

Are Fertilizer Subsidies in Malawi Value for Money?

Joachim De Weerd and Jan Duchoslav

It is easy enough to calculate how much the Government of Malawi spends on subsidizing chemical fertilizer. Last year, for example, this was MWK 120 billion (about US\$ 150 million) taking up over 50% of the agricultural budget. It is much harder, however, to calculate the benefits that these subsidies bring about and how they stack up against the costs. In this policy note, we combine multiple methods and sources of data to narrow down the range of possible benefit estimates, compare it to the cost of subsidies, and propose changes to current policies to make fertilizer subsidies more efficient and affordable.

We first look at recent agronomic data on yield responses to determine how much additional Kwacha output each farmer produces per Kwacha of subsidized input under ideal conditions. Second, we use nationally representative farming household survey data with detailed information on both fertilizer use and yield to calculate likely benefits under normal conditions. We find that for every Kwacha spent on fertilizer, less than 8 Tambala worth of maize is produced on average. It costs MWK 3,236 to turn fertilizer into a kilogram of maize, while that same kilogram of maize can be imported 5 times more cheaply at a total cost of MWK 600.¹ Rising prices of fertilizer and decreasing yield response rates will make the situation even worse.

Fortunately, not all farmers are unproductive. While some cannot turn fertilizer into maize productively, others can, and they typically know it about themselves. If given the choice between receiving a fertilizer subsidy or a cash transfer, productive farmers will choose the former while the unproductive ones will choose the latter. By giving farmers this choice and ensuring that contracts to import the resulting shortfall of maize are in place, the government would spend less money on ensuring the country's food security than by subsidizing inputs for everyone. In a situation where foreign exchange reserves are low, this would be a prudent course of action.

Yield response to fertilizer is low in Malawi

One way of valuing the benefit of fertilizer is to ask how much extra maize the farmer can expect to harvest after applying this fertilizer. There are some good estimates of nitrogen yield response rates in the literature, which can provide insight into this ([Burke et al., 2021](#)). In the most recent one, [Burke et al. \(2020\)](#) estimate the average yield response to nitrogen under ideal conditions in the Central Region of Malawi to be 2.6 kg of maize per kg of nitrogen. Under less-than-ideal conditions, the estimated yield response is as low as zero. Given the nitrogen content of the formulations of

fertilizer supplied through the current subsidy program and the estimated yield response, a farmer who applies the two bags of fertilizer that she is entitled to (50 kg of urea and 50 kg of NPK 23:10:5) can expect to produce 72.5 kg of maize more than had she not applied the nitrogen. Under suboptimal conditions, such as in seasons with poor rainfall or in poorly managed farms, the additional production resulting from the same nitrogen application would be even less and start converging to zero.

The agronomic data give insights in the response to nitrogen, but do not inform on the response to other components present in the subsidized fertilizer (phosphorus and potash), nor to the extent to which application of the subsidized fertilizer reduces application of non-subsidized fertilizer. Furthermore, the careful and accurate measurement underlying these studies tends to come at the expense of nation-wide representativeness. We overcome some of these problems, by using nationally representative survey data from the four-round panel component of the Integrated Household Survey (IHS) to estimate not only how fertilizer application improves agricultural yields under real conditions, but also to what extent fertilizer subsidies increase application rates and hence how fertilizer subsidy affects production levels. Between 2010 and 2019 when the data was collected, applying 100 kg of chemical fertilizer increased maize production on average by 30.9 kg, which is somewhere between the estimates of nitrogen yield response under ideal and non-ideal circumstances coming from the agronomic data. However, because subsidies crowd out private purchases, subsidizing 100 kg of fertilizer increased fertilizer application by only 31.6 kg. Combined with the low yield response rate to fertilizer, this makes the effect of the subsidy on maize production statistically indistinguishable from zero.

Importing maize is cheaper than importing the fertilizer to grow it

What does this mean in monetary terms? The numbers above imply that at the current fertilizer price of around MWK 50,000 per 50 kg bag, producing an additional kilogram of maize by applying chemical fertilizer costs between MWK 1,379 under ideal conditions and MWK 3,236 under real-life conditions.

The only alternative to producing maize domestically is importing it from abroad. How do these two compare monetarily? At current maize and freight prices, it would cost MWK 600 to import a kilogram of maize, which is up to 5 times cheaper than converting imported fertilizer into maize. As prices of fertilizer rise (which they are expected to do this year), this comparison will become even further skewed in favor of maize imports.² Rather than subsidizing fertilizer, the government would be better off securing future contracts for maize imports and giving people cash to buy imported maize. This would reduce the cost of ensuring a sufficient supply of maize in the country 3 to 5-fold.

Subsidizing productive farmers

On average, for the country as a whole, subsidies do not give value for money: Malawi pays more for fertilizer than the value of extra production that the fertilizer realizes. But not all farmers are average. Some are better than others at turning fertilizer into maize. Targeting subsidies at the most productive farmers could bring their cost-effectiveness on par with maize imports. However, experience from past years shows that targeting subsidies is costly and distinguishing between productive and unproductive farmers is difficult ([Asfaw et al., 2017](#); [Basurto, Dupas and Robinson, 2020](#); [Kilic, Whitney and Winters, 2015](#)).

Fortunately, the government does not need to take on this task alone – farmers themselves can help. In fact, they are already moving subsidized fertilizer from unproductive farmers to productive ones. Having spoken to 1,845 farmers from 892 villages across Malawi between May and June

2022, we have documented a thriving secondary market for subsidized fertilizer (see Box). During the 2021-22 growing season, farmers across the country sold their entitlement to two subsidized bags of fertilizer to others for an average price of MWK 15,000. Immediate cash needs and problems navigating the system can explain some of these transfers, but evidence from Tanzania shows that less productive farmers end up selling to more productive farmers in such secondary markets ([Giné et al., 2022](#)).

Secondary market for subsidized fertilizer

In the 2021/22 farming season, many farmers who were eligible to buy two bags of subsidized chemical fertilizer preferred receiving cash and sold their entitlement. To do this, a farmer would typically lend her national ID to a trader for an average fee of MWK 15,000. The trader would use the ID to buy the two bags of fertilizer at a subsidized price of MWK 7,500 per bag and resell at an average price of MWK 26,000 per bag to another farmer who required more fertilizer than the two bags subsidized by the government. The discount compared to price on the primary fertilizer market, which was between MWK 30,000 and 35,000, would be necessary to ensure a quick sale, because the small traders who are typically involved in this business lack capital and need the proceeds from the sale to repeat the operation with the next farmer willing to rent her ID.

Taken together, this evidence leads to two important and reasonable conjectures. First, farmers know how productive they are at turning fertilizer into grain. Second, unproductive farmers prefer receiving cash over an input subsidy. This implies that if given the choice between a subsidy and a cash transfer, productive farmers will likely choose the subsidy, while unproductive ones will choose cash. A program that would explicitly give farmers this choice, rather than imposing the subsidy, would therefore take the best of the two worlds without the need for costly, imprecise targeting ([De Weerd and Duchoslav, 2022](#)): it would provide fertilizer to those farmers who can make productive use of it, and cash to buy (imported) maize to those who cannot.

How can policy respond?

There are productive and unproductive farmers. It makes no sense to give fertilizer subsidies to unproductive farmers. They are better off with cash. If farmers are allowed to choose between fertilizer subsidy and cash, those who are good at turning fertilizer into maize will choose the subsidy while those who are not will choose the cash, which will allow them to buy food on the market. This is the best short-term response to the emergency that Malawi is facing. Right now, importing maize and giving unproductive smallholders the cash to buy it is more cost-effective than subsidizing fertilizer for everybody.

Continued reliance on imported food is not a sound strategic and sustainable long-term solution for an agriculture-based economy like Malawi. In the medium-term, it will be important for Malawian farmers to improve the response of their yields to fertilizer. To facilitate that, the government will need to invest in soil health, agricultural extension, and research, as has been discussed at length by [Chadza and Duchoslav \(2022\)](#), [De Weerd and Duchoslav \(2022\)](#), and [Nyondo et al. \(2022\)](#).

In the long-term, it will be necessary for productive farmers to move from subsistence to commercial agriculture, and for unproductive ones to move out of agriculture altogether. This will require phasing out subsidies that nudge farmers to produce maize while there are more lucrative crops to grow. To entice farmers away from maize production, however, maize markets need to be fixed in Malawi. What this will take is well-trodden ground: regional integration and rules-based government interventions ([Pauw and Edelman, 2016](#); [Benson, 2021](#)).

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ENDNOTES

¹ This is the New Orleans FOB price to which we added freight costs and port fees. Imports from South Africa would be cheaper. Domestically sourced maize would be cheaper yet, but commercial farmers in Malawi are unlikely to have sufficient production capacity.

² The comparison would become less skewed in favor of importing maize if global prices of grain were to keep increasing. However, current prices of future contracts indicate that markets no longer expect much growth in maize prices in the next 18 months. Even if grain prices were to increase, fertilizer prices would likely follow, neutralizing this effect.

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