

MALAWI

Strategy Support Program



HOW BEST TO TARGET AGRICULTURAL SUBSIDIES?

The Case for an Indicator-Based Targeting System in Malawi

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Over the past few years Malawi made remarkable progress toward increasing its national maize production and achieving food security owing to its long-running policy of subsidizing fertilizer. The implementation of these subsidy programs is continuously being improved upon as the country learns from past experiences.¹ Recent evaluations of the current Farm Input Subsidy Program by Dorward and Chirwa (2011, 2012) suggest that various components of the program have been redesigned over time. These include timeliness of fertilizer delivery, fertilizer coupon receipts, regional distribution, area targeting, allocation and distribution processes, and coupon use and redemption. However, the issue of beneficiary identification and targeting remains a challenge for the program. Drawing on recent research by Houssou and Zeller (2010, 2011, 2012), this note proposes an alternative approach to effectively target the poor within the group of potential program beneficiaries. In our analysis we are mindful of the fact that targeting criteria for the current program are vague at best. One interpretation of these criteria is that the program intends to target the “productive poor”, and since poverty is widespread in Malawi, some would argue that the focus of the targeting mechanism should be on identifying farmers who would make best use of subsidized fertilizer (e.g., as measured by their marginal productivity per unit of fertilizer applied). Many evaluations, however, have criticized the program for not being pro-poor enough; hence a targeting mechanism that can identify the poor in a cost-effective manner may also be desirable to policymakers.

TARGETING DEVELOPMENT PROGRAMS: THE MALAWIAN CONTEXT

Fertilizer subsidies are a key element of the Malawian Government agricultural and food security policy. The more recent fertilizer subsidy policies saw significant increases in coverage and benefits distributed. For example, the 2006/07 Farm Input Subsidy Program (FISP) provided subsidized fertilizer and seeds to just under 2.48 million households and cost about US\$91 million. In subsequent years, the government continued to provide agricultural subsidies to between 1.4 and 1.6 million farm families every year.

Malawi’s targeted subsidy programs have always adopted Community-Based Targeting (CBT) systems in which local authorities and community leaders identify program beneficiaries. This is also the case with the FISP. Several annual evaluations of FISP have put forward suggestions for improving the targeting criteria and procedures, but fundamental difficulties remain (Dorward and Chirwa 2012). Targeting criteria under FISP are still loosely defined and leave major judgments to the communities. This stems from the fact that the program objectives are not clearly defined. Consequently, community leaders often argue that “they are all poor” and, therefore, should all benefit from agricultural subsidies meant for the poor. The problem is not unique to Malawi. Almost all targeted development interventions experience targeting problems. Often, they do not cover all of the eligible poor and leak program benefits to a significant number of non-poor. This brief proposes an alternative or complementary targeting approach to CBT based on Proxy

Means Tests (PMTs) and discusses its merits and implementation challenges.

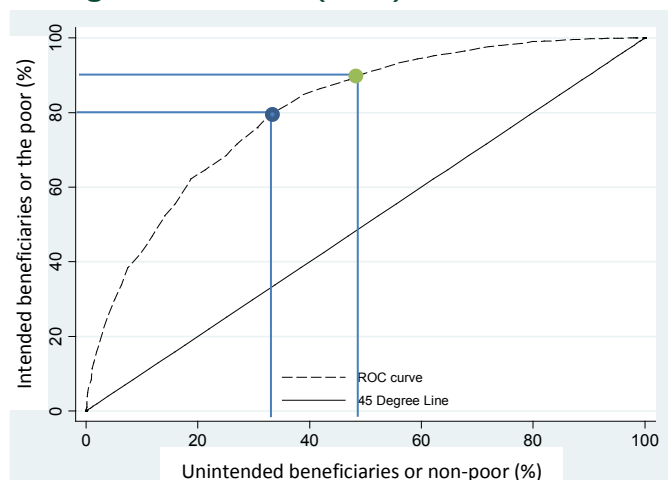
TARGETING: AT A COST

Administratively speaking, the cheapest targeting system is a universal one. Leakage to unintended beneficiaries is not an issue with a universal subsidy as everybody is eligible. Targeting intended beneficiaries on the other hand, ensures that resources are directed to those that most need them but inherently bears the risks of wrongly providing subsidies to unintended program beneficiaries and missing some of the intended beneficiaries. Usually, there are trade-offs; for example, reducing the number of intended beneficiaries that are missed out means accepting to provide subsidies to a higher number of unintended program beneficiaries. These trade-offs can be illustrated with a so-called Receiver Operating Characteristic (ROC) curve shown in Figure 1. In this example the ROC shows that if a program intends to cover 80 percent of the poor (blue marker), policymakers would have to accept inclusion of about 30 percent unintended subsidy beneficiaries (i.e., the non-poor).

If policymakers wish to extend the coverage to 90 percent of intended beneficiaries (green marker), they will have to accept almost 50 percent of unintended beneficiaries being wrongly targeted. These trade-offs are inevitable. Setting the coverage lower will lead to leaving out some intended beneficiaries. Doing so may become as costly at some point as covering those that do not need assistance.

¹ A variety of subsidy programs have been implemented in Malawi in recent years. Most prominent among these have been the Starter Pack (SP) in the late 1990s, the Targeted Input Program (TIP) during the early 2000s, and the Farm Input Subsidy Program (FISP), which was first implemented in 2005/06.

Figure 1. Exploring trade-offs using a Receiver Operating Characteristic (ROC) curve



Source: Adapted from Houssou and Zeller (2010)

Note: The 45 degree line represents the case where for every poor beneficiary that is to be included, one non-poor beneficiary would have to be accepted through leakage.

DEVELOPING AN INDICATOR-BASED SYSTEM FOR TARGETING THE POOR AND SMALLHOLDER FARMERS

PMTs seek a few indicators that are quick, easy, and inexpensive to verify, but which can be used for identifying intended program beneficiaries (usually the poor) effectively with the aim of reducing leakage of program benefits to unintended program beneficiaries (or non-poor). PMTs simplify the relationships often seen in survey data between household characteristics and the welfare level of the household, and are usually developed using stepwise regression methods. Using the Malawi Second Integrated Household Survey (IHS2) data, we selected indicators for inclusion in our PMT based on practicability considerations, such as the ease, objectiveness, verifiability, and accuracy with which information on the indicators could be quickly elicited in an interview.²

INDICATOR-BASED VERSUS COMMUNITY-BASED TARGETING

Table 1 compares the targeting performances of the PMT-based model developed from the IHS2 with the targeting performance of the 2000/01 Targeting Input Program (TIP) and the 2006/07 FISP, both of which were administered through CBT systems. The table indicates that 65 and 54 percent of TIP and FISP beneficiaries, respectively, were actually poor, but when using the PMT model, we can increase the share of intended poor beneficiaries in the targeted population to 71 percent. More importantly, the results suggest that TIP and FISP exhibit substan-

² The IHS2 was carried out from March 2004 through March 2005 and covered a sample of 11,280 households that were representative at national as well as district levels.

tial leakages of fertilizer to unintended non-poor beneficiaries (i.e., 62 and 54 percent, respectively). On the other hand, applying the PMT model approach, this percentage can be reduced to 27 percent in the targeted population. This result implies that under the PMT model, leakage could potentially be cut by two-thirds.

Table 1. Targeting efficiency of TIP and FISP versus the PMT model

| Program type | Poverty accuracy: % of poor among targeted house- holds | Leakage: % of non-poor among targeted households (%) |
|----------------|--|---|
| 2000/2001 TIP | 65 | 62 |
| 2006/2007 FISP | 54 | 54 |
| PMT model | 71 | 27 |

Source: Adapted from Houssou and Zeller (2011)

Note: Poverty accuracy is defined as the number of poor who received program benefits (under TIP and FISP) or the number of poor who were predicted as being poor (under the PMT system), expressed as a percentage of the total number of poor. Leakage is defined as the number of non-poor who received program benefits or who were predicted as being poor, expressed as a percentage of the total number of poor.

The results here do not consider potential challenges that may arise from actual implementation of the PMT system. Nevertheless, the PMT system offers a mechanism to objectively validate and thus complement community-based beneficiary selection. The system improves targeting towards the poor and more importantly reduces the number of unintended non-poor beneficiaries. Thus, the greatest benefit can be realized from providing program implementers with a set of objective criteria and a simple “check-list”, thereby enhancing the transparency of the selection process.³

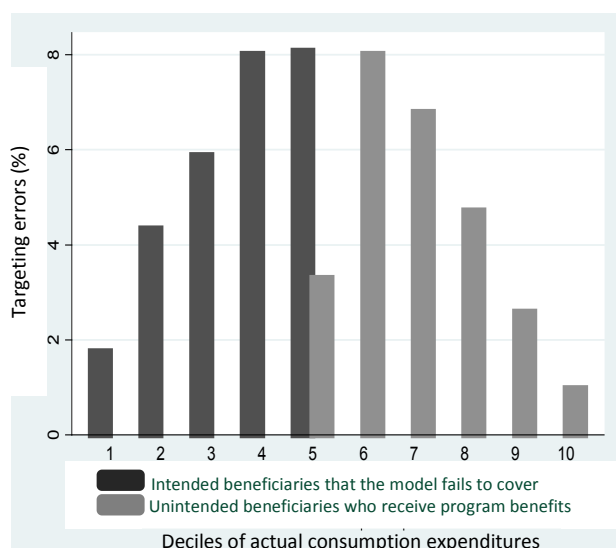
With regard to administrative costs, the PMT approach also proves to be more cost-effective than CBT. Using the 2006/07 FISP as an example, Houssou and Zeller (2011) estimate that under the existing CBT approach the cost of delivering MK1.00 worth of benefits to a poor household is around MK1.44, compared to a cost of only MK1.00 under a PMT approach.

WHO ARE EXCLUDED FROM RECEIVING PROGRAM BENEFITS WITH THE PMT APPROACH?

Figure 2 reveals that the proposed PMT approach, while not perfect, can at least be considered progressive: most of the intended beneficiaries that are excluded are the least poor. Similarly, most of the unintended beneficiaries who receive program benefits are the least rich. The implication for targeting is that, while there is bound to be some errors as no indicator is perfectly correlated with poverty, the proposed approach is relatively effective at targeting the intended beneficiaries.

³ See the list of indicators and their weights in the last section.

Figure 2. Distribution of intended beneficiaries missed and unintended beneficiaries wrongly included by the PMT targeting approach



Source: Adapted from Houssou and Zeller (2012)

HOW TO USE THE PMT MODEL IN THE FIELD? AN EXAMPLE

Each household that may be considered or applies for inclusion in the program would need to be assessed by a targeting agent. The targeting agent would need to collect and verify information on the poverty status of the household in question using a defined indicator set (see Table 2 bottom part). These indicators are assigned different weights because some may have a stronger correlation with the wealth or poverty status of a household than others. Similarly, to account for regional differences, different weights are assigned to each district against a reference district (see Table 2 top part). Once all this information is compiled and cross-checked (see Table 3 for illustration), the targeting agent can compute each household's score. Program designers may choose a cut-off line to qualify for inclusion in the program or not. If a household's score is above the cut-off line, the household is not included, if it is below the household qualifies for program benefits. In Table 4, the scoring results are presented for the three households in the example in Table 3. The score for Household ID 1 would be computed as follows:

$$\text{Score} = A_0 + A_2 + B_1 * C_1 + B_2 * C_2 + B_3 * C_3 + B_4 * C_4 + B_5 * C_5 + B_6 * C_6 + B_7 * C_7 + B_8 * C_8 + B_9 * C_9 + B_{10} * C_{10}$$

With figures from Table 3:

$$\text{Score} = 4.337 + 0.184 - 0.15 * 8 + 0.109 * 0 + 0.36 * 0 + 0.148 * 1 + 0.631 * 0 + 0.084 * 0 + 0.12 * 1 + 0.121 * 1 - 0.082 * 0 + 0.117 * 1 = \mathbf{3.8}$$

Based on the cut-off line of 3.9 which was used to determine the number of poor-intended beneficiaries under the PMT model, this household would qualify for inclusion in the program. Thus, a key advantage of this system is that it is transparent, objective, and verifiable, and thus suited to curb system capture.

Table 2. Indicator list and their weights

| Indicator list | | Weights |
|---------------------------|--|---------|
| District dummies | Intercept A_0 | 4.337 |
| | Mzuzu A_1 | -0.015 |
| | Kasungu A_2 | 0.184 |
| | Salima A_3 | -0.028 |
| | Lilongwe A_4 | 0.090 |
| | Machinga A_5 | -0.237 |
| | Blantyre A_6 | -0.156 |
| | Ngabu A_7 | -0.154 |
| Karonga (reference) A_8 | | |
| Best 10 indicators | 1. Household size B_1 | -0.154 |
| | 2. Wireless radio ownership B_2 | 0.109 |
| | 3. Floor of main dwelling is predominantly made of smoothed cement B_3 | 0.360 |
| | 4. Bicycle ownership B_4 | 0.148 |
| | 5. Lighting fuel is electricity B_5 | 0.631 |
| | 6. Panga ownership B_6 | 0.084 |
| | 7. Highest educational qualification achieved B_7 | 0.120 |
| | 8. Does any household member sleep under a bed net? B_8 | 0.121 |
| | 9. Rubbish disposal facility is public rubbish heap B_9 | -0.082 |
| | 10. Household head can read Chichewa language B_{10} | 0.117 |

Source: Adapted from Houssou and Zeller (2011).

Table 3: Potential fertilizer subsidy beneficiaries selected from IHS2 Data

| Household ID | District | Household Size | Wireless radio ownership | Floor of main dwelling is cement | Bicycle ownership | Lighting fuel is electricity | Panga ownership | Education qualification is Junior Certificate of Education | Whether household sleep under a bed net | Rubbish disposal facility is public heap | Household can read Chichewa language |
|--------------|----------------|----------------|--------------------------|----------------------------------|-------------------|------------------------------|-----------------|--|---|--|--------------------------------------|
| | | C_1 | C_2 | C_3 | C_4 | C_5 | C_6 | C_7 | C_8 | C_9 | C_{10} |
| 1 | Kasungu A_2 | 8 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| 2 | Lilongwe A_4 | 15 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |
| 3 | Machinga A_5 | 6 | 1 | 1 | 1 | 0 | 0 | 3 | 1 | 0 | 1 |

Source: IHS2 data (2005) 1=yes, 0=no.

Table 4: Screening results indicating eligible and ineligible households

| Household ID | Score | Status | Eligible for Fertilizer Subsidy |
|--------------|-------|----------|---------------------------------|
| 1 | 3.8 | Poor | Yes |
| 2 | 2.9 | Poor | Yes |
| 3 | 4.4 | Non-poor | No |

Source: Authors' calculations based on IHS2 data.

IMPROVING THE TARGETING OF FUTURE SUBSIDY PROGRAMS: POLICY RECOMMENDATIONS

The aim of this note is to stimulate debate among Malawian decision makers and stakeholders as they reflect on improving the efficiency of the subsidy program. The results suggest that an indicator-based targeting mechanism such as PMT has the potential to improve the efficiency with which the program targets the poor. The PMT system is simple to administer: the targeting agent simply needs to compute each potential beneficiary's score using the set of indicators selected, their weights, and information provided by the potential beneficiary household in an arithmetic formula.

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As indicated, the PMT model is not perfect at targeting. Likewise, any targeting approach is prone to implementation challenges. It is essential that the challenges that may arise with the implementation of the PMT model are effectively addressed if the system is to yield the desired results. Administrative challenges include, among others: accurate data collection from potential program beneficiaries; data management, control, and verification; and the institutional design of the system. For example, misreporting during beneficiary selection can be reduced with an effective verification system, including random home visits, triangulation of the information provided by potential program beneficiaries, or introduction of bonus and penalty clauses for targeting agents.

The proposed PMT approach is an alternative system that can be combined with the current mechanism in a multi-stage targeting process. Furthermore, there is scope for improvement: the validity of the PMT model over time can be assessed through robustness tests using the newly released IHS3 data. Finally, the PMT approach can be used to identify the ultra-poor that do not have the capacity to use subsidized inputs and, therefore, are in need of social protection interventions. Such an approach would provide a consistent and coherent targeting mechanism for rural development interventions ranging from, for example, direct cash transfers for ultra-poor, to farm input subsidies for resource-constrained smallholder farmers, to credit schemes for emergent agro-entrepreneurs.

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