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Challenges of Smallholder Soybean Production and Commercialization in Eastern Province of Zambia

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Key Points

1. This study uses data from qualitative research and different national representative surveys to identify factors limiting smallholder linkages to the growing markets for soybean in Zambia and to provide concrete strategies to overcome them.
2. Soybean production remains low despite its clear benefits for smallholders. This is due to limited availability of high yielding soybean seed and limited incentive for private investment in smallholder soybean seed multiplication. Low production is also related to agronomic practices, such as late planting and poor disease management as well as low usage of yield improving inputs such as inoculum.
3. Due to low production, farmers tend to have small quantities to sell and the earliest opportunity farmers have to turn their crop into cash is when the prices are the lowest of the marketing season during harvest time.
4. There is need for more public investment in the smallholder soybean seed production and multiplication. Farmers need to be aware on the benefits of using inoculum and how to apply it in soybean production as well as improve the extension service with regard to agronomic practices. Training farmers on market identification and negotiation skills may help to overcome marketing constraints..

INTRODUCTION: Soybean offers a variety of potential benefits to the production systems, diets, and incomes of smallholder producers. In addition to being a potentially profitable cash crop, the high protein content (about 40%) in soybean means it could also contribute to improved nutritional status of rural households. Finally, soybean also has potential agronomic benefit of rejuvenating soils by fixing atmospheric nitrogen into the soil and decaying root residues improve soil fertility.

At the industrial level, soybean can be transformed into edible oils, with the by-product (cake) acting as a high quality protein source for livestock feed rations. With growing demand for high quality edible oils

and livestock products, demand for soybeans is likely to remain high.

Despite the clear benefits, smallholder soybean production remains low. Only 15% of domestic demand is supplied by smallholder farmers, while 85% comes from commercial farmers (TechnoServe 2011). In part, this may be linked to the pervasive belief among farmers that soybean markets are unreliable. However, interviews with downstream market actors suggest that there is in fact significant unmet demand for soybean in Zambia. Most processing companies do not operate at full capacity due to limited supply of soybean. This policy brief thus identifies the factors limiting smallholder linkages to the growing markets for soybean in Zambia, and provides concrete strategies to overcome them.

DATA AND METHODS: The primary data used in this study stem from qualitative research conducted in Eastern Province of Zambia. The data were collected through guided interviews with key actors at each node of the soybean value chain. In addition to qualitative research, data from different national representative surveys were used to inform our discussion.

RESULTS:

Input Supply and Production Constraints:

Soybean is cultivated in nearly all the parts of Zambia, though production levels vary. The Eastern Province leads the country in smallholder soybean production. The total soybean production in Eastern Province ranges from about 2,000MT to about 9,000MT depending on the year, while average yields have remained less than one metric tonne per hectare.

Farmers in Eastern province predominantly use recycled local soybean varieties. Of the commercial varieties used, the Magoye open pollinated variety from ZamSeed is the most common. There are several reasons for the predominance of local, recycled seed usage. First, local varieties are inexpensive, self-pollinating, and farmers say they can be recycled for more than five years with little reduction in output production per seed. Secondly, the availability of commercially produced and open pollinated seeds has been unreliable in recent years. In 2011, for example, the expectation of above-average soybean prices significantly increased farmer demand for the more productive commercial seeds. Despite the demand, commercial seed supply systems were unable to respond, leaving considerable unmet demand within the smallholder sector.

Seed contamination is also a major concern in the soybean input sector. Contamination may occur at various stages. Though the multiplication process in Zambia is regulated and inspected by the Seed Control and Certification Institute, it is still possible for farmers involved in seed multiplication to co-mingle *pure* seed with non-seed beans in order to give the appearance of greater production of

seed. According to farmers, the seed retail level is another potential source of contamination, amongst both the unregistered agro-dealers and those registered by the seed companies, though this is less frequent. Some dealers are said to go beyond contamination and actually counterfeit entire bags of seed.

A critical input in soybean production is inoculum, which enhances both production and nitrogen fixation. Unfortunately, very few farmers in Eastern Province are aware of the benefits of inoculation, and those who are aware find it difficult to acquire. At the time of data collection, the available inoculum was in liquid form which requires cold storage and has a very short shelf life, making it impractical for most rural farmers. Though the Zambia Agricultural Research Institute has developed a powder inoculum which overcomes some of the limitations of liquid inoculum (specifically the need for cold storage), it introduces the need for training farmers on the re-hydration and application of the input.

Low production is also related to poor crop management practices, such as late planting and poor disease management. For example, nearly 40% of smallholder farmer reported they did not harvest the entire area planted with soy due to late planting. The resulting low yields on those fields did not merit the cost of harvesting.

Marketing Challenges: Insofar as the market's role is to move commodities from the farm gate to the processing sector, the soybean market in Eastern Province succeeds unequivocally. It is true that farmers frequently complain about there being no market for soybean (and other commodities), but they are usually referring to the lack of a subsidized market in which they could sell to the government.¹ In reality, when a farmer puts a soybean seed in the ground there is very little risk that there will be no one to buy the

¹ The belief that the market for soybean is less certain discourages adoption and despite the efforts of cotton companies in promoting crop rotation, cotton farmers are sometimes reluctant to rotate because they believe cotton is more lucrative than soybeans (at least in the short run.)

beans come harvest time. It is rather more likely that buyers will be clamoring to be the first in line to buy the crop. That said, if the soybean market is to be used as a potential pathway to smallholder income generation and poverty alleviation, the constraints are considerable.

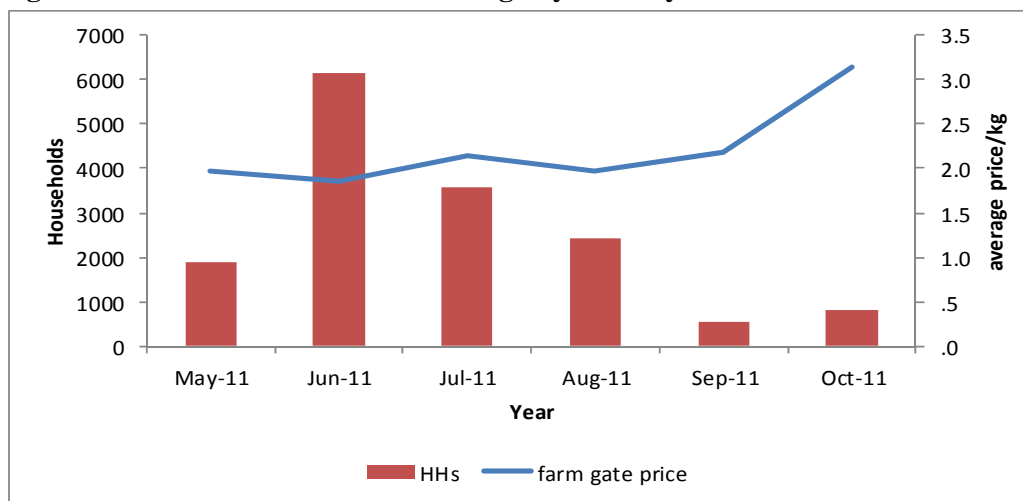
Firstly, there is strong anecdotal evidence of positive correlation between poverty and the apparent discount rate for cash; the poorer a household is, the more likely they would rather have a little money now than substantially more money later. Furthermore, the earliest opportunity farmers have to turn their crop into cash is when the prices are the lowest of the marketing season during harvest time (Figure 1). These factors combine to form what can be described as distress sales whereby the poorest farmers sell their products at the earliest possible moment in the marketing season and at the lowest prices (and thus, remain the poorest). Figure 2 further shows the bulk (about 70%) of the total marketed volume is sold during the first three months after harvest (May-July). By the time the prices start to increase, farmers are left with only 15% of the marketed volume and only wealthier farmers supply soybean during

this period. This implies that the benefits of higher prices do not accrue to poorer households. This is a recurrent phenomenon for most crops in Zambia.

Secondly, poorer farmers tend to have small quantities to sell. Most farmers do not produce a sufficient amount to justify transporting to potentially more remunerative markets in the district capital where buyers are willing to pay a premium on bulk purchases. About 80% of smallholder farmers who grow soybean sell less than 500 kilogram (10 by 50 kg bags) of soybeans (Figure 3). Thus again, only the wealthier farmers (those selling the most) receive the highest prices for their crop.

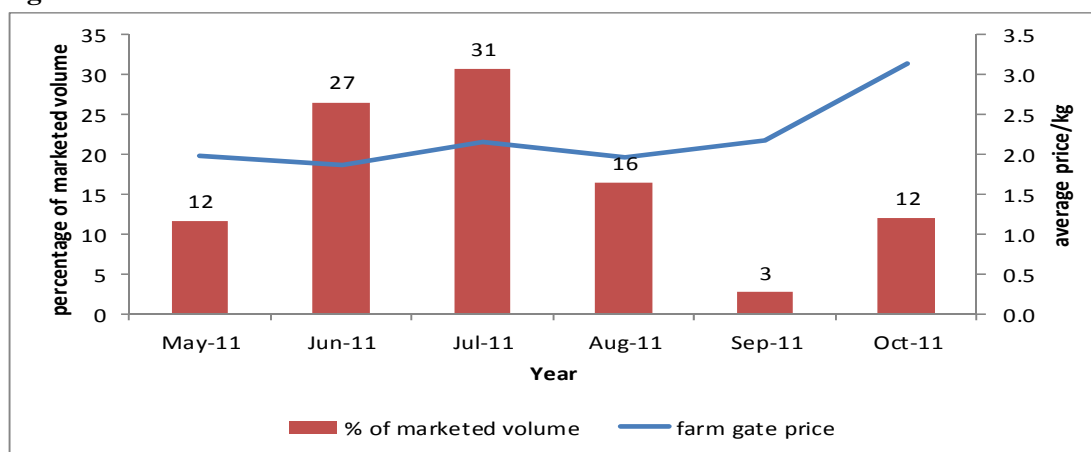
Finally, there is a large amount of distrust between farmers and traders, and it flows in both directions. More often than not, farmers complain of rigged scales whereas traders claim that scales are checked and certified by the government officials annually. Farmers complain that a scale can measure a 50kg bag for as little as 30kg. While there is certainly a possibility of scale rigging, this could also stem from a lack of understanding about differing grain weights by volume.

Figure 1. Number of Households Selling Soybeans by Price Movement



Source: IAPRI/CSO/MAL 2012.
Prices are in kwacha rebased.

Figure 2. Price Movement and Marketed Volume



Source: IAPRI/CSO/MAL 2012.

Prices are in kwacha rebased.

Figure 3. Cumulative Percent of Households by Kilogram of Soybeans Sold



Source: IAPRI/CSO/MAL 2012.

Specifically, a 50kg bag is meant to hold 50 kg of maize, while the same volume of soybean very likely does have a different weight. Traders, on the other hand, claim that scales are rigged to favor the farmer, if anything, to promote loyalty. This could be a tactic to attract sellers without initiating a price war, or perhaps violating any collusive price agreements that may exist (we acknowledge suspicion of such collusion, but can confirm none).

Traders, on the other hand, complain that sacks are frequently loaded with sand or stones to increase their weights, and that such tampering is only evident after purchases have been made and are untraceable. Other than buyer's discretion, there is no enforced

grading system in place to dis-incentivize weighting bags. These institutional inadequacies impose transfer costs and rents that are disproportionately captured by dishonest market actors. The honest farmer will get the same price for a pure kilogram of soybean as a dishonest farmer will get for a kilogram diluted with sand and stones. Furthermore, this price is lower than what they would get for a certifiably pure kg of soybean, because the traders assume that some of the farmers are dishonest. Therefore, the dishonest farmer gets a price slightly higher than the actual value of what they are selling, at the expense of the honest farmer who gets a slightly lower price than their product is worth.

Buyer's discretion is not sufficient to solve this issue, because traders prefer to act quickly and buy as much as they can in a given day. In other words, because buyers can factor their risk into the price paid to farmers, they largely accept that some sacks will be diluted and focus on purchasing the largest quantity possible.

CONCLUSION: Evidence presented in this brief raises several critical issues that need to be considered in addressing the challenges of smallholder soybean production and marketing in Zambia. Based on the challenges highlighted, the following are suggestion for improving the input supply, production and bean marketing. First, there is need to engage the seed producers and agro-dealers on forecasting demand for both soybean seed and inoculum. Second, there is need to promote awareness of smallholder rights under the Laws of Zambia Seed Act and ensure the government's ability to enforce rules on sellers that are in violation. Third, farmers need to be aware on the benefits of using inoculum and how to apply it in soybean production as well as improve the extension service with regard to agronomic practices. Private sector-led out grower schemes, increased investment in public research, development, and extension, or, more likely, some combination of the two could significantly help to overcome these constraints.

To address the challenges associated with grain marketing, the following options may be considered: First, work with farmers on local bulking for onward sale. In recent years, there has been increased advocacy for farmers to collectively market as a way to reduce transaction costs, especially in areas where public infrastructures are poorly maintained. Alternatively, privately organized out grower schemes could also serve the same function. Second, regulation against weight and scale tampering needs to be enforced more often and spot check of equipment less predictable to infuse greater trust in the market.

Lastly, there is need to focus efforts on improving farmers' capacity to engage with the already existing market through training on negotiation, market identification, bulking, and storage.

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