact, the results suggest the opposite situation prevails with considerable private sector capacity at the district level in many parts of the country.

193. As a further indication of private sector development, shopkeepers were also asked to identify their main suppliers of seed and fertilizer and whether they are formally registered as an authorized dealer for any of the listed companies. These results are summarized in [Table 31](#). Although Ominia and Nyiombo were identified as the main sources of fertilizer by more shops than any other firms, the overall picture is of a reasonably competitive supply situation rather than one of cartels and monopolies. Many shops at the district-level, in fact, identified two or more suppliers as their main source of fertilizer supply further dispelling the notion of limited outreach used to justify the original program.

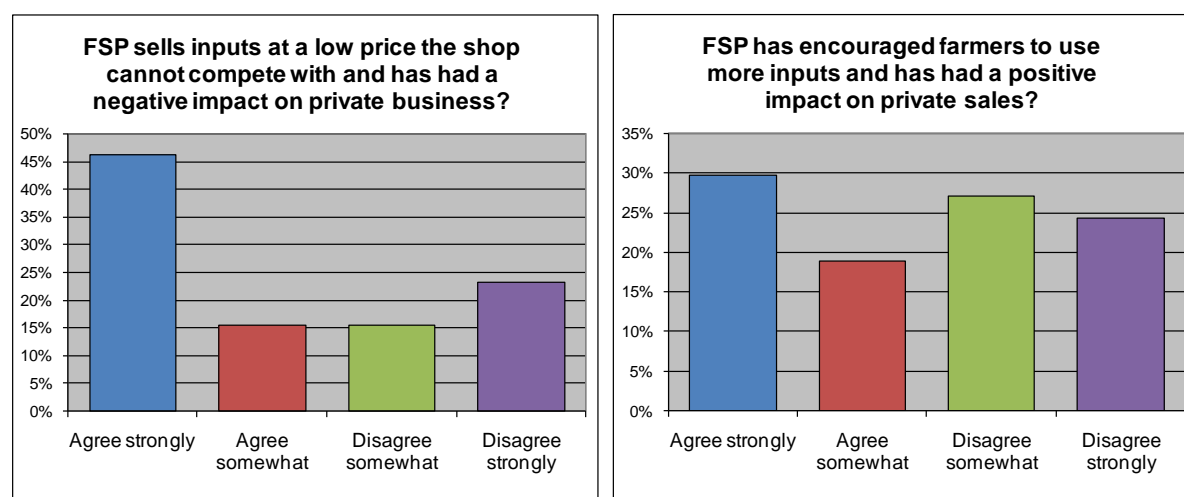
**Table 31: Leading Suppliers of Seed and Fertilizer Identified by District-level Retail Shops**

SEED			FERTILIZER		
Company	Main supplier	Authorized dealer	Company	Main supplier	Authorized dealer
Seedco	34	22	Omnia	19	5
ZAMSEED	28	17	Nyiombo	16	7
Pannaar	18	13	Sassol	14	3
MRI	18	6	Zambian Fertilizer	11	7
CropServe	4	0	NCZ	6	1
MACO	1	0	Bridgeway	2	1
Other	4	0	Greenbelt	1	0
			Other	8	0

Survey data (number of shops out of 49 stores interviewed)

194. Finally, at the private dealer level, shopkeepers were asked for their opinions on how FSP has affected business. Interviewers were instructed to read the statements in the following charts and to ask the respondent whether they agree or disagree as shown.

**Figure 23: Private Retailer Views on the Impact of the FSP**



195. According to these results, most shopkeepers said that the FSP has had a negative impact on their business because the program sells inputs at a price that is too low for them to compete. Not all retailers agreed with this statement, however, and nine shopkeepers strongly disagreed and said that the FSP has not had a negative impact on their business. With respect to the second question of whether FSP has encouraged farmers to use more inputs as anticipated by MACO, the results were split.

### Farmer-level survey results

196. Beyond the results described already, questions were included in the farmer survey to ask about use of private fertilizer. These results are summarized in [Table 32](#) and show that FSP was the only source of fertilizer for 57% of interviewed households in 2007/08. Closer examination of the data, however, reveals that farmers in many locations relied extensively of private fertilizer in addition to what they received from FSP. Only in Western Province was there a very clear trend whereby most recipients relied exclusively on FSP. Moreover, the survey results show that 50% of FSP recipients used private inputs before participating in program compared with the 43% who continued to use private inputs with the program suggesting the FSP displaced 7% of private sector customers who received subsidized inputs.



**Table 32: Sources of fertilizer among 2007/8 FSP beneficiaries**

		<b>Total FSP farmers interviewed</b>	<b>FSP farmers that used fertilizer from other sources in 2007/08</b>	<b>% of recipients for whom FSP was the only source of fertilizer</b>
<b>Central</b>	Kabwe	40	33	18%
	Mkushi	35	13	63%
	Mumbwa	39	22	44%
	Serenje	32	19	41%
<b>Copperbelt</b>	Chililabombwe	24	14	42%
	Masaiti	66	36	45%
	Mufurila	47	25	47%
	Ndola	41	20	51%
<b>Eastern</b>	Chadiza	47	10	79%
	Lundazi	44	17	61%
	Nyimba	41	14	66%
	Petauke	49	14	71%
<b>Northern</b>	Kasama	50	32	36%
	Luwingu	50	20	60%
	Mporokoso	49	24	51%
	Nakonde	50	38	24%
<b>Western</b>	Kalabo	18	1	94%
	Mongu	42	5	88%
	Senanga	40	2	95%
	Sesheke	40	2	95%
<b>Total Sample</b>		<b>844</b>	<b>361</b>	<b>57%</b>

Survey data

## **VII. CONCLUSIONS AND RECOMMENDATIONS**

197. This report set out to analyze the technical efficiency and impact of the Zambia Fertilizer Support Program using original survey data covering the 2007/08 agricultural season and other information from key informant interviews. FSP costs have risen significantly since the program was launched and the program now accounts for nearly one third of the Ministry of Agriculture's total budget allocation.

198. To provide an improved platform for discussing the program's actual achievements, this assessment followed a unique public sector expenditure tracking and qualitative service delivery approach. Through a combination of survey instruments focused on different FSP stakeholders at the district level and interviews by team leaders at the national and provincial levels, the study provides insight to the efficiency of Government expenditure including incidence of leakage and waste, and effectiveness in providing farmers adequate and timely access to inputs. Survey data were also used to estimate the amount of incremental maize that can fairly be attributed to program and effects of FSP market interventions on private retail networks at the district level.

### **A. Conclusions**

199. Overall, the analysis finds that the FSP faces a number of important challenges. The FSP has become an open-ended program with large variations in the number of farmers targeted each year, a rapid escalation of total costs, and service delivery that beneficiaries report to be of mixed quality. Across the sample, less than 4% of the FSP fertilizer in 2007/08 was distributed before the end of October and 69% of beneficiaries said they did not get their inputs until after the start of the rains. The estimate of incremental maize production that can be attributed to the FSP is 61-78% lower than predicted by MACO. Just two private fertilizer companies have been involved with the supply of inputs, raising questions about the success of the program in building activity of the private sector.

200. The FSP is not the only agricultural subsidy program in Zambia. A similar portion of the budget has been used for maize price support through the Food Reserve Agency. Until now, there has been no apparent coordination between the programs or consideration of how the two parts of Zambia's overall subsidy program could work together.

201. The lack of differentiation of the FSP program with regard to agroecological and economic characteristics of the targeted areas reduces effectiveness of the program. At the farm level, for example, the universal application of a 4x4 input pack for maize under the FSP makes little sense because of variations in climate, market access, resource limitations, and other factors that shape individual decision making in a free market economy. Similarly, for private sector development, it is apparent that the challenges of building new capacities are different in various regions of Zambia and cannot be adequately addressed by a universal program that allocates resources based on the proportional distribution of farmers across the country rather than by how well they are able to access inputs or whether private networks are available and developing in the area.

202. At the national level, weakness in transparency and accountability is evidenced by the difficulty to determine the actual amounts MACO spent on individual supplier contracts and lack of reconciliation of the amounts collected from farmers and deposited in the central account. At the district level, cooperatives could only confirm they received 80% of the inputs district officials said they sent to them and reported leakage was high in some districts. For example, in four districts (i.e. 20% of the district sample) cooperatives only confirmed receiving 54% of the inputs DACOs said they sent.

203. In terms of incremental maize, the analysis concludes that the FSP beneficiaries produced around 82,000 to 146,000 tons that would not have been grown without the program. At this level of output, each ton of FSP maize cost Zambia between USD 325 to 579 at the farm gate excluding labor and other costs that apply equally to FSP and non-FSP maize alike. Based on a comparison with import parity prices it appears that FSP was reasonable value for money if Government's sole objective was to increase food security in outlying areas, but was otherwise uncompetitive compared with the cost of importing an equivalent amount of food for urban markets. On the export side, the analysis likewise shows that the FSP is unlikely to be a route to competitive market development, since costs remain above export parity prices.

204. The program at present lacks a monitoring and evaluation system at the central level to help make informed decisions on the program's scope and coverage. The PCO does not monitor whether the inputs it subsidizes actually reach the farmers, when the inputs arrive, how the inputs are used, or what effects of FSP subsidy provision is having on private retailers at the district level.

## **B. Recommendations**

205. In considering the future of the program, the Government may wish to consider the following recommendations.

### **Start with a clear definition of objectives of the FSP.**

206. The objective of improving smallholder and private sector capacities is very broad and this has contributed to the FSP being pulled in different directions.

207. In this regard, Government may wish to decide whether the program is to be more about promoting agriculture growth or livelihood security. These objectives are not mutually exclusive, but do have important implications for beneficiary targeting, regional allocations, implementation arrangements, exit strategy, and types of parallel investment needed for a successful outcome. If the program is to be more about growth, for example, then targeting should focus on farmers with good market access and capacity to grow a surplus of maize and/or other agricultural commodities. If, on the other hand, the program is to be about livelihood support, then selection criteria should focus on a farmer's poverty status and ability to afford private sector supplies.

208. Opportunities to exit from subsidy provision would also vary depending on stated objectives. In the case of a growth objective, mechanisms that link farmers with a financial intermediary and allow for a reduction of the subsidy over time could be built into the program. With a livelihoods program, however, the opportunities to exit from subsidy provision would be less clear except for a possible switch to direct cash transfers or other kinds of long-term social safety net provision.

### **Implement a dual approach with differences between remote and non-remote areas.**

209. In deciding which approach to follow, one option would be for Zambia to split the FSP into two sub-programs with different strategic objectives and implementation arrangements depending on the level of private sector development in each district. Since the FSP was launched, private sector networks have expanded in many areas but not in others and the program's design should account for these differences. In areas where farmers already have reasonable private sector access, for example, opportunities to engage local retailers should be exploited to the fullest extent possible as part of the strategy for private sector capacity development and successful economic transition. In other areas where private networks are less developed, continued supply through the GRZ's own distribution system such as the existing FSP system may still be required. The comparison of FSP costs with import parity

found a reasonably strong efficiency argument for this kind of support to achieve food security in outlying areas.

**In non-remote areas, consider moving away from direct procurement.**

210. With respect to non-remote areas where private supply networks are developing, one promising option would be to switch to a voucher system that allows farmers to buy inputs from private retailers and apply the subsidy to whatever inputs they require. Such a system would not only provide income support to farmers, but would also be a direct way to support local retail development. Vouchers would be more consistent with the picture of emerging private sector capacities than the current system, which does not seek to involve district-level suppliers. Vouchers are not a panacea, however, and the operational details of any new arrangement would require careful consideration.

**Choose selection criteria that are meaningful, easy to apply, and verifiable.**

211. In mapping the way forward, it is also important for the FSP to adopt clear, easy to apply, and verifiable beneficiary selection criteria. To date, targeting has been undermined by very loose selection criteria. Because of this, selection appears arbitrary leaving too much influence to representatives of cooperatives and MACO staff.

212. To improve on this, MACO may wish to develop new criteria that relate specifically to declared objectives. In areas where the objective is growth, then priority should be given to farmers with a proven capacity to produce a market surplus; or, if rural livelihood support is the main objective, then farmers that are vulnerable to food insecurity and/or have used little or no fertilizer in the recent years should be given priority. Whatever the approach, the criteria need to be clear, simple to apply and easy to interpret. The World Bank financed input subsidy program in Tanzania provides an interesting example.

**Box 1: Tanzania Accelerated Food Security Program**

The World Bank financed Tanzania Accelerated Food Security Program seeks to provide resource-poor farmers access to inputs through a voucher program for maize and rice. Input vouchers are allocated for the targeted commodities to agro-ecologically suitable areas using transparent criteria. The selection of beneficiaries at the village level is through a participatory process managed by an elected group of six farmers comprising the Village Voucher Committee and involving diverse members of the community through the Village Assembly.

The criteria for eligibility are simple and published in the local media. Regular information and awareness campaigns ensure that beneficiaries are aware of their entitlements and a complaints mechanism allows farmers to register their concerns and ensures they are addressed. Routine participatory monitoring and rigorous impact evaluation is included as a core part of the design to inform necessary adjustments (see Box 2).

213. The question of how to involve farmer cooperatives also needs careful consideration. On the one hand, cooperative leaders are likely to have some of the best insight to individual farmer capacities and local poverty conditions. As farmer representatives, however, cooperative leaders may not be the best suited to make hard strategic decisions for which individuals should benefit. Consistent with the dual approach, therefore, one way forward would be for coop leaders to continue to play a role with farmer selection in remote areas where food security objectives are the main priority. In other areas where a voucher approach could be introduced, however, new selection procedures that give increased responsibility to the DACO and farmer extension agents may be required.

**Give greater consideration to costs and profitability.**

214. In areas where MACO decides to continue with direct input distribution, the recommendation for farmers to apply a standard 4x4 fertilizer pack per hectare should be

reviewed. This recommendation traces back to the period before liberalization and is based on “technically optimal” yield maximizing strategy rather than profit maximizing in a free market economy.

215. The problem is that this technically optimum level does not guarantee farmers to realize maximum profit. Not only are eight bags of fertilizer very difficult for a farmer to afford (thus raising questions about sustainability without ongoing subsidy provision), but there is abundant evidence from crop budget analysis in Zambia and elsewhere to show that a lighter application of inputs can provide farmers better financial rates of return and greater protection from weather related and market risks.<sup>34</sup> In the case of drought, for example, fertilizers are useless and therefore very costly. This is true regardless of whether the crop is grown for market sale or home consumption. Particularly in areas with low natural yield potential, the universal application of a 4x4 fertilizer package (or 4x4 equivalent over a smaller area) makes little economic or agronomic sense.

216. Already for the upcoming 2009/10 production season, MACO has reduced the FSP pack size to 10kg seed and 2x2 fertilizer. MACO's new approach, however, is not to say that farmers should apply the inputs more thinly over a full hectare (which would still require 20kg of seed), but that the FSP will only support a half hectare of maize at the same 4x4 level as before. This move may be viewed as a positive change, particularly from a food security perspective, in that it should allow MACO to reach more beneficiaries with the same level of funding. This study shows that many farmers receiving the smaller pack have access to private dealers if they choose to supplement their inputs through commercial purchase.

#### **Develop new design features to limit the program's scope and duration.**

217. To date, the graduation requirement has been the only feature in the FSP's design to limit the scope of program assistance. In practice, however, district administrators, cooperative leaders, farmers, and political decision makers have lacked the capacity and/or will to implement this part of the program. At the field level, “graduation” seems to be more about farmers taking turns to receive FSP inputs than developing genuine capacity to stand on their own. Limiting the FSP pack size and/or number of years that beneficiaries should be entitled to FSP inputs may seem fair and effective, but is unlikely to address Zambia's true development priorities or improve on the situation that gave rise to the FSP in the first place.

218. Given that program costs have grown rapidly (and unpredictably), therefore, other mechanisms are needed to prevent the FSP from becoming a permanent drag on the national budget. Starting with a clear definition of what the FSP aims to achieve and deciding how progress towards these objectives will be measured would help. Government must also have the political will to scale back on FSP operations when it sees its objectives are being reached. As described, private sector appears to have more capacity now than when the FSP was launched and policymakers need clear systems to account for and respond to such developments.

#### **Consider multiyear programming to send clear signals and avoid pressure for change.**

219. One of the most important limitations of the current FSP is that rules of participation, district allocations, and tender procedures have been allowed to change each year. This situation has particularly negative consequences for farmers and private suppliers since it is not possible to make forward plans when scope of each year's FSP program is unknown until it happens. Uncertainty over the FSP allocation also exposes the program to political pressures

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<sup>34</sup> See, for example, Keyser, Grey and Scott, 1996; Saasa, et. al. 1999; or Keyser 2007 for comparative advantage analysis in Zambia, or Duflo, et. al, 2008 for similar analysis on the marginal returns to fertilizer in Kenya.

and last minute decision making without due consideration for long-term strategic objectives. Although Government rules currently prevent multiyear tendering, GRZ should look for other ways to send long-term policy signals to create the kind of stable environment needed for lasting improvement.

**Address problems of late delivery and differences between expectations and actual deliveries.**

220. From 2010, the GRZ fiscal year will shift to follow the calendar year effectively giving FSP administrators an additional three months after the budget is approved to complete the distribution. Because the new budget year means that FSP planning will have to be done while the current distribution is still ongoing, however, the time for effective action could easily slip by if not used effectively.

**Institute a clear and workable system for auditing, monitoring and evaluation.**

221. The GRZ may wish to institute a routine system for rigorous auditing, accounting, and results-based monitoring and evaluation of the subsidy program. At present an M&E system is lacking. Government decision makers need a routine system for tracking program expenditures during the course of each FSP season together with key outcome indicators that can be used to assess the program's contribution.

**222.** GRZ might wish to consider engaging farmers themselves in the monitoring. Participatory monitoring has been used in many sectors and countries as a way to increase social accountability (see Box 2). The Farmer's Report Card (see Annex) developed as part of the survey instruments for this study offer a practical starting point for GRZ to track the FSP's performance. Another practical step in that same direction would be to ensure that the Implementation Manual is readily available for all cooperatives.

**Box 2: Participatory monitoring using Report Cards**

Citizen Report Cards (CRCs) are participatory surveys that solicit *user* feedback on the performance of public services. Citizen Report Cards are used in situations where demand side data, such as user perceptions on quality and satisfaction with public services, is absent. Starting from their original context of evaluating urban services in Bangalore, CRCs have been applied in different geographic and sectoral contexts – the common theme being to use a survey that captures consumer data in a comparative manner. Some of the actual applications include (i) using CRCs as a basis for performance based budget allocations to pro-poor services (Philippines), (ii) cross-state comparisons on access, use, reliability and satisfaction with public services (India), (iii) supplementing national service delivery surveys (Uganda), and (iv) governance reform projects (Ukraine and Bangladesh).

\* \* \* \* \*

223. Many other conclusions besides those noted above can be drawn from the survey results described in this report. Government decision makers at the national, provincial, and district levels as well as members of the donor community, private sector traders, farmers, and farmer representative may all draw different conclusions depending on their specific areas of interest. By providing empirical insight to FSP performance, it is primarily hoped the analysis will be used as a platform for dialogue on policy options and effective decision making for the way forward.

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## APPENDIX 1: 2007/08 FSP ALLOCATION

		Targeted Beneficiaries (Packs)	Fertilizer Allocations	Seed Allocations
<b>Central</b>	Chibombo	4,160	1,664	83.2
	Kapiri Mposhi	4,000	1,600	80.0
	* <b>Mkushi</b>	<b>3,750</b>	<b>1,500</b>	<b>75.0</b>
	* <b>Mumbwa</b>	<b>3,275</b>	<b>1,310</b>	<b>65.5</b>
	* <b>Serenje</b>	<b>3,000</b>	<b>1,200</b>	<b>60.0</b>
	* <b>Kabwe</b>	<b>2,500</b>	<b>1,000</b>	<b>50.0</b>
<b>Total, Central Province</b>		<b>20,685</b>	<b>8,274</b>	<b>413.7</b>
<b>Copperbelt</b>	Mpongwe	3,465	1,386	69.3
	* <b>Masaiti</b>	<b>2,310</b>	<b>924</b>	<b>46.2</b>
	Lufwanyama	1,540	616	30.8
	* <b>Chililabombwe</b>	<b>1,155</b>	<b>462</b>	<b>23.1</b>
	Chingola	1,155	462	23.1
	Kalulushi	1,155	462	23.1
	Kitwe	1,155	462	23.1
	Luanshya	1,155	462	23.1
	* <b>Mufulira</b>	<b>1,155</b>	<b>462</b>	<b>23.1</b>
	* <b>Ndola</b>	<b>1,155</b>	<b>462</b>	<b>23.1</b>
<b>Total, Copperbelt Province</b>		<b>15,400</b>	<b>6,160</b>	<b>308.0</b>
<b>Eastern</b>	* <b>Petauke</b>	<b>4,290</b>	<b>1,716</b>	<b>85.8</b>
	Chipata S	4,250	1,700	85.0
	Katete	3,845	1,538	76.9
	* <b>Lundazi</b>	<b>3,685</b>	<b>1,474</b>	<b>73.7</b>
	Chipata N	2,860	1,144	57.2
	* <b>Chadize</b>	<b>2,225</b>	<b>890</b>	<b>44.5</b>
	* <b>Nyimba</b>	<b>925</b>	<b>370</b>	<b>18.5</b>
	Mambwe	560	224	11.2
	Chama	460	184	9.2
<b>Total, Eastern Province</b>		<b>23,100</b>	<b>9,240</b>	<b>462.0</b>
<b>Luapula</b>	Kawambwa	2,000	800	40.0
	Mansa	1,875	750	37.5
	Samfya	750	300	15.0
	Chiengwe	385	154	7.7
	Milenge	385	154	7.7
	Mwense	385	154	7.7
	Nchelenge	195	78	3.9
<b>Total, Luapula Province</b>		<b>5,975</b>	<b>2,390</b>	<b>119.5</b>
<b>Lusaka</b>	Chongwe	3,500	1,400	70.0
	Lusaka	2,185	874	43.7
	Kafue	2,025	810	40.5
	Luangwa	40	16	0.8
<b>Total, Lusaka Province</b>		<b>7,750</b>	<b>3,100</b>	<b>155.0</b>

\* Sampled district

		Targeted Beneficiaries (Packs)	Fertilizer Allocations	Seed Allocations
<b>Northern</b>	Mbala	3,250	1,300	65.0
	* <b>Kasama</b>	<b>2,500</b>	<b>1,000</b>	<b>50.0</b>
	Mpika	2,370	948	47.4
	Isoka	2,200	880	44.0
	* <b>Nakonde</b>	<b>1,500</b>	<b>600</b>	<b>30.0</b>
	Chinsali	1,400	560	28.0
	Mungwi	1,350	540	27.0
	* <b>Mporokoso</b>	<b>850</b>	<b>340</b>	<b>17.0</b>
	* <b>Luwingu</b>	<b>825</b>	<b>330</b>	<b>16.5</b>
	Mpulungu	500	200	10.0
	Kaputa	175	70	3.5
	Chilubi	170	68	3.4
<b>Total, Northern Province</b>		<b>17,090</b>	<b>6,836</b>	<b>341.8</b>
<b>Northwestern</b>	Kasempa	1,500	600	30.0
	Solwezi	1,500	600	30.0
	Mwinilunga	1,100	440	22.0
	Kabompo	750	300	15.0
	Mufumbwe	500	200	10.0
	Zambezi	500	200	10.0
	Chavuma	375	150	7.5
<b>Total, Northwestern Province</b>		<b>6,225</b>	<b>2,490</b>	<b>124.5</b>
<b>Southern</b>	Kalomo	6,155	2,462	123.1
	Choma	5,400	2,160	108.0
	Mazabuka	4,375	1,750	87.5
	Monze	4,275	1,710	85.5
	Kazungula	1,000	400	20.0
	Namwala	230	92	4.6
	Itthezi Itthezi	225	90	4.5
	Gwembe	150	60	3.0
	Siavonga	125	50	2.5
	Sinazongwe	125	50	2.5
	Livingstone	75	30	1.5
<b>Total, Southern Province</b>		<b>22,135</b>	<b>8,854</b>	<b>442.7</b>
<b>Western</b>	Kaoma	1,925	770	38.5
	* <b>Sesheke</b>	<b>250</b>	<b>100</b>	<b>5.0</b>
	* <b>Mongu</b>	<b>230</b>	<b>92</b>	<b>4.6</b>
	Lukulu	190	76	3.8
	Shang'ombo	150	60	3.0
	* <b>Senanga</b>	<b>125</b>	<b>50</b>	<b>2.5</b>
	* <b>Kalobo</b>	<b>20</b>	<b>8</b>	<b>0.4</b>
<b>Total, Western Province</b>		<b>2,890</b>	<b>1,156</b>	<b>57.8</b>
<b>Backstopping Fund</b>		<b>3,750</b>	<b>1,500</b>	<b>75.0</b>
<b>TOTAL 2007/08 FSP</b>		<b>125,000</b>	<b>50,000</b>	<b>2,500</b>

## APPENDIX 2: DETAILED TABLES USED FOR CALCULATION OF INCREMENTAL MAIZE PRODUCTION.

**Table A2-1: Total Fertilizer Used per hectare on Maize with and without FSP Support**

		Before FSP							With FSP						
		None	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4	None	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4
<b>Central</b>	Kabwe	2	1	7	14	3	10	3	0	0	3	7	6	15	8
	Mkushi	14	1	5	4	3	3	3	0	2	4	20	2	2	6
	Mumbwa	14	1	8	7	2	1	3	0	6	12	12	4	2	3
	Serenje	13	3	7	1	1	5	1	0	0	2	5	2	16	7
<b>Copperbelt</b>	Chililabombwe	6	0	3	7	1	4	3	0	0	1	4	7	5	6
	Masaiti	20	2	20	15	3	3	1	1	0	3	12	7	27	14
	Mufurila	12	7	10	6	2	7	0	1	0	4	7	5	20	10
	Ndola	14	0	1	7	2	10	3	0	0	3	9	4	11	13
<b>Eastern</b>	Chadiza	16	0	11	5	2	6	1	0	1	12	23	3	5	2
	Lundazi	19	1	2	10	1	4	5	0	0	3	7	4	19	10
	Nyimba	31	1	1	4	0	1	0	2	5	14	11	1	5	1
	Petauke	36	0	0	5	1	5	0	2	3	13	16	1	8	4
<b>Northern</b>	Kasama	15	3	15	5	1	6	1	3	1	2	8	1	25	8
	Luwingu	40	1	2	2	0	5	0	0	3	2	10	5	20	9
	Mporokoso	26	1	15	3	0	4	0	0	5	12	14	7	9	2
	Nakonde	15	5	10	7	4	5	0	2	4	9	15	8	4	7
<b>Western</b>	Kalabo	3	0	8	4	3	0	1	0	2	7	3	1	5	0
	Mongu	10	1	22	6	1	1	1	4	1	6	17	0	12	4
	Senanga	24	2	13	0	0	1	0	9	5	7	11	0	7	1
	Sesheke	34	0	5	1	0	0	0	2	11	17	8	0	1	1
<b>Total Sample</b>		<b>364</b>	<b>30</b>	<b>165</b>	<b>113</b>	<b>30</b>	<b>81</b>	<b>26</b>	<b>26</b>	<b>49</b>	<b>136</b>	<b>219</b>	<b>68</b>	<b>218</b>	<b>116</b>
		<b>45%</b>	<b>4%</b>	<b>20%</b>	<b>14%</b>	<b>4%</b>	<b>10%</b>	<b>3%</b>	<b>3%</b>	<b>6%</b>	<b>16%</b>	<b>26%</b>	<b>8%</b>	<b>26%</b>	<b>14%</b>

Survey data

**Table A2-2: Estimated number of 1ha FSP Packs used at Different Levels of Intensity with and without FSP Support in Sampled Provinces**

		FSP Allocation (1ha packs)	No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4
<b>Before FSP</b>	Central	20,685	6,353	887	3,989	3,842	1,330	2,807	1,478
	Copperbelt	15,400	4,738	820	3,098	3,189	729	2,187	638
	Eastern	23,100	14,025	275	1,925	3,300	550	2,200	825
	Northern	17,090	8,590	895	3,758	1,521	447	1,790	89
	Western	2,890	1,455	61	984	225	82	41	41
	<b>Total sample</b>	<b>79,165</b>	<b>35,162</b>	<b>2,938</b>	<b>13,754</b>	<b>12,077</b>	<b>3,138</b>	<b>9,025</b>	<b>3,071</b>
<b>With FSP</b>	Central	20,685	-	1,133	2,975	6,234	1,983	4,959	3,400
	Copperbelt	15,400	177	-	974	2,832	2,036	5,576	3,806
	Eastern	23,100	528	1,188	5,544	7,524	1,188	4,884	2,244
	Northern	17,090	438	1,139	2,191	4,119	1,840	5,083	2,279
	Western	2,890	249	395	769	811	21	520	125
	<b>Total sample</b>	<b>79,165</b>	<b>1,393</b>	<b>3,856</b>	<b>12,453</b>	<b>21,520</b>	<b>7,068</b>	<b>21,022</b>	<b>11,853</b>

Calculated from survey data

**Table A2-3: Average Area Planted to Maize with and without FSP Support**

		Average area planted to maize before FSP (ha per hh)	Average area planted to maize with FSP (ha per hh)	Average increment with FSP (ha per hh)
<b>Central</b>	Kabwe	1.50	1.52	0.02
	Mkushi	1.61	1.30	(0.31)
	Mumbwa	1.79	2.13	0.35
	Serenje	0.66	1.48	0.81
<b>Copperbelt</b>	Chililabombwe	1.08	1.53	0.45
	Masaiti	0.80	1.34	0.54
	Mufurila	0.79	1.10	0.31
	Ndola	1.67	1.32	(0.35)
<b>Eastern</b>	Chadiza	2.12	1.67	(0.44)
	Lundazi	1.41	1.25	(0.16)
	Nyimba	2.67	2.98	0.31
	Petauke	2.10	2.15	0.05
<b>Northern</b>	Kasama	0.79	0.95	0.16
	Luwingu	0.45	1.12	0.68
	Mporokoso	0.45	1.20	0.76
	Nakonde	1.16	1.47	0.30
<b>Western</b>	Kalabo	1.53	1.61	0.08
	Mongu	0.76	0.87	0.11
	Senanga	0.95	1.29	0.34
	Sesheke	2.48	3.73	1.25
<b>Average</b>		<b>1.34</b>	<b>1.60</b>	<b>0.26</b>

Survey data

**Table A2-4: Total Area Planted to Maize in Hectares by Surveyed Households with and without FSP Support in Sampled Provinces**

	Before FSP		With FSP	
	N	%	N	%
No maize	61	7.4%	2	0.2%
+ 0 < 0.49 Ha	156	18.9%	57	6.8%
0.5 - 0.99 Ha	201	24.3%	172	20.5%
1 - 1.99 Ha	205	24.8%	366	43.6%
2 - 2.99 Ha	92	11.1%	135	16.1%
3 - 3.99 Ha	43	5.2%	39	4.6%
4 - 4.99 Ha	25	3.0%	30	3.6%
5 - 10 Ha	37	4.5%	36	4.3%
+ 10 Ha	6	0.7%	2	0.2%
<b>Total</b>	<b>826</b>	<b>100.0%</b>	<b>839</b>	<b>100.0%</b>

Survey data

**Table A2-5: Total MT Incremental Maize based on Reported Levels of Fertilizer Use and Average Yields at each Level with and without FSP Support in Sampled Provinces**

***Without area increase***

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4	TOTAL
<b>Before FSP</b>	Central	4,130	651	4,498	6,518	2,250	7,248	5,724	31,019
	Copperbelt	6,468	603	3,432	4,296	1,449	4,635	1,834	22,717
	Eastern	6,750	222	2,004	6,148	1,319	5,844	3,698	25,984
	Northern	8,508	741	4,660	2,993	1,032	5,604	326	23,865
	Western	277	28	575	158	61	35	47	1,182
	<b>Total Sample</b>	<b>26,132</b>	<b>2,245</b>	<b>15,170</b>	<b>20,114</b>	<b>6,112</b>	<b>23,365</b>	<b>11,629</b>	<b>104,767</b>
<b>With FSP</b>	Central	-	793	3,195	10,074	3,197	12,193	12,547	41,997
	Copperbelt	230	-	1,027	3,633	3,855	11,253	10,422	30,421
	Eastern	242	913	5,496	13,351	2,713	12,356	9,580	44,650
	Northern	413	899	2,588	7,719	4,045	15,161	7,911	38,736
	Western	45	172	429	542	15	419	135	1,756
	<b>Total Sample</b>	<b>931</b>	<b>2,776</b>	<b>12,734</b>	<b>35,318</b>	<b>13,824</b>	<b>51,381</b>	<b>40,594</b>	<b>157,559</b>
<b>Increment w/o area increase</b>		(25,202)	531	(2,436)	15,205	7,712	28,016	28,965	<b>52,791</b>

***With area increase***

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4	TOTAL
<b>Before FSP</b>	Central	4,130	651	4,498	6,518	2,250	7,248	5,724	31,019
	Copperbelt	6,468	603	3,432	4,296	1,449	4,635	1,834	22,717
	Eastern	6,750	222	2,004	6,148	1,319	5,844	3,698	25,984
	Northern	8,508	741	4,660	2,993	1,032	5,604	326	23,865
	Western	277	28	575	158	61	35	47	1,182
	<b>Total Sample</b>	<b>26,132</b>	<b>2,245</b>	<b>15,170</b>	<b>20,114</b>	<b>6,112</b>	<b>23,365</b>	<b>11,629</b>	<b>104,767</b>
<b>With FSP</b>	Central	-	999	4,026	12,693	4,028	15,363	15,809	52,916
	Copperbelt	290	-	1,294	4,578	4,857	14,179	13,131	38,330
	Eastern	305	1,150	6,925	16,822	3,418	15,568	12,071	56,258
	Northern	521	1,132	3,261	9,726	5,097	19,102	9,968	48,807
	Western	57	216	540	682	19	527	170	2,212
	<b>Total Sample</b>	<b>1,173</b>	<b>3,497</b>	<b>16,045</b>	<b>44,501</b>	<b>17,419</b>	<b>64,740</b>	<b>51,149</b>	<b>198,524</b>
<b>Increment w/ area increase</b>		(24,960)	1,253	875	24,387	11,306	41,375	39,520	<b>93,756</b>

Calculated from survey data

**Table A2-6: Estimated Number of 1ha FSP Packs used by Beneficiaries at Different Levels of Fertilizer Use with and without FSP in Areas not Covered by the Survey**

		FSP Allocation (1ha packs)	No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4
<b>Before FSP</b>	Luapula	5,975	3,003	313	1,314	532	156	626	31
	Lusaka	7,750	3,157	279	1,233	1,384	350	963	384
	N'Western	6,225	3,129	326	1,369	554	163	652	33
	Southern	22,135	9,016	797	3,522	3,952	999	2,752	1,096
	Backstopping	3,750	1,671	136	778	527	142	369	126
<b>With FSP</b>	Luapula	5,975	153	398	766	1,440	643	1,777	797
	Lusaka	7,750	89	274	1,155	2,095	722	2,101	1,314
	N'Western	6,225	160	415	798	1,500	670	1,852	830
	Southern	22,135	253	784	3,299	5,984	2,062	6,000	3,753
	Backstopping	3,750	110	232	631	999	296	968	514

Calculated from survey data according to specified assumptions

**Table A2-7: Estimated Maize Yields (MT/ha) at Different Levels of Fertilizer Use with and without FSP Support in Areas not Covered by the Survey**

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4
<b>Before FSP</b>	Luapula	0.99	0.83	1.24	1.97	2.31	3.13	3.65
	Lusaka	0.83	0.76	1.09	1.64	2.03	2.45	3.74
	N'Western	0.99	0.83	1.24	1.97	2.31	3.13	3.65
	Southern	0.71	0.64	0.93	1.39	1.72	2.08	3.18
	Backstopping	0.81	0.74	1.07	1.63	1.96	2.48	3.38
<b>With FSP</b>	Luapula	0.94	0.79	1.18	1.87	2.20	2.98	3.47
	Lusaka	0.79	0.72	1.04	1.56	1.93	2.34	3.57
	N'Western	0.94	0.79	1.18	1.87	2.20	2.98	3.47
	Southern	0.67	0.61	0.88	1.32	1.64	1.99	3.03
	Backstopping	0.77	0.70	1.02	1.55	1.87	2.37	3.22

Calculated from survey data according to specified assumptions

**Table A2-8: Estimated Total MT Incremental Maize based on Assumed Levels of Fertilizer use and Expected Yields at each Level with and without FSP Support in Areas not Covered by the Survey**

***Without area increase***

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4	TOTAL
<b>Before FSP</b>	Luapula	2,975	259	1,629	1,046	361	1,959	114	8,344
	Lusaka	2,627	212	1,347	2,263	709	2,363	1,437	10,957
	N'Western	3,099	270	1,698	1,090	376	2,041	119	8,693
	Southern	6,377	514	3,270	5,495	1,721	5,736	3,488	26,601
	Backstopping	1,350	101	835	858	279	916	426	4,764
	<b>Total other areas</b>	<b>16,427</b>	<b>1,355</b>	<b>8,778</b>	<b>10,753</b>	<b>3,446</b>	<b>13,016</b>	<b>5,584</b>	<b>59,359</b>
<b>With FSP</b>	Luapula	145	314	905	2,699	1,414	5,300	2,766	13,543
	Lusaka	70	198	1,201	3,264	1,393	4,907	4,686	15,718
	N'Western	151	327	943	2,812	1,473	5,522	2,882	14,109
	Southern	169	481	2,916	7,923	3,382	11,912	11,375	38,160
	Backstopping	84	163	645	1,549	552	2,289	1,654	6,936
	<b>Total other areas</b>	<b>618</b>	<b>1,485</b>	<b>6,609</b>	<b>18,246</b>	<b>8,215</b>	<b>29,931</b>	<b>23,362</b>	<b>88,466</b>
<b>Increment w/o area increase</b>		(15,809)	129	(2,169)	7,494	4,770	16,915	17,778	<b>29,107</b>

***With area increase***

		No fert	Less than 1x1	1x1 or more	2x2 or more	3x3 or more	4x4	More than 4x4	TOTAL
<b>Before FSP</b>	Luapula	2,975	259	1,629	1,046	361	1,959	114	8,344
	Lusaka	2,627	212	1,347	2,263	709	2,363	1,437	10,957
	N'Western	3,099	270	1,698	1,090	376	2,041	119	8,693
	Southern	6,377	514	3,270	5,495	1,721	5,736	3,488	26,601
	Backstopping	1,350	101	835	858	279	916	426	4,764
	<b>Total other areas</b>	<b>16,427</b>	<b>1,355</b>	<b>8,778</b>	<b>10,753</b>	<b>3,446</b>	<b>13,016</b>	<b>5,584</b>	<b>59,359</b>
<b>With FSP</b>	Luapula	182	396	1,140	3,400	1,782	6,679	3,485	17,064
	Lusaka	88	250	1,513	4,112	1,755	6,182	5,904	19,805
	N'Western	190	412	1,188	3,543	1,857	6,958	3,631	17,778
	Southern	213	607	3,674	9,983	4,262	15,009	14,333	48,081
	Backstopping	106	206	812	1,952	696	2,884	2,083	8,740
	<b>Total other areas</b>	<b>779</b>	<b>1,870</b>	<b>8,328</b>	<b>22,990</b>	<b>10,351</b>	<b>37,713</b>	<b>29,436</b>	<b>111,468</b>
<b>Increment w/ area increase</b>		(15,648)	515	(450)	12,238	6,906	24,697	23,852	<b>52,108</b>

Calculated from survey data according to specified assumptions

**Table A2-9: Comparison of FSP costs per MT Incremental Maize with SAFEX Import Parity**

	1 MT white maize, ex Randfontein (ZAR)	ZAR per USD	1 MT white maize ex Randfontein (USD)	Road to Lusaka	Insurance (1%)	Clearing (1.5%)	Imported Maize (cif Lusaka)	Minimum cost of FSP Maize (USD 326/MT farmgate)	Maximum cost of FSP Maize (USD 580/MT farmgate)	Competitiveness (gap) or advantage compared with minimum FSP cost (USD per MT)	Competitiveness (gap) or advantage compared with maximum FSP cost (USD per MT)
Nov-07	1,866.4	6.8	276.0	120	3.96	6.00	405.96	326	580	79.96	(174.04)
Dec-07	1,733.7	6.8	253.9	120	3.74	5.66	383.25	326	580	57.25	(196.75)
Jan-08	1,792.8	7.0	256.3	120	3.76	5.70	385.75	326	580	59.75	(194.25)
Feb-08	1,755.3	7.6	229.6	120	3.50	5.30	358.38	326	580	32.38	(221.62)
Mar-08	1,873.1	8.0	234.6	120	3.55	5.37	363.56	326	580	37.56	(216.44)
Apr-08	1,856.6	7.8	237.9	120	3.58	5.42	366.88	326	580	40.88	(213.12)
May-08	1,783.9	7.6	233.8	120	3.54	5.36	362.72	326	580	36.72	(217.28)
Jun-08	1,993.6	7.9	252.1	120	3.72	5.64	381.41	326	580	55.41	(198.59)
Jul-08	1,964.9	7.6	257.4	120	3.77	5.72	386.85	326	580	60.85	(193.15)
Aug-08	1,851.8	7.7	241.6	120	3.62	5.48	370.68	326	580	44.68	(209.32)
Sep-08	1,863.1	8.0	231.5	120	3.51	5.32	360.31	326	580	34.31	(219.69)
Oct-08	1,784.4	9.7	183.3	120	3.03	4.59	310.92	326	580	(15.08)	(269.08)
Nov-08	1,761.4	10.1	174.0	120	2.94	4.45	301.42	326	580	(24.58)	(278.58)
Dec-08	1,670.2	10.0	167.4	120	2.87	4.35	294.65	326	580	(31.35)	(285.35)
Jan-09	1,814.4	9.9	182.8	120	3.03	4.59	310.43	326	580	(15.57)	(269.57)
Feb-09	1,727.8	10.0	172.4	120	2.92	4.43	299.77	326	580	(26.23)	(280.23)
Mar-09	1,704.8	10.0	171.0	120	2.91	4.41	298.32	326	580	(27.68)	(281.68)
Apr-09	1,630.2	9.0	180.2	120	3.00	4.55	307.80	326	580	(18.20)	(272.20)
May-09	1,597.7	8.4	190.7	120	3.11	4.71	318.50	326	580	(7.50)	(261.50)
Jun-09	1,512.4	8.1	187.7	120	3.08	4.66	315.41	326	580	(10.59)	(264.59)
Jul-09	1,339.5	8.0	168.3	120	2.88	4.37	295.59	326	580	(30.41)	(284.41)
Aug-09	1,411.7	7.9	177.7	120	2.98	4.51	305.19	326	580	(20.81)	(274.81)

**Source:** Calculated with data from [http://www.safex.co.za/ap/market\\_price\\_history.as](http://www.safex.co.za/ap/market_price_history.as)

## **MAP – SURVEY AREAS**