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UNDER WHAT POLICY AND MARKET CONDITIONS WILL MALAWI'S SMALLHOLDER FARMERS SWITCH FROM TOBACCO TO SOYABEAN?

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Malawi relies heavily on burley tobacco for export earnings, which makes the country's economic growth vulnerable to climate-related shocks and global market trends. In the last few years, government has identified oilseeds as an alternative export crop that could also address dietary deficiencies and improve soil fertility. Among oilseeds, soyabean has strong domestic and regional demand and is especially well-suited to Malawi's agronomic conditions. It is also a crop Malawi's farmers already know how to grow. Yet Malawi's farmers have been reluctant to increase soyabean production relative to other crops.

This may be because of volatile returns to soyabean production, especially due to unstable soyabean prices. From 2009 to 2013, prices for soyabean were 25 percent more volatile than tobacco prices and 28 percent more volatile than those of groundnuts, despite soyabean yields being less variable on average than those for the other two crops over this period. When returns are unpredictable, smallholder farmers tend to devote more land to low-value food staples and less land to potentially higher-value, but riskier non-staple crops (Fafchamps 1992; Alwang and Siegel 1999; Barrett 2008). And indeed, Malawi's farmers devote a majority of their land to maize, mostly for own consumption (Benson and Edelman 2016; Pauw and Edelman 2015).

Policy wise, soyabean competes with crops that receive strong public and private sector support, especially maize and tobacco. Through its Farm Input Subsidy Program (FISP), Malawi provides beneficiary farmers with 100 kg of subsidized fertilizer, 5 kg of hybrid maize seed, plus 2 to 3 kg of improved seed for legumes, including common bean, cowpea, pigeonpea, groundnut, and soyabean. Through contract farming arrangements, tobacco firms provide input loans to smallholder farmers that can be repaid after harvest. In contrast, few private or public institutional incentives exist for soyabean production.

So how would farmers respond in terms of the mix of crops they produce if faced with more stable soyabean returns or if provided with input loans for soyabean production? Would they expand soyabean production and rely less on tobacco? In this policy note, we explore key findings from a farm-level analysis of smallholders' crop choice under different policy and risk scenarios.

METHODOLOGY

We examine smallholder farmers planting decisions for five major crops – maize, tobacco, common bean, groundnut, and soyabean – using a farm-level risk model (Hazell and Norton 1986). This model simulates the impact that different policies could have on the planting decisions of risk-averse farmers. The model uses micro-level data from a variety of sources, including field visits, expert interviews, and secondary data sources from two districts in central Malawi with strong potential for soyabean production, Lilongwe and Mchinji.[1] To account for the smallholders' primary concern for household food security, we assume that farmers will always allocate an adequate amount of land to produce sufficient quantities of maize for home consumption.

The policy scenarios include: (a) reducing the volatility of farm gate soyabean prices by 25 percent; and (b) introducing a loan package for soyabean inputs. We conduct these simulations both without and in the presence of a loan package for tobacco inputs – an incentive quite common in Malawi (Prowse, 2011). This allows us to study competition or complementarities between individual policies for soyabean and tobacco. The two study districts allow an assessment of how sensitive the simulation results are to current levels of price uncertainty. Lilongwe historically has experienced low soyabean price volatility, while prices in Mchinji have been relatively much more volatile.

FINDINGS

Figure 1 shows the amount of land that smallholder farmers in Lilongwe and Mchinji districts allocated to different crops under existing conditions (*Base*) and under the four policy scenarios simulated. The average incomes farmers earn under each of these scenarios are also shown in corresponding tables. In the *Base* case, farmers in Lilongwe allocate about 0.5 ha of their land to maize, another 0.5 ha to groundnuts, and 0.85 ha to soyabean. In contrast, in Mchinji where farm size and income are slightly higher, just under 0.5 ha is planted to maize, more than 1.0 ha to beans, 0.7 ha to groundnut, with the remainder to tobacco. In the *Base* case for each district, no tobacco is grown in Lilongwe and no soyabean in Mchinji.

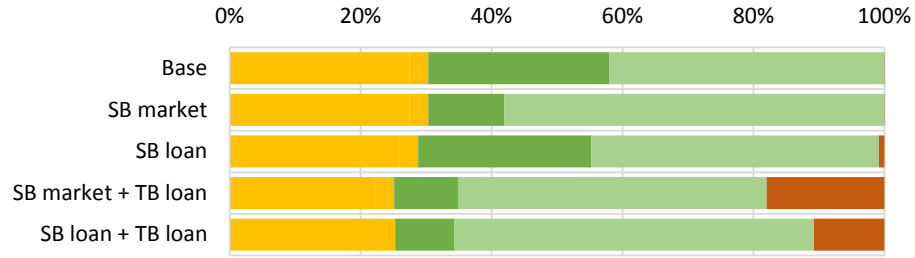
When soyabean price volatility is reduced by 25 percent in the *SB market* simulation, farmers in Lilongwe expand the cropland that they allocate to soyabean (SB) by approximately 40 percent, primarily displacing groundnut in doing so. In Mchinji, where soyabean prices are relatively less stable to begin with, farmers increase the amount of land they allocate to soyabean from nothing to 0.15 ha on land previously allocated to tobacco and bean. Incomes change little as a result, but are more stable due to more predictable prices. The contrasting results between the two districts derive from relative price risk. In Lilongwe, because the prices of other crops, especially tobacco, are more volatile than the price of soyabean in the *Base* case, farmers benefit relatively less from reduced soyabean price volatility. Farmers in Mchinji, on the other hand, benefit more from more stable soyabean prices since soyabean prices start out more volatile than the prices of the other commodities in their crop mix.

[1] Although Mzimba was also included in our study, we exclude results from the district in this policy note for brevity. Farmers in Mzimba only choose to plant soyabean in limited circumstances. Please refer to the full paper for these results.

Figure 1–Soyabean policy simulation results

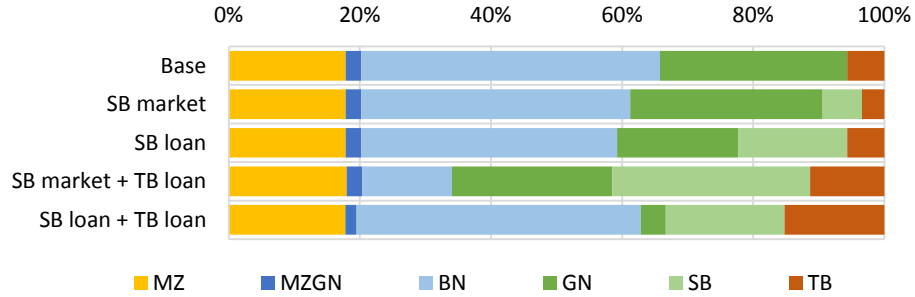
a) Area allocation (share of total area cultivated) b) Average farmer income

Lilongwe District



	Income (MK ,000)
Base	259
SB market	250
SB loan	276
SB market + TB loan	335
SB loan + TB loan	317

Mchinji District



	Income (MK ,000)
Base	357
SB market	362
SB loan	388
SB market + TB loan	439
SB loan + TB loan	421

Source: Authors' estimates

Note: BN=common bean; GN = groundnut; MZ=maize; MZGN=maize/groundnut intercrop; SB = soyabean; TB=tobacco. Income results are in constant 2014 Malawi kwacha (MK). Average cropped area for smallholder farmers in Lilongwe district is just over 2.0 ha, while in Mchinji district it is slightly larger at 2.4 ha.

Soyabean input loans, as examined in the *SB loan* simulation, also increase production and incomes in both districts, but much more so in Mchinji than in Lilongwe. One reason for this result is that, by enabling them to intensify soyabean production through fertilizer provided in the loan package, soyabean yields in Mchinji increase to a point that offsets the relative price risk compared to other crops. Moreover, we observe that the increased land allocated to soyabean in fact comes at the expense of groundnut, a crop with more stable prices. In contrast, farmers in Lilongwe district behave much as they did in the *Base* case, because soyabean was already a safe bet. Consequently, they intensify production on land already allocated to soyabean, but change their overall land allocation across crops very little.

It is also important to consider soyabean interventions alongside existing incentives for tobacco production in Malawi. As seen under the *SB market + TB loan* simulation, when soyabean prices become more stable for farmers already receiving tobacco input loans, soyabean production and incomes increase. This is notably the case for farmers in Mchinji compared to the case with no tobacco input loans. In Lilongwe, soyabean production does not increase as much under this scenario, but incomes do. As in the case without the tobacco input loan of the *SB market* simulation, farmers in Mchinji district see greater benefit from less uncertain soyabean prices, since soyabean prices there are more volatile to begin with.

When the two input loan packages are combined in the *SB loan + TB loan* simulation, land allocated to soyabean by farmers in Mchinji does not change much relative to the case with no tobacco loan in the *SB loan* simulation. However, farmers in Lilongwe plant 25 percent more soyabean than when there is no tobacco loan. Incomes in both districts are higher relative to the *Base* scenario and the scenarios with no tobacco loans. Tobacco production increases slightly in Lilongwe but more in Mchinji as a result of the combined effect of differing price volatility patterns and labor requirements between the two crops. The tobacco input loan encourages tobacco production, but tobacco also requires more labor than soyabean. So when provided with an incentive to produce both tobacco and soyabean, farmers in Lilongwe prefer to allocate their remaining labor to soyabean, which is less labor demanding and has more predictable returns, at least compared to tobacco. In contrast, in Mchinji, farmers allocate even more land and labor to tobacco, as soyabean prices there are more volatile than in Lilongwe district.

The combination of soyabean and tobacco loan packages, when compared to the situation when only the tobacco loan package is present, produces varying results between the two locations. In Lilongwe, farmers choose to allocate more area to soyabean and less to tobacco, while in Mchinji they allocate more to tobacco and beans than to soyabean. The reason why the effects of the addition of the soyabean loan package vary is that, when given an incentive to produce both crops, farmers must choose how to allocate labor and land resources between them, weighing in the availability of labor and the risky nature of crop incomes. In Lilongwe district, farmers allocate more land to soyabean than tobacco simply because soyabean is a safer bet and is easier to grow, in that it requires less labor than tobacco. In Mchinji, where soyabean is far riskier than tobacco due to relatively high volatility in soyabean prices, farmers instead allocate more land and labor to tobacco than to soyabean.

DISCUSSION AND POLICY RECOMMENDATIONS

Our model results indicate that more stable soyabean prices and soyabean input loans can increase soyabean production and smallholder incomes in Malawi. Furthermore, by freeing up resources for more intensive production, we find that the presence of an existing tobacco input loan program does not diminish the effect of these interventions. Indeed, in some cases, the tobacco loan amplifies the effect by freeing up both land and cash resources for even more intensified soyabean production.

Policy makers should therefore study pilot programs that have been designed to provide input loans to soyabean farmers in order to determine how best to **create the conditions for the private sector to expand these pilots where they have proven successful.** More research is needed to identify which models will work best in different farming contexts in Malawi.

Government should also act to ensure more stable markets for export crops and, thereby, provide greater incentives for farmers to diversify into soyabean and other crops. One easy way to do this is to simply **refrain from arbitrarily introducing discretionary or ad hoc trade policies** that can significantly increase market uncertainty. While Malawi has promoted soyabean exports since 2013, in the past it has imposed temporary bans on soyabean exports. Government still possesses the power to introduce an export levy on soya or reinstate export bans in the name of value addition. The risk that government may act in this way increases the risks that soyabean producers face related to obtaining prices for their crop that are sufficient to provide them with an acceptable financial return.

Recent research shows that an export levy on oilseeds would actually reduce the domestic supply of oilseeds and value addition in the long run (Aragie et al. 2016). Such an ad hoc export levy or ban would also increase uncertainty and discourage production in the oilseeds sector. Highly discretionary and uncertain policy environments are known to contribute to price instability as has been shown for maize in Malawi, for example (Chapoto and Jayne 2009). Predictable policies and stable prices, therefore, can help all actors along the soyabean value chain – from farmers and aggregators to processors and exporters – to better plan their activities and investments.

Malawi has the potential to reorient its smallholder agriculture away from being primarily directed towards assuring household subsistence and self-sufficiency to increased commercial production, including of soyabean. This shift would reduce the country's reliance on tobacco and diversify its agricultural production and exports. As a legume, furthermore, soyabean would also have the additional benefit of improving soil health, through biological nitrogen fixation and crop rotations, and child nutrition, if the nutritious soyabean is consumed at home or increased income from soya sales is used to provide children with more diverse and healthier diets. But this reorientation will require that government creates the conditions for private sector to invest in the increased production of soyabean, both through the support of input loan packages and a more stable marketing environment for the crop.

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