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MOUNTAINS OF MAIZE, PERSISTENT POVERTY

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Summary: The past two years are a tribute to Zambian farmers; they have responded admirably to government efforts to promote maize production. But ironically, rural poverty remains stubbornly high despite the fact that the government has spent over 2% of the nation's gross domestic product in supporting maize production and subsidizing inputs for farmers. Why is it that maize production has increased so impressively without making a serious dent in rural poverty? And what are the lessons for the new government?

Zambia's small- and medium-scale farmers produced an impressive maize surplus in 2011. The marked increase in maize production between the mid-2000s and 2011 coincides with the scaling-up of the government's two flagship agricultural sector programmes: the Farmer Input Support Programme (FISP, formerly known as the Fertiliser Support Programme), which distributes subsidised inputs to farmers; and the purchase of maize at above-market prices through the Food Reserve Agency (FRA). Together these programmes accounted for over 60% of the Ministry of Agriculture's public budget over the past five years. They also accounted for 90–96% of the total budget allocated to the ministry's Poverty Reduction Programmes (PRPs) during the 2006–2011 budget years. While there are other PRPs, such as the Food Security Pack and Programme Against Malnutrition, they are dwarfed by the FISP and FRA operations, which in budgetary terms stand out as Zambia's main anti-poverty programmes.

In spite of all this, rural poverty declined very little between 2006 and 2010. Although the rural poverty rate declined from 83% in 1998 to 77.3% in 2004, it was virtually unchanged at

76.8% in 2006 (CSO 2010). While official poverty rate estimates for 2010 have not yet been released, preliminary estimates suggest that the rural poverty rate remains in the range of 74–78%.

The government has spent over 2% of the nation's gross domestic product in supporting maize production and subsidizing inputs for farmers. So, why is it that maize production has increased so impressively without making a serious dent in rural poverty? And how should the new PF government be measuring success in agriculture?

A Disaggregated Picture: This analysis uses data from the 2010/11 Crop Forecast Survey to show how maize production has varied according to farm size. The Crop Forecast Survey is a nationally representative survey conducted annually by the government's Central Statistical Office involving roughly 13,500 small- and medium-scale households. From this survey, annual crop production estimates are produced each year by the Ministry of Agriculture and Cooperatives (now Ministry of Agriculture and Livestock).

Column A of Table 1 shows the number of farmers in five farm size categories. Overall Zambia has an estimated 1,471,221 small- and medium-scale farmers ('smallholder' farmers), defined as farmers cultivating between 0.1 and 20 hectares. Approximately 42% of them are cultivating less than one hectare of land; 33.3% of the smallholder farms are cultivating 1–2 hectares; 2.9% are cultivating 5–10 hectares, and 0.5% are cultivating over 10 hectares (column B). Farmers cultivating less than 2 hectares accounted for 75% of the total number of farmers in Zambia's smallholder farm sector.

Column C shows the estimated total maize production within each of the farm size categories over a 'baseline' period (the three years covering the 2005/06 to 2007/08 crop seasons). Column D shows the estimated maize production for these five farm size categories in the 2010/11 crop season. Overall, maize production increased from an average of 1,383,735 tonnes in the baseline period to 2,786,896 tonnes in the 2010/11 season.

Table 1. Smallholder Maize Production Growth from the Baseline Period (2005/06–2007/08) to 2010/11, by Farm Size Category

Total area cultivated (maize + all other crops)	Average number of farms, 2005/06 to 2007/08, and 2010/11	% of farms	Total smallholder maize production			
			Annual mean during 2005/06 to 2007/08 baseline period (MT)	2010/11 (MT)	Absolute change (MT) (D-C)	Change per farm (kg per farm) (E*1,000/A)
			(C)	(D)	(E)	(F)
0-0.99 ha	616,867	41.9%	212,335	309,324	96,989	157.2
1-1.99 ha	489,937	33.3%	381,293	707,438	326,145	665.7
2-4.99 ha	315,459	21.4%	490,102	1,130,527	640,425	2,030.1
5-9.99 ha	42,332	2.9%	196,848	494,719	297,871	7,036.6
10-20 ha	6,626	0.5%	103,156	144,888	41,732	6,298.4
Total	1,471,221	100%	1,383,735	2,786,896	1,403,161	953.7

Sources: MACO/CSO Crop Forecast Surveys, 2005/06-2007/08, 2010/11.

Column E shows the change in maize production over this period for each farm size category. Farmers cultivating less than one hectare contributed an additional 96,989 tonnes to national maize production in 2010/11 compared to their average maize production during the 3-year period 2005/06-2007/08. By dividing the additional maize production in column E by the number of farms in each category as shown in Column A, we derive the additional maize production per farm for each of the farm size categories, as shown in Column F. When expressed on a per farm basis, it is apparent that

farmers cultivating less than one hectare produced 157.2 additional kilograms of maize per farm in 2011. Farmers cultivating 1–2 hectares contributed 326,145 additional tonnes of maize in 2010/11, which amounts to 666 kilograms of additional maize per farm. Farmers cultivating 2–5 hectares contributed an additional 640,425 tonnes to national maize production in 2010/11, or 2.03 additional tonnes per household. The 2.9% of the farmers cultivating 5–10 hectares contributed an additional 297,871 tonnes to national maize production in 2010/11, which amounted to 7.04 tonnes of additional

maize production per farm. And lastly, the 0.5% of farmers cultivating 10–20 hectares increased their maize production in 2010/11 by 6.3 tonnes per household in compared to the earlier baseline period.

The data in Table 1 show that very little of the increase in national maize production in 2010/11 came from the bottom category of farmers (less than one hectare cultivated) even though they account for over 40% of the smallholder farms in Zambia and are among the poorest of the rural poor. Given that their maize output increased by an average of just three 50-kg bags per household between 2005/06-2007/08 and 2010/11, the national maize bumper harvest is unlikely to have resulted in significant reductions in hunger and poverty among this group of farmers. The main increase in national maize production (column E) came from farmers in the 1–2, 2–5 and 5–10 hectare cultivated area categories. When expressed in per farm terms, however, the major increases in maize production were enjoyed by farmers cultivating over 5 hectares—farm households which constitute only 3.4% of all the smallholder farms in Zambia. Table 1 clearly shows that the increase in maize production per farm is strongly related to farm size. However, the relatively small increases in average maize production

among the smallest farms is likely to have improved their food security status substantially as a result of their harvesting even a few more 50-kg bags of maize in 2010/11 than in the earlier period.

Table 2 uses the same Crop Forecast Survey data to examine the amount of subsidised FISP fertiliser received during the 2010/11 crop season by farmers within the same five categories. The number and percentage of farms in each category in 2010/11 are shown in columns A and B, respectively. The percentage of farms receiving FISP fertiliser in each category is presented in column C. Slightly over 14% of the farmers cultivating less than one hectare received FISP fertiliser in the 2010/11 crop season. The average quantity of fertilizer they received was 168 kg. Therefore, across all 596,334 households in the category, the average household received 24.1 kg of FISP fertiliser (column D). By contrast, over 50% of farmers in the 10–20 hectare cultivated category received FISP fertiliser in 2010/11, receiving 657 kg per farm. Therefore, the average amount of FISP fertiliser received by farmers in the 10–20 hectare category was 346 kg, about 14 times more per farm than those in the less than one hectare category.

Table 2. FISP Fertiliser Received (2010/11 Crop Season) and Expected Maize Sales, 2011, by Farm Size Category

Total area cultivated (maize + all other crops)	Number of farms (A)	% of farms (B)	% of farmers receiving FISP fertilizer (C)	kg of FISP fertilizer received per farm household (D)	% of farmers expecting to sell maize (E)	Expected maize sales (kg/farm household) (F)
0-0.99 ha	596,334	39.6%	14.3%	24.1	22.2	135
1-1.99 ha	499,026	33.1%	30.6%	69.3	47.7	609
2-4.99 ha	354,116	23.5%	45.1%	139.7	64.0	1,729
5-9.99 ha	49,410	3.3%	58.5%	309.7	82.1	6,613
10-20 ha	6,999	0.5%	52.6%	345.6	86.8	15,144
Total	1,505,885	100%	28.6%	77.1	42.7	950

Source: MACO/CSO Crop Forecast Survey, 2010/11.

Column E shows the percentage of households selling maize. This ranges from 22.2% among the smallest farm size category to 86.8% among the largest. In terms of quantities of maize expected to be sold, column F shows that, on average, about 135 kg of maize will be sold for every farm in the less-than-one hectare category, compared to 1.7 tonnes per household in the 2–5 hectare category, and over 15.1 tonnes per household in the 10–20 hectare category. Clearly, the benefits of the FRA maize support prices are disproportionately enjoyed by the relatively large farmers over 5 hectares, even though they constitute only 3.8% of the smallholder farm population.

Who Benefited? The past two years are a tribute to Zambian farmers: they have responded admirably to government efforts to promote maize production. Being the most important staple food in Zambia, maize surpluses contribute to food security and benefit the nation. But the smallest farmers in Zambia—those cultivating less than 2 hectares who account for over 70% of all the smallholder farms in the country—participated only marginally in the maize production expansion of 2010/11. These farmers received relatively little FISP fertiliser and sold very little maize, hence they were unable to benefit from the FRA producer price of 65,000 kwacha per bag. The farmers benefiting the most from the government's expenditures on supporting maize prices were clearly those selling the most maize.

This disaggregated picture of Zambia's maize production expansion may reveal why rural poverty rates remain so high despite the record maize harvests in the past two years. The benefits of the two main poverty reduction programmes have been enjoyed disproportionately by the larger smallholder farmers who received more subsidised fertiliser per farm and sold substantially more maize than the 73% of farmers cultivating less than 2 hectares. In fact, about 30% of the relatively poor smallholder households actually had to purchase more maize and maize meal than they

produced to meet their families' food needs and hence were adversely affected by a support price policy that raised maize prices in the countryside.

What to do? Future efforts to reduce rural poverty could focus on targeting subsidised FISP fertiliser to the smallest farmers. This would provide them with greater opportunities to produce a surplus and benefit from FRA support prices. Targeting subsidised fertiliser in this way would have a greater likelihood of reducing rural poverty.

Of course, there are other government programmes that have attempted to target inputs to poor farmers. However, their budgets have been small compared to the FISP, and the number of poor households in the less-than-two hectare category needing support is so large that some reallocation of poverty reduction funds from targeting better-off farmers to targeting poor farmers will be necessary to make serious progress in combating rural poverty.

Evidence from the Crop Forecast Survey shows that the smallest farms use fertiliser slightly less efficiently than the larger smallholder farmers. In 2011, farmers cultivating less than two hectares obtained about 9% less maize per kilogram of fertiliser applied than farmers cultivating 5–20 hectares. Hence the targeting of subsidised fertiliser to poorer farmers would be expected to have a small impact on the size of Zambia's national maize production, which may not be such a bad thing in a year in which the country is struggling to find export markets even at a major financial loss to the Treasury.

Although the timing of the national maize production expansion coincides with the ramping up of FISP and FRA activities, empirical evidence indicates that unusually favorable weather, *not* FISP/FRA activities, was the main driver of higher maize output levels during the last two crop seasons. Overall, favorable weather was responsible for 42% of the growth in total production from the 2005/06-

2007/08 baseline period to 2010/11 (Mason et al. 2011). In the era of climate change, there is increased risk of unfavorable weather. The dominant role played by weather in determining Zambia's maize production levels underscores the country's high level of vulnerability to shifting weather patterns.

A broader conclusion for the new PF government is that the FRA and FISP are very blunt tools for reducing rural poverty. Clearly a more holistic strategy is needed, one that involves raising on-farm productivity so that Zambian smallholders can profitably produce maize and other crops without government output price supports and input subsidies, promoting crop diversification, educating farmers in improved agronomic management and marketing practices, improved seed generation systems, livestock promotion programmes, and improved health and education programmes. A more holistic approach can be designed to raise the productivity of Zambian farms cultivating less than two hectares so that rural poverty can be more effectively tackled at its source.

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The Food Security Research Project is a collaborative program of research, outreach, and local capacity building, between the Agricultural Consultative Forum, the Ministry of Agriculture and Cooperatives, and Michigan State University's Department of Agricultural Economics. Comments and questions should be directed to the Food Security Research Project Director, 26A Middle way Road, Kabulonga, Lusaka: Tel +260 (21)1 234539; fax +260 (21)1 234559; email: kabaghec@msu.edu

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