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Pricing farmer contributions under AIP

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The government can set the farmer contribution to fertilizer subsidized through the Affordable Input Programme (AIP) so that farmer demand for the commodity matches available supplies under the program. For any given budget dedicated to subsidizing fertilizer, this approach will maximize food security gains through two distinct channels. First, it will maximize the total amount of subsidized fertilizer that can be distributed under the allocated budget. Second, it will maximize the additional food generated through the subsidies by ensuring each subsidized bag of fertilizer has the largest possible yield response. This policy note discusses the first advantage. A companion policy note (Banda et al., 2022) discusses the second advantage.

By adopting this pricing mechanism, the government can achieve the phase-out of the AIP, to which it has recently committed (Sabola, 2022), efficiently through a gradual reduction in allocated budget and a commensurate increase in farmer contribution.

Introduction

The market price of fertilizer in Malawi has, in nominal terms, more than tripled compared to two years ago. The price hikes were both unexpected and beyond the control of the government, linked to global events, such as the COVID-19 pandemic and Russia's invasion of Ukraine.

This changed global reality reinforces the need to rethink the way in which Malawi approaches its agricultural input subsidies. A number of options for reforming the AIP have been outlined in recent policy work, but all have medium to long term implementation horizons. We will not repeat these here and instead refer the interested reader to Chadza and Duchoslav (2022), De Weerdt and Duchoslav (2022), and Nyondo et al. (2022).

This policy note discusses a strategy that can be implemented readily and immediately, potentially still this year, to ensure that the budget allocated to fertilizer subsidies has the highest possible effect on food security in the country.

It also discusses how the strategy, once adopted, can be used to phase out the AIP, while ensuring allocative efficiency within the program. This can be achieved by, each year, fixing the budget at a lower point and conducting the same optimization exercise.

Fertilizer status update

It is surprisingly difficult to obtain precise information on the amount of fertilizer available for the AIP. The first four rows of data in Table 1 summarize our best guess, compiled from multiple sources, of the fertilizer the government currently has access to outside the private market: 31,500 MT of urea purchased by SFFRFM earlier in the year at a cost of MK 29 billion, a donation of 10,000 MT of monoammonium phosphate from the government of Morocco, which will be blended with other privately sourced inputs into 52,000 MT of NPK at a cost of MK 40 billion, 20,000 MT of NPK confiscated in the Netherlands due to European Union sanctions against Russia and subsequently donated to Malawi via the World Food Programme (WFP). The government further intends to purchase 10,000 MT of NPK and 10,000 MT of urea using a grant from the African Development Bank (AfDB). If these numbers are correct, the government will have access to around 82,000 MT of NPK and 41,500 MT of urea. Some of this is in country, some in transit and some will still need to be blended upon arrival. All these factors influence when we estimate the fertilizer to be available to the farmer (column 2). At current availability, the AIP is unlikely to be able to serve more than 630,000 beneficiaries before the end of December.

Stated government commitments

The government has recently confirmed a number of commitments. First, it will offer 2.47m AIP beneficiaries one 50kg bag of NPK and one 50kg bag of urea. The program will therefore require 123,500 MT of each kind of fertilizer. Second, the farmer contribution to each bag shall be MK 15,000. Third, the budget allocated to the AIP, MK 109.4 billion, shall be respected. Juxtaposing these three commitments with the fertilizer situation as described in Table 1, we note a serious problem.

Table 1: Fertilizer availability and cost

	Availability (MT)			Cost to government (MK billion)	
Source	**When**	**NPK**	**Urea**	**Gross**	**Net**
In country					
SFFRFM	now		31,500	29.0	20.5
In transit					
Morocco	Nov-Jan	52,000		40.0	26.0
WFP	Jan or later	20,000		0.0	-5.4
AfDB	Jan or later	10,000	10,000	0.0	-3.4
Total available		82,000	41,500	**Total spent**	37.7
Shortfall		41,500	82,000	**Remaining budget**	57.9
Total required		123,500	123,500	**Total budget**	95.6

Notes: The total requirement is for 2.47 million beneficiaries receiving 50kg of NPK, 50kg of urea, and 5kg of seed each. Net cost excludes farmer contribution and includes MK30,000 per MT transport distribution costs within Malawi. The total budget available for fertilizer purchases (MK 95.55 billion) is based on the total AIP budget as appropriated by parliament (MK 109.4 billion) less the expected government contribution to AIP seeds for 2.47 million beneficiaries (MK 12.4 billion) and AIP goats for 30,000 beneficiaries (MK 1.5 billion). **Source**: Since the government does not publish official figures on the availability inputs under AIP, the reported figures have been compiled by the authors from multiple sources including the African Fertilizer and Agribusiness Partnership (AFAP), the Minister of Agriculture (Kawale, 2022), The Nation newspaper (Singini, 2022), and the WFP. They are reported to the best of the authors' knowledge, but they may not be entirely complete or accurate.

Once the government recovers MK 15,000 per bag from farmer contributions, the net cost of the 123,500 MT that is in country or in transit will be MK 37.7 billion,[1] leaving MK 57.9 billion (column 6)

to source the remaining 123,500 MT of fertilizer if the AIP is to stay within budget (around MK 95.6 billion available for fertilizer purchases and distribution out of the total AIP budget of MK 109.4 billion).

Plugging the shortfall: donations or private market?

Factoring in the farmer contribution of MK 15,000 per bag, the additional fertilizer would have to be sourced at an average price of MK 38,500 per bag. The current commercial retail price for a bag of fertilizer is close to MK 75,000 in Malawi. Fertilizer can be procured cheaper abroad, but transport and distribution costs will bring the final price back close to the local retail price. The government may be able to get a slightly better price by purchasing in bulk, but the negotiated discounts will not be of this order of magnitude. Unless an unknown benefactor arrives on the scene with free or cheaper fertilizer, the government will have to turn to the private market to purchase the fertilizer, in which case MK 57.9 billion would be able to buy only about 48,500 MT of fertilizer, only reducing the shortfall from 123,500 MT to 75,000 MT. Under such a scenario, the AIP would only be able to serve 1.7 million beneficiaries instead of the intended 2.5 million (Table 2).

Note that if farmer contribution remained at last year's MK 7,500 per bag, only 1.5 million beneficiaries could be served by the program, so the doubling of farmer contribution to MK 15,000 per bag is a step in the right direction. However, more can be done, as we show below.

Table 2: AIP fertilizer shortfall

Farmer contribution (MK)	Total fertilizer in AIP assuming no further donations (MT)	Number of beneficiaries the AIP can serve assuming no further donations	Donations needed to reach 2.5m beneficiaries (MT)
7,500	152,663	1,526,630	94,337
15,000	171,746	1,735,890	75,254
20,000	187,359	1,893,700	59,641
25,000	206,095	2,083,070	40,905
30,000	228,994	2,314,520	18,006
33,280	247,000	2,470,000	0
35,000	257,619	2,603,830	0

Source: Authors

Relying on further donations to plug the shortfall of 75,000 MT is a precarious strategy. Even if they can be secured, which is far from certain, they are likely to arrive too late to be useful to farmers who need to apply basal fertilizer (NPK) now and top-dressing fertilizer (urea) in a few weeks' time. Procuring the shortfall commercially on international markets would carry the same time penalty. Procuring as much of the shortfall fertilizer as possible on the domestic market would, on the other hand, make it available almost immediately. This could be achieved by increasing the level of farmer contribution, which would reduce the net cost of the fertilizer that has already been secured and thus increase the amount of fertilizer that the program could afford to purchase at market prices. If farmers contributed MK 33,280 per bag, the program could afford to purchase all shortfall fertilizer at market prices without relying on uncertain donations (Table 2).

What can farmers pay?

Can enough farmers afford to contribute MK 33,280 per bag? Probably not. We phoned 1,390 farmers to ask them how many bags of NPK and urea they would buy at different price points, ranging from MK 5,000 to MK 110,000 (current market prices lie around MK 75,000). Interpolating from the

numbers thus obtained, Table 3 shows, for each farmer contribution level, how many households would be willing to participate in the program. This can be contrasted with the next column showing the number of beneficiaries the program can afford to serve with 2 bags each. The last two columns contrast, per farmer contribution level, total demand in the country (in MT) to total supply under AIP. In that last exercise we assume households are allowed to purchase more than 2 bags each.

Table 3: Balancing fertilizer supply and demand, assuming no further donations

Farmer contribution (MK)	Interested beneficiaries	Number of beneficiaries the AIP can serve assuming no further donations	Total unrestricted demand (MT)	Total subsidized supply (MT)
7,500	3,661,200	1,526,630	775,030	152,663
15,000	3,172,580	1,717,460	542,843	171,746
23,807	**2,470,000**	2,012,940	339,806	201,294
27,621	**2,174,950**	**2,174,950**	282,187	217,495
29,949	1,994,760	2,287,370	**247,000**	228,737
31,214	1,920,960	2,353,410	**235,341**	**235,341**
33,280	1,801,920	2,470,000	216,785	**247,000**

Notes: Unrestricted demand means no restrictions on the number of bags bought. Our data show very few farmers buying more than 3 or 4 bags of each, so a higher-level restriction would give similar results. Total subsidized supply is the affordable amount of fertilizer in the AIP assuming no more donations, equivalent to column 2 in Table 2. **Source**: Authors

Comparing demand and supply, we see that at MK 33,280 per bag, only 1.8 million farmers say that they would want to buy, while there is supply for 2.5 million farmers. Clearly, this price level is too high. This, then, implies that the AIP cannot reach 2.5 million beneficiaries without receiving further donations or exceeding its budget.

We point to two interesting price points in the table, where demand equals supply. The first is at a farmer contribution MK 27,621, where 2,174,950 farmers would be willing to participate and the total AIP supply can serve them with 2 bags each. The second assumes a price level of MK 31,214, at which total unrestricted demand, that is demand if farmers are allowed to buy more than 2 bags of fertilizer each, matches total available supply under AIP.

The amount of immediately available fertilizer can be maximized at 235,341 MT if farmer contribution is increased to MK 31,214 and the limit of two bags per household removed. Should the limit stay in place, 217,495 MT of fertilizer can be made available, enabling the AIP to reach 2,174,950 households.

Caveats

Our analysis comes with a few important caveats. First, we cannot be sure that our survey resulted in a completely representative sample of farmers in Malawi. Second, we are using *stated* willingness to pay, which can be different from *actual* willingness to pay. Third, as we pointed out before, there is some uncertainty on the exact amount of fertilizer available to the government outside the market. Fourth, we have assumed that the private market can deliver a sufficient amount of fertilizer on time.[2] Fifth, raising farmer contributions would maximize production but would entail some of the least productive farmer dropping out of the scheme. In a companion policy note on targeting (Banda et al., 2022) we discuss this.

Given these caveats it will be important for the exact level of subsidy to be independently verified, taking into account the principles that underpin the analysis in this note: the subsidy should be set at such level that subsidized supply matches demand. This will, for a given budget, maximize the

amount of fertilizer available under AIP, thus maximizing the program's impact on yields—and harvest. To achieve this for this growing season the optimal farmer contribution would need to be higher than the currently proposed MK 15,000 per bag.

Phasing out AIP

The government has recently confirmed its commitment to phase out the AIP by gradually reducing the number of beneficiaries over the next five years (Sabola, 2022). This would be better achieved by a gradual and planned reduction in the budget, because a phase-out based on reducing the number of beneficiaries will have less predictable fiscal impact. Pricing the subsidy where demand meets supply will also eliminate the (potentially politically costly) need to decide which beneficiaries to remove from the program, because they will opt out themselves. Those who will remain will be the most productive ones, which will ensure that the smaller subsidy has the biggest possible impact on food production in the country (Banda et al., 2022).

This note outlines how to optimally price the farmer subsidy, but we hasten to point out that any phase-out needs to consider more than pricing alone. At the very least, it should be accompanied by deliberate efforts to strengthen the network of private agrodealers, to improve soil health, to promote other sound agricultural practices, and to communicate long- and short-run plans clearly to farmers.

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ENDNOTES

[1] The government has so far spent MK 69.0 billion on the MT 123,500 of fertilizer currently in country or in transit and will need to spend another MK 30,000 per MT to transport it within Malawi (plus, in the case of the WFP supply, also MK 100,000 per MT to bring it from Beira).

[2] The likelihood that the private sector would be able to supply the shortfall fertilizer on time is high. According to the Fertilizer Association of Malawi (FAM), its members currently stock 53,500 MT of NPK and 33,500 MT of urea in Malawi, with 2,500 MT of NPK and 50,500 MT of urea awaiting transport in Beira, pending forex clearance. Private firms which are not members of FAM are likely to hold additional stock.

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