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**POLICY SYNTHESIS**  
**FOOD SECURITY RESEARCH PROJECT – ZAMBIA**

*Ministry of Agriculture and Cooperatives, Agricultural Consultative Forum,  
Lusaka, Zambia*

*No. 45 (Downloadable at: <http://www.aec.msu.edu/fs2/zambia/index.htm>), July 2011*

## WHY ARE ZAMBIAN FARMERS NOT HARVESTING ALL THEIR MAIZE?

**Arthur M. Shipekesa and T.S. Jayne**

### **Key Points**

1. According to nationally representative Crop Forecast Survey data, over the past 10 years farmers have harvested between 55 and 90 percent of the area that they planted to maize.
2. In the 2009/10 and 2010/11 crop years, over 80 percent of the maize area planted by small- and medium-scale farmers was harvested, mainly due to favorable weather.
3. In 2010/11, the ratio of harvested to planted maize area was highest in Luapula, Northern and Eastern (all over 90%), and lowest in Western (56%) and Southern Province (70%).
4. The main reasons provided by Zambian farmers for not harvesting all their area planted to maize are: (i) wilting due to drought (50.6%); (ii) crop failure due to lack of fertilizer (25.6%); and (iii) floods, heavy rains, and water logging (12.2%).
5. More effective extension of moisture conserving and flood protecting agronomic practices to farmers may substantially promote maize production and yields in Zambia.

**INTRODUCTION:** The recent expansion of fertilizer subsidies, marketing board price supports, and favorable weather conditions in the 2009/10 and 2010/11 crop seasons have resulted in an impressive 65% rise in national maize production in Zambia compared to the first 8 years of the decade. Expansion in maize area planted and yield growth account for 72% of this growth. However, it is not well recognized that another factor has played a major role in this production expansion, accounting for 28% of the total maize production expansion over this period: farmers are harvesting a higher proportion of the area they plant to maize.

An increase in production of any crop over time stems from three possible sources: *yield increases*, *increased area planted*, and *increased ratio of harvested to planted area*.

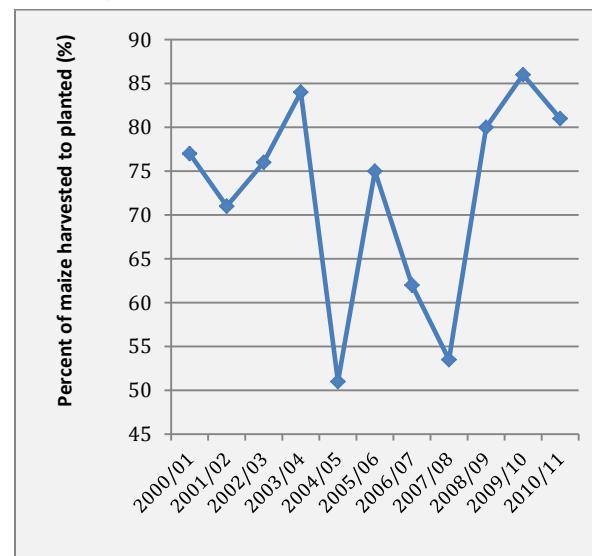
Numerous reasons arise as to why this ratio may be less than 1 for a number of farmers. However, there is very little information on why this may be the case in Zambia and the extent to which it is possible to help farmers harvest more of what they plant.

**OBJECTIVES:** The objectives of this policy synthesis are (1) to examine trends over time in the extent to which Zambian farmers harvest all of the maize they plant; (2) to examine regional variations in the ratio of area harvested to area planted; (3) to identify the reasons why farmers do not harvest all the maize they plant; and lastly (4) to identify measures that may help farmers to increase the ratio of harvested to planted area to maize

**DATA:** The study uses nationally representative household survey data drawn from the Crop Forecast Surveys (CFS), collected annually by the Central Statistical Office (CSO) in collaboration with the Ministry of Agriculture and Cooperatives (MACO). The CFS provides a comprehensive and statistically valid source of information on approximately 14,000 maize fields grown by roughly 13,000 small- and medium-scale farm households in Zambia.

**FINDINGS:** The study highlights five findings: *First*, a relatively high proportion of maize area planted was harvested in the past three years, being 86% in 2009/10 and 81% in 2010/11 (Figure 1).

**Figure 1. Trend of Maize Area Harvested to Planted, 2000/01-2010/11**



Source: CSO/MACO/FSRP Crop Forecast Survey 2010/2011

The changes in this ratio in 2009/10 and 2010/11 has accounted for 28% of the growth in maize production in Zambia compared to the prior 3 year period.

*Second*, there is substantial regional variation in the proportion of maize area harvested to area planted (Table 1). Luapula

Province had the highest ratio at 96%, followed by Eastern and Northern Provinces, with 91% apiece. Western and Southern Province had the lowest ratios, with only 56% and 70% of the area planted being harvested, respectively. Ironically, Southern Province had the greatest area planted to maize in 2010/11. Southern Province had the largest un-harvested area, 40,000 hectares more than in any other province, followed by Western Province.

**Table 1. Proportion of Harvested to Planted Hectares of Maize by Province, 2010/11**

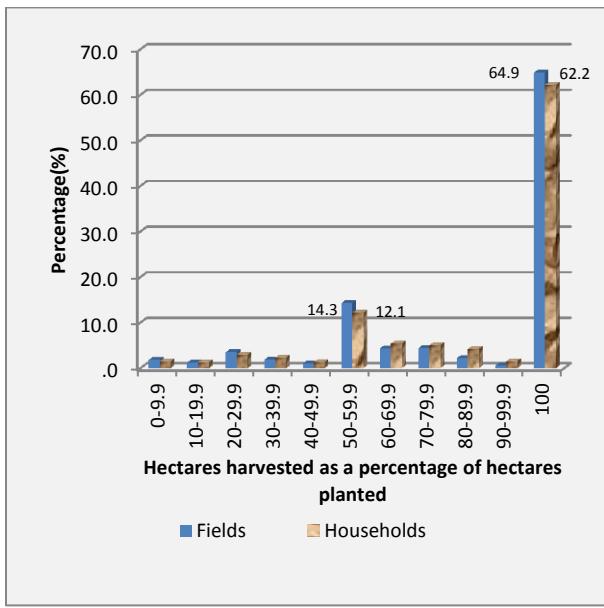
Province	Hectares planted	Hectares unharvested	Ratio=(Ha harvested/Ha planted)
	A	B	C
Central	186,881	40,576	.78
Copperbelt	97,283	13,259	.86
Eastern	307,823	27,527	.91
Luapula	43,879	1,713	.96
Lusaka	45,514	10,848	.76
Northern	151,488	13,792	.91
N/Western	72,876	8,043	.89
Southern	309,194	93,597	.70
Western	96,356	42,691	.56
<b>National</b>	<b>1,311,295</b>	<b>252,046</b>	<b>.81</b>

Source: CSO/MACO/FSRP Crop Forecast Survey 2010/2011

*Third*, 62.2% of the nation's farm households harvested 100% of the area they planted to maize in the 2010/11 season. On average, 12.1% of the farmers harvested only half of the area planted to maize. Figure 2 shows that 9.5% of the households harvested less than 50% of their planted area. Also, 15.8% of households harvested between 50% and 99% of the area they planted. At the field level, 64.9% were completely harvested, 14.3% had 50% conversion, whereas 9.3% experienced less than 50% conversion and 11.4% ranged between half and complete conversion. Therefore, the national average of area

harvested to area planted being below one is due to 36% of farmers failing to fully convert slightly over 35% of the area that they planted, rather than a symptom of most farmers failing to harvest all of the maize that they plant.

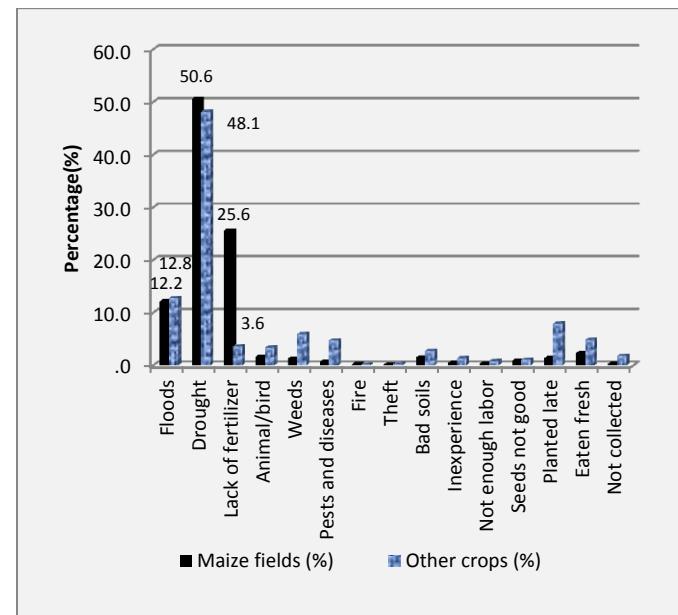
**Figure 2. Distribution of the Proportion of Harvested to Planted Hectares of Maize, 2010/11**



Source: CSO/MACO/FSRP Crop Forecast Survey 2010/2011

*Fourth*, Figure 3 shows that among the maize fields that were not fully harvested, the main reasons were wilting due to drought (50.6% of unharvested area), floods (12.2%) and crop loss due to lack of fertilizer (25.6%). These three factors accounted for over 80% of total unharvested maize area in the 2010/11 season, and over 60% of the unharvested area for all the other crops covered in the Crop Forecast Survey. In earlier years in which drought and flooding were major problems (such as in 2001/02 and 2004/05), the proportion of unharvested area due to these natural disasters rises greatly.

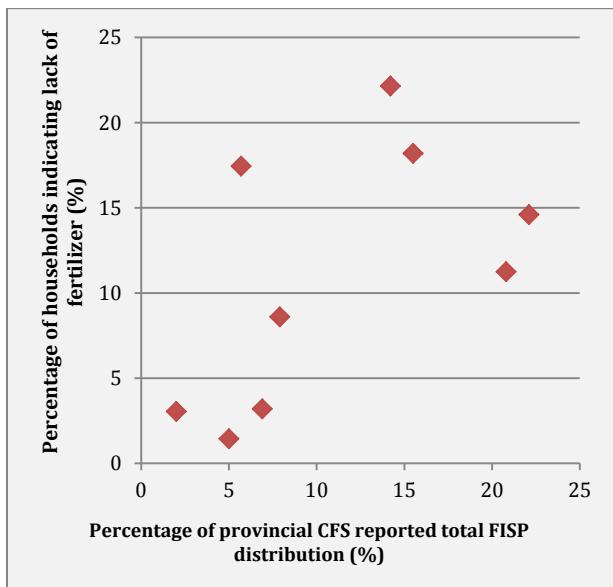
**Figure 3. Distribution of Factors Affecting Un-harvested Hectares Planted to Maize, 2010/11**



Source: CSO/MACO/FSRP Crop Forecast Survey 2010/2011

*Fifth*, the reasons why failure to acquire fertilizer leads some farmers to leave their fields unharvested requires additional research attention. There may be a perception that a failure to fertilize the field leads to such a low yield that production is not worth the harvest labor time. Late delivery of fertilizer may be another disincentive to complete conversion of the area planted. Another dimension is the possibility that this response represents a strategic response on the part of household respondents. This is observed in the correlation between the proportion of national FISP being received by the province and the proportion of respondents indicating that lack of fertilizer was the main reason for not harvesting their maize. Provinces receiving the highest proportion of FISP distribution tended to have a relatively high proportion of households indicating that the reason for their inability to harvest all their maize area planted was due to failure to acquire fertilizer (Figure 4).

**Figure 4. Total FISP Distribution and Unharvested Area Due to Lack of Fertilizer, 2010/11**



Source: CSO/MACO/FSRP Crop Forecast Survey 2010/2011

**CONCLUSIONS:** Even in the major bumper harvest of 2010/11, only 62.2% of farmers harvested all of the maize area that they planted. Farmers managed to harvest 81% of all the maize area planted in 2010/11.

The major factors contributing to less than 100% conversion was wilting due to drought, a lack of fertilizer, and flooding. A combination of floods, heavy rains and water logging was the third major reason. These factors accounted for more than 80% of unharvested area with a higher weight going to natural disasters.

Undoubtedly, a lack of fertilizer was forwarded as one of the major economic reasons behind unharvested area. This response was most prevalent among FISP non-recipients in provinces where the FISP programme was active.

**POLICY RECOMMENDATIONS:** Greater extension efforts to disseminate conservation farming and other agronomic techniques that conserve soil moisture are

likely to reduce the prevalence of farmers abandoning their maize fields due to drought. These extension efforts are likely to reap particularly big rewards in low-rainfall years such as in the early 2000s when over 40% of maize area planted went unharvested.

Moreover, extension efforts to promote agronomic practices that protect crop growth from water logging and flood damage may also pay major dividends. Especially if climate change tends to increase the prevalence of both extended drought periods as well as concentrating rainfall into more infrequent but severe bursts, there may be high payoffs to extension programmes that can put appropriate agronomic management practices into the hands of farmers. However, there has been insufficient research in Zambia on whether such techniques are profitable for most farmers. Such research should be conducted to determine whether more aggressive extension efforts are warranted and for which specific agronomic practices.

## ACKNOWLEDGEMENTS

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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) 234539; fax +260 (21) 234559; email: [kabaghec@msu.edu](mailto:kabaghec@msu.edu)

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