

POLICY BRIEF I

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Redefining the goals and objectives of the Farm Input Subsidy Program (FISP) in Malawi

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Policy Pointers

- 1) Evidence suggests that the FISP has helped increase fertilizer use among smallholders in Malawi. Although household survey data indicate that the FISP has had a positive and modest direct impact on maize productivity, much of the increase has likely not been obtained by the poorest households.
- 2) The current FISP objectives need to be clarified. Increasing productivity by targeting poor households may be difficult to achieve given the limited resource base of many poor smallholders in Malawi.
- 3) The FISP's main objective should be to increase land and labour productivity by targeting those relatively productive farmers who do not buy much fertilizer commercially. Other objectives, such as reducing poverty, should be secondary aims.
- 4) For the FISP to be more effective, complimentary programs such as soil fertility and weed and pest management training needs to be scaled up. Additional safety net programs such as cash transfers are likely needed to directly assist the poor outside FISP.

Policy summary

The overall conclusion that can be drawn from the existing body of research is that the FISP has helped increase smallholder fertilizer use. It has also had a positive but modest direct impact on maize yields and overall smallholder maize production in Malawi. There is conflicting evidence as to whether rural poverty rates have risen or declined in recent years, and it is unclear how FISP has directly impacted household poverty. Since the FISP mainly distributes subsidized seed and fertilizer to farmers, these beneficiaries need to have complimentary inputs such as land, labor, quality soil, and good management for it to be effective. Therefore, the main objective of the FISP should be to increase maize productivity, and this can likely be achieved by targeting relatively productive farmers. At the same time additional safety-net programs are needed that are specifically aimed at assisting the poor.

Introduction

Subsidizing modern inputs for smallholders has been a part of Malawi's agricultural development strategy for decades. Input subsidy programs in Malawi have taken various forms since independence, beginning with the parastatal controlled input distribution system that served smallholders until it was phased out in the late 1980's under structural adjustment. Subsequent programs including the universal Starter Pack Program in the late 1990's, the target input subsidy program (TIP) in the early 2000's, and the current Farm Input Subsidy Program (FISP) have been justified on the grounds that soil nutrients, particularly nitrogen, are essential for maize production. These nutrients are in short supply, and inorganic fertilizer is the most effective short-term method for farmers to add nutrients to the soil. Furthermore, most smallholders in Malawi and

elsewhere in Africa lack the cash resources or access to credit that would enable them to purchase inorganic fertilizer at commercial market prices, so fertilizer purchases must be subsidized by government (Carr 2014). In addition, given Malawi's current exchange rates and poor infrastructure, subsidizing fertilizer is often thought to be a more cost-effective method to promote food security than importing maize.

This is the first in a series of 4 policy briefs that focus on synthesizing what is known about Malawi's large-scale FISP that began in the 2005/2006 cropping season. The FISP mainly distributes subsidized inorganic fertilizer and improved maize seeds to through coupons to targeted farm households who are defined as being the "productive poor."

The FISP has multiple stated objectives, including 1) increasing smallholder maize yields and overall production, 2) reducing poverty, 3) promoting food security, and enhancing rural incomes. While the stated objectives are admirable, the weight of the evidence suggests that the households who should be targeted to increase maize productivity are likely not the same households who should be targeted to

reduce rural poverty. This dilemma has implications for targeting FISP beneficiaries and program implementation. Having multiple stated objectives for the FISP puts considerable pressure on the program, when the primary objective of distributing subsidized seed and fertilizer to smallholders should be to increase maize productivity. Therefore, the FISP's main goal should be to increase productivity, and other objects such as reducing poverty should be considered as secondary aims.

Though large and complex input subsidy programs like the FISP face many challenges, we recognize the severe constraint that access to inputs play in smallholder agriculture. Therefore, we make suggestions of how the FISP can be improved and modified to meet its objectives. The present brief first clarifies what is currently known about how well the FISP raises maize productivity, reduces poverty, and promotes food security. Second, this brief provides suggestions for improving efficiency in meeting the government's objectives of maize productivity, poverty reduction, and food security.

Part 1: What we know

What is known about FISP's ability to increase maize yields and production in Malawi?

National production estimates from the Ministry of Agriculture and Food Security (MoFAS) suggest that maize production in Malawi has increased dramatically since the FISP was scaled up in 2005/06. During that year total maize production was estimated at more than double the 2004/05 harvest, with the nation producing an estimated surplus of 510,000 MT above the national maize requirement. Official estimates in the subsequent years also indicate that Malawi has generated substantial maize surpluses. However, maize prices have remained high over this time period, and some experts contest the validity of Malawi's production numbers, stating that the MoFAS may overstate actual production estimates (Dorward et al., 2008; Dorward and Chirwa, 2011). In addition, farm-level studies based on survey data of rural households find relatively modest increases in maize production and yields that can be directly attributed to the FISP (Holden and Lunduka, 2010; Ricker-Gilbert and Jayne, 2011; Chibwana et al.,

2014). Evidence from Malawi and elsewhere also suggests that that resource-constrained farmers tend to get a lower return from inorganic fertilizer than do somewhat better off-households (Marenya and Barrett, 2009; Matita and Chirwa, 2011; Ricker-Gilbert and Jayne, 2012). Limited resource farmers likely have limited land, and labor available. They also tend to have lower management ability, and may farm soils that have less soil organic matter, so get lower response to inorganic fertilizer than do relatively better off farmers. It should be noted that very wealthy farmers should not be targeted by inputs subsidies either. These farmers are more likely to buy fertilizer commercially, and are perhaps more likely to be engaged in other activities besides maize cultivation.

What is known about the maize response rate to fertilizer from farmers in Malawi?

The economic return to any input subsidy program fundamentally depends upon how much value farmers obtain from the input provided.

Based on a review of agronomic literature and on farm trials, Dorward et al. (2008) states that in Malawi response rates for local maize varieties likely fall between 10-12 kgs/1kg nitrogen, 15 kgs/1kg nitrogen for composite varieties, and 18-20 kgs/1 kg nitrogen for hybrids. However, studies using farm survey data report significantly lower average response rates from maize to fertilizer ranging from 5.5 - 12kg maize/ 1 kg nitrogen (Ricker-Gilbert and Jayne, 2011; Chibwana et al., 2014). For comparison, a recent farm-level study in Kenya finds that the average response of maize to nitrogen is 17 kg/1 kg nitrogen across the country, and is even higher in the high potential areas (Sheahan et al., 2012).

The main point is that maize yield response to fertilizer in Malawi is low than is desirable, and there is considerable room for improvement. Reasons for low response rates to fertilizer include the prevalence of degraded soils that lack sufficient soil organic matter, along with damage from pests, and weeds such as *striga*. This is caused by continuous cultivation with little to no fallow, little crop rotating or intercropping, and limited use of organic manure or herbicides. Other reasons included late delivery and application of fertilizer and late or no weeding due to household labor shortages.

What is known about the FISP's effectiveness at reducing poverty and increasing food security?

- Evidence suggests that poorer households are not more effectively targeted by the FISP relative to better-off households. (Chibwana et al., 2012; Holden and Lunduka, 2012; Ricker-Gilbert et al., 2011).
- Evidence suggests that a substantial portion of the subsidized fertilizer has been diverted from intended beneficiaries and resold as commercial fertilizer. This form of diversion occurs when government officials take fertilizer that is intended for FISP beneficiaries and resell it as commercial fertilizer. This is different than FISP beneficiary

farmers reselling FISP fertilizer after acquiring it. Estimates of subsidized fertilizer diversion rates in 2009/10 range from 22% (Dorward and Chirwa, 2013 p. 117) to 42% (Lunduka et al., 2013). Diversion reduces the FISP's ability to reach the poor because wealthier farmers can more easily access diverted fertilizer that is sold on the commercial market.

- A few studies report small increases in farm household income from the input subsidy program (Chirwa, 2010; Ricker-Gilbert and Jayne 2011).
- Recent evidence indicates that the FISP has had a small effect on maize prices, and wage rates (Ricker-Gilbert et al. 2013; Ricker-Gilbert 2013). Hence the program has likely had little effect on the purchasing power of poor rural households.
- Matilda and Chirwa (2011) find that poorer households have lower agricultural growth rates compared to the richest 20% of households, indicating that poverty constrains agricultural growth in Malawi. They also find that providing the subsidy to the poorest 20% of households does not cause these households to achieve higher agricultural growth rates.
- The poverty rate in Malawi and its recent trends remain the subject of debate. A 2012 GOM report found Malawi's rural poverty rates have changed little over the past decade, while another study finds that poverty rates have declined over the same period (Beck et al. 2014). These studies do not directly link changes in poverty rates to the FISP.

Overall, these findings raise questions about the degree to which the FISP has contributed to poverty reduction in Malawi, despite its large financial outlay. As stated in the introduction, at the most fundamental level subsidies for inorganic fertilizer and seeds are intended to increase maize productivity. As a result, program objectives such as reducing poverty, along with increasing incomes and food security can only be achieved indirectly after increases in smallholder productivity have been achieved. Therefore, one might reasonably ask: Is the FISP the best tool to serve limited resource households? And if not, what other policy options are available?

Part 2: The Way Forward

What types of farmers should be targeted in order to increase productivity vs. types of farmers that should be targeted to reduce poverty?

Figure 1: Possible Trade-off in Program Objectives and Targeting of Farmers

		PROGRAM OBJECTIVES	
		Increase productivity	Food security for the poor
T A R G E T	The poor and vulnerable households		<u>Safety nets programmes</u> > Food for work > Public works
	Productive farmers	<u>Input support</u> Subsidy programmes <u>Output support</u> Improve market access	

Figure 1 illustrates the possible trade-offs in households to target with different support programs.

The appropriate type of farmer to target with a given program depends on the goals and objectives of that program. For example, targeting the poor with subsidized inputs, as the FISP aims to do, may in fact provide little yield benefits if poor farmers are unable to use modern seed and fertilizer effectively. Poor farmers could be more efficiently target to reduce food insecurity through safety net programs like food for work or public works (See Figure 1).

The FISP may be a more effective program for farmers who are able to generate some maize surplus and can thereby contribute to national level maize production. Therefore the main objective of FISP should be to increase land and labour productivity by targeting productive farmers who can use fertilizer most efficiently and effectively. The challenge with attempting to target wealthier farmers with input subsidies is that, in the absence of subsidies, wealthier households would be more likely to purchase fertilizer at commercial prices (Ricker-Gilbert et al. 2011). If these households are targeted with the FISP and use the subsidized inputs in place of some or all of their subsidized fertilizer, then the amount of new fertilizer that ends up on

farmers’ field is reduced. This is called the displacement or crowding out effect, and it lowers benefits of the program. However, identifying and delivering subsidized inputs to households who can use them effectively, but who are not likely to buy them from commercial sources, is important for an input subsidy program to be effective. This is challenge that the FISP in Malawi (and similar programs in other African countries) has struggled to achieve in our estimation. Using farmer clubs or cooperatives, where there will be self-selection of more productive farmers could potentially provide a solution to this challenge, though there may be some crowing out of commercial fertilizer. This is discussed in details in brief #2.

What are the complimentary strategies that are needed to increase maize productivity?

In order to increase the effectiveness of the FISP, the government needs to provide complimentary management practices that can help farmers obtain higher maize yields from subsidized fertilizer.

- Maize productivity can be improved by promoting sustainable agricultural practices such as organic manure use, along with soil

and water conservation techniques. Survey data indicate that there is a tendency for households to use both manure and fertilizer on the same plot to supply nutrients and organic matter to crops that are short on nutrients. However, in Malawi there are very few plots that receive organic manure (Holden and Lunduka, 2012).

- The main source of good quality manure in Malawi is livestock. However, livestock production in Malawi is very low due to, among other things, inadequate land availability. Since land is limited and income are low, smaller livestock such as goats, sheep, pigs, and poultry, can provide smallholders with manure, income and protein, at a much lower cost of production than cattle. Promoting advanced zero grazing technologies can increase incomes from livestock sales at the same time supply agricultural plots with manure. Therefore greater public investment in small livestock production programs could synergistically improve the effectiveness of the FISP in addition to the more direct benefits of such programs.
- Intercropping, and/or rotating maize with legumes is a strategy that can increase soil fertility because legumes put nitrogen in the soil, and can increase nutrition by encouraging the cultivation of crops that provide protein for the household (Snapp et al., 2010). Earlier evidence from the FISP suggests that subsidies for maize and tobacco may cause households to plant a lower share of their area to other crops like legumes (Chibwana et al. 2012). For this reason the addition of legume vouchers as part of the FISP is a positive change. However, the number of households receiving legume vouchers should be increased, and farmers should receive information and training on the importance of intercropping and rotating maize with legumes.
- Only 15-20% of Malawian households receive extension advice on an annual basis (Chirwa and Dorward, 2013). This is a small percentage of the population, considering the vital role extension services play in delivering information for farmers so that they can use

better manage their land and use fertilizer more effectively. The government should re-invest in extension services so that agents can provide fertilizer and land management advice to farmers along with their FISP coupons. New extension delivery methods, such as sell phone videos and mass media should be explored to reach more people with important messages at a lower cost.

- Investments in public goods such as infrastructure and agricultural technologies such as improved seed varieties have high payoffs in both Africa and Asia (Fan et al. 2008; Fuglie and Rada 2013). Investments in infrastructure and technology can benefit all 4 cells of the matrix in Figure 1.

Finally, it is important to recognize that other programs may be more appropriate than the FISP at boosting income and wealth for limited resource households. These programs include i) flexible input vouchers for labor constrained households; ii) cash for work for land constrained households; 3) direct cash transfers for very poor land and labor constrained households. (Alternatives to FISP will be discussed in detail in brief #4).

In conclusion, the FISP objectives should be simple and direct **“to increase land and labor productivity in the country”**. The FISP is likely to be most effective for productive households who can contribute to national level maize production but do not purchase much or any fertilizer at commercial prices. However, identifying and targeting these households in practices is very difficult. Self-selection into farmer clubs or cooperatives could help targeting of these productive farmers. Participation in public works projects and cash transfer programs may be able to help poor households more directly than the FISP in its current form.

References

- Beck, U., Mussa, R., Pauw, K. (2014). “Did Rapid Smallholder-led agricultural growth fail to reduce rural poverty? Making sense of Malawi’s poverty puzzle.” Working paper.

- International Food Policy Research Institute. Washington D.C.
- Carr, S. (2014). "The Challenge of Africa's Nitrogen Drought: Some Indicators from the Malawian Experience." International Food Policy Research Institute. Malawi Strategy Support Policy Note #19.
- Chibwana, C., Fisher, M., Shively, G., (2012). "Cropland allocation effects of agricultural input subsidies in Malawi." *World Development*. 40(1), 124-133.
- Chibwana, C., Shively, G., Fisher, M., Jumbe, C., Masters, W., (2014). Measuring Impacts of Malawi's farm input subsidy program. *African Journal of Agricultural and Resource Economics*. (Forthcoming).
- Chirwa, E.W., Dorward, A., (2013). *Agricultural Input Subsidies. The Recent Malawi Experience*. Oxford University Press, Oxford, UK.
- Chirwa T.G., (2010). Program evaluation of agricultural input subsidies in Malawi using treatment effects: methods and practicability based on propensity scores. Munich Personal RePEc Archive (MPRA).
- Dorward, A., Chirwa, E., Kelly, V., Jayne, T. S., Slater, R., Boughton, D., (2008). Evaluation of the 2006/07 agricultural input subsidy programme, Malawi. Final Report. Lilongwe, Malawi. Dorward, A., and Chirwa, E. (2013). *Agricultural Input Subsidies. The Recent Malawi Experience*. Oxford University Press, Oxford, United Kingdom.
- Dorward, A., Chirwa, E., (2011). The Malawi agricultural input subsidy programme: 2005-6 to 2008-9. *International Journal of Agricultural Sustainability* 9(1): 232-247.
- Fan, S., A. Gulati, and S. Thorat (2008). "Investment, Subsidies, and Pro-Poor Growth in Rural India." *Agricultural Economics* 39(2): 163-170.
- Fuglie, K., and Rada, N., (2013). "Resources, Policies and Agricultural Productivity in Sub-Saharan Africa." Economic Research Report #145. The Economic Research Service. Washington D.C.
- Holden, S.T., Lunduka, R., (2010). "Impacts of the fertilizer subsidy program in Malawi: Targeting, household perceptions and preferences. Department of Economics and Resource Management. Norwegian University of Life Sciences. April 2010.
- Holden, S. T., Lunduka, R., (2012). Do Fertilizer subsidies crowd out organic manures? The case of Malawi. *Agricultural Economics*. 43(3):303-314.
- Lunduka, R., J. Ricker-Gilbert, and M. Fisher. (2013). "The Consistent and Contrasting Results of Research Examining the Economic Impacts of Malawi's Fertilizer Subsidy Program." *Agricultural Economics* 44(6):563-579.
- Marenja, P. P., Barrett, C. B. (2009). State-conditional fertilizer yield response on western Kenyan farms. *American Journal of Agricultural Economics*, 91(4): 991-1006.
- Matita, M., Chirwa, E.W. (2011). Agricultural Growth and Poverty in Rural Malawi. AERC Collaborative Research Project on Understanding the Links between Growth and Poverty in Africa
- Ricker-Gilbert, J., Jayne, T.S., Chirwa, E., (2011). Subsidies and Crowding Out: a Double-hurdle Model of Fertilizer Demand in Malawi. *American Journal of Agricultural Economics* 93(1): 26-42.
- Ricker-Gilbert, J., Jayne, T.S., (2011). "What are the enduring effects of fertilizer subsidies on recipient households?" Staff Paper 2011-09. Department of Agricultural Food and Resource Economics, Michigan State University. East Lansing, MI. USA.
- Ricker-Gilbert, J., Jayne, T.S., (2012). "Do fertilizer subsidies boost staple crop production and reduce poverty across the distribution of smallholders in Africa? Quantile Regression Results from Malawi." Selected Paper for the Triennial Meeting of the International Association of Agricultural Economists: Foz Do Iguacu, Brazil.
- Ricker-Gilbert, J. (2013). "Wage and Employment Effects of Malawi's Fertilizer Subsidy Program." *Agricultural Economics* (Forthcoming).
- Ricker-Gilbert J., Mason, N.M., Darko, F.A., Tembo, S., (2013). General Equilibrium Effects of Input Subsidy Program on Maize Prices: Evidence from Malawi and Zambia. *Agricultural Economics* 44(6):671-686.
- Sheahan, M., Black, R., & Jayne, T. S. (2013). Are Kenyan farmers under-utilizing fertilizer? Implications for input intensification strategies and research. *Food Policy*, 41:39-52.
- Snapp, S., Blackie, M.J., Gilbert, R.A., Bezner-Kerr, R., Kanyama-Phiri, G.Y. (2010). "Biodiversity Can Support a Greener Revolution in Africa." PNAS direct submission. Available at <http://www.pnas.org/content/107/48/20840>