Poverty and Dependency as targeting Criteria for Farm Input Distribution in a Rural Malwian Community affected by HIV/AIDS.

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Summary

In a community with an estimated HIV infection rate of 8 to 10% of adults and poverty levels of 65%, a method of targeting was attempted which avoided the common "proxies". It used the ratio of the theoretical household food requirement to the active labour force as a measure of dependency and the valuation of household assets, including livestock as a measure of poverty. 42% of households were selected as beneficiaries on the basis of a combined score of dependency and poverty. Evaluation suggested that the targeting methodology was usable up to the point of beneficiary selection but that inclusion errors occurred during the process of distributing the entitlement cards and in the distribution of farm inputs. It remains to be seen whether these errors could be avoided in future distributions but the cost implications are large.

Output for the package of crop inputs was estimated at US$82 per beneficiary household at post-harvest prices which is about equal to the value of a year's supply of the staple, maize. As a result of the fertiliser distributed, the return to labour for the maize increased by at least 2.5 times. Valued at the time they began to lay, the contribution of the chickens distributed was estimated at $25 per household. The total value of the output was about 180% of the cost of the inputs.

Despite results better than for other "targeted" distributions in Malawi, the team involved in this exercise felt that the results did not justify the large effort put into targeting. In future they would prefer to use methods less demanding of staff time and more involving the community in the selection process.

Background

The Kasungu-Lilongwe plain in central Malawi is a livelihood zone where smallholder upland rainfed cropping is dominated by maize and tobacco with about 50% of households also growing a small plot of groundnuts. Beans grown for their dry seed and pumpkins grown for their leaves are intercropped into the maize. Small plots of cassava or sweet potato are grown by about 30% of households. Most land is permanently cropped and infertile after many years use for non-leguminous crops.

In 1998, the number of people living below the poverty line (basic needs defined as MK9.27 per head per day = US$0.36 at 1998 exchange rate) in Ntchisi District was estimated at 64.8% (Benson, 2002) and may have increased since then. The national average was 64.3%. One of the consequences of this is that many families cannot afford fertiliser and their maize is very poor. In a nearby district, an Action Against Hunger (AAH) survey of several hundred maize crops in March 2003 classified 13% as very poor (liable to yield less than 400 kg/ha) and a further 21% as poor (liable to yield less than 800 kg/ha). Nitrogen deficiency was the dominant reason for this poor performance and excellent fertilised rainfed crops capable of yielding 3000 kg/ha were frequently found adjacent to very poor crops likely to yield no more than 300 kg/ha. Irrespective of their HIV status and even in a good year, households that cannot afford fertiliser are unable to ensure food self sufficiency at these yield levels. After harvesting in March to May, they progressively run out of home produced food from August

onwards and in the hungriest months of December to February, are mainly dependent on casual labour as their source of food or cash for food. This casual labour is negotiated for the individual task and is provided by tobacco estates and the better-off commercial small farmers. Rates are equivalent to about US$0.50 per day (2004 exchange rate) and their value in local currency has not changed greatly in the last five years. In the crisis year of 2001-02, maize prices reached $0.40 per kg in some markets but peak (February) prices have been between $0.12 and $0.25 since then. At the lower prices, supporting a family through the hungry season by casual labour is just about possible. At the higher price it is not.

AAH is an international NGO dedicated to reducing hunger and malnutrition. It came to Malawi in June 2002 in the aftermath of the food emergency declared the previous February. AAH has sought to address high levels of severe acute malnutrition in children by capacity building and the implementation of new guidelines in the country's nutrition rehabilitation units. Food security issues have been addressed through distributions of farm inputs rather than through food aid. AAH has supported the Malawi Vulnerability Assessment Committee and has provided technical support for a Surveillance system to give early warning of child malnutrition and food insecurity.

HIV infection of adults in central Malawi is reckoned to be 9.7% (NAC 2003a) and the national figure is 14.4%. NAC (2003b) suggested 6,100 infected adults in Ntchisi (a relatively rural district) which (assuming adults as 43% of the population) would imply 8.5% infected. Allowing 1.5 infected adults per household, would indicate that about 5% of rural households contain one or more HIV-infected adults. Other households are affected in the sense that they have relied on the labour, wage earnings or remittances of a family member now dead or incapacitated by AIDS. Usually these households begin as relatively well-off but are in a rapidly descending poverty spiral, accelerated by medical bills and funeral costs (CARE, 2002).

Targeting AIDS-affected households among the less poor and the well educated is relatively simple. They are more likely to have been tested, more likely to have been competently diagnosed and more likely to be willing to discuss their HIV status (CARE, 2002). A number of international and local NGOs have programmes for these people including World Vision International in a sub-District of Ntchisi not covered by our activity. In the whole of Ntchisi district with about 36,000 households, they and others are targeting a total of perhaps 50 households with Food Security interventions. This represents about 0.15% of all households and perhaps 3% of households that are infected or affected.

Targeting affected households among the poor is hindered by the lack of testing and the unwillingness of people to reveal their status even if known. Other agencies have used "proxies" such as female-headed or elderly-headed households, "chronically ill" and households with orphans. From previous questionnaires and focus group discussions, often confirmed by the large survey used in this exercise, we knew that theses proxies were either misunderstood or deliberately exaggerated in the Malawian context:

- many households were found to include an active male of about the same age as the female described as the household head
- many respondents described as "orphans" the children of broken marriages rather than the children of dead parents
- AAH does not find credible the very high incidence of "chronic illness" described by some studies (22 to 64% in CARE, 2002). If such chronic illness were sufficient to prevent people from farming, many more farms would be deserted. But very little land that has been farmed in living memory is now abandoned. The limiting factor in food production is perceived as "having no money to buy fertiliser" (cited by 157 of respondents in our study) rather than "labour shortage" (34 respondents) or "illness of a family member" (85 respondents).

In the intervention to be described, AAH accepted the major difficulties in targeting poor HIV-infected or poor AIDS-affected households and instead attempted to target based on dependency and poverty. In this way, the potential impact of HIV/AIDS on the labour capacity of a household is recognised, whilst not excluding other households. We used asset valuation as a simple proxy for poverty. We avoided the classical dependency ratio because of its sudden transitions between dependency and productivity. The reality is that older rural children and old people normally contribute to farming and income earning activities in central Africa and always have done. Instead of the dependency ratio, we developed a "food-labour ratio": the theoretical daily food energy requirement summed for all members of the household and divided by its labour force with sliding scale contribution from older and younger family members.

Methods: targeting

During September and October 2003, 3500 simple interviews were carried out in the catchment area of four health centres in the west of Ntchisi District which is part of the Kasungu-Lilongwe plain livelihood zone as defined by the Malawi Vulnerability Assessment Committee (MVAC). The interviews captured the demographic structure of each household and the assets owned by them: farming tools, household furniture, radios, bicycles and livestock. Each interview took about ten minutes.

Table 1. Food energy requirement and labour force contribution assumed for the calculation of food-labour ratio.

	Food energy requirement kcal/day		Contribution to workforce, man equivs			Food energy requirement kcal/day		Contribution to workforce, man equivs	
Age in years	male	female	male	female	Age in years	male	female	male	female
1	1300	1300			55	3300	2900	0.93	0.74
2	1300	1300			56	3300	2900	0.86	0.68
3	1400	1400			57	3300	2900	0.79	0.62
4	1400	1400			58	3300	2900	0.72	0.56
5	1500	1500			59	3300	2900	0.65	0.50
6	1500	1500			60	3300	2900	0.58	0.44
7	1600	1600			61	2400	2000	0.51	0.38
8	1600	1600			62	2400	2000	0.44	0.32
9	1700	1700			63	2400	2000	0.37	0.26
10	1700	1700			64	2400	2000	0.30	0.20
11	1800	1800			65	2400	2000	0.23	0.14
12	1900	1900	0.10	0.08	66	2400	2000	0.16	0.08
13	2000	2000	0.20	0.16	67	2400	2000	0.09	0.02
14	2100	2100	0.30	0.24	68	2400	2000		
15	2400	2300	0.40	0.32					
16	2700	2500	0.50	0.40					
17	3000	2700	0.60	0.48					
18	3000	3000	0.70	0.56					
19	3000	3000	0.80	0.64					
20	3000	3000	0.90	0.72					
21to54	3300	2900	1.00	0.80					

From the demographic data, the household food energy requirement was calculated by assigning each member a theoretical requirement dependent on age and sex (table1).

Similarly the labour availability was assessed dependent on age and sex. Household members described as "chronically ill" during the interview were excluded from the labour pool. The "Food-Labour Ratio" was calculated by dividing the food requirement by the labour force and is the food energy which one man equivalent must produce by farming or other means to satisfy the theoretical food requirement of the household. Households with many unproductive members (children, old people, ill people) have a high food-labour ratio. Finally, to avoid the problem of skewness (and a few infinite values), the ratio was reduced to deciles, the highest score representing the 10% of families with highest dependency.

Assets were assigned a monetary value which was approximately half of the maximum value for that asset (e.g. market value of a fully-grown animal, cost of a new bicycle). Asset values were summed for the household and divided by the number of people in the household and then reduced to deciles as for food-labour ratio. The richest 10% were in group 10.
The final selection was made on a score:

10 + Food-labour score – Asset score

Thus for the most dependent families with fewest assets:

Selection score = 10 + 10 -1 = 19

and for the least dependent families with most assets:

Selection score = 10 +1 – 10 = 1

It was decided to include households with a composite score of 11 or more as beneficiaries and this included 46% of the households interviewed (1610 households). We would have liked to include a smaller proportion of a bigger database but thus was not practical in the time available. The remaining 990 households were selected in discussion with village heads and included female-headed and elderly-headed households and households hosting orphans who were not already included. 2000 households were selected for crop inputs and 500 for chickens. In the database, chicken beneficiaries were selected electronically for their low labour supply or limited access to land.

Methods: distribution

Village heads were then asked to organise the distribution of beneficiary cards to named households.

All inputs were distributed between 24 November and 19 December 2003. Each of 2000 crop beneficiary households received:

5 kg groundnut seed	(CG7)
5 kg bean seed	(Ngaga)
50 kg fertiliser	(either 23:21:0 compound or Urea: 46:0:0)
5 packets of vegetable seed	(tomato, cabbage, kale, onion, Chinese)
1 hoe blade	
1 watering can	

Beans and groundnuts were chosen for crop diversification and their nitrogen fixing capacity. The fertilizer was intended to increase household maize production.
Each of 500 chicken beneficiary households received:

5 Black Australope chicks, aged 10 – 12 weeks, not sexed
15 kg of pullet grower feed.

All inputs, commodities and livestock were locally procured.

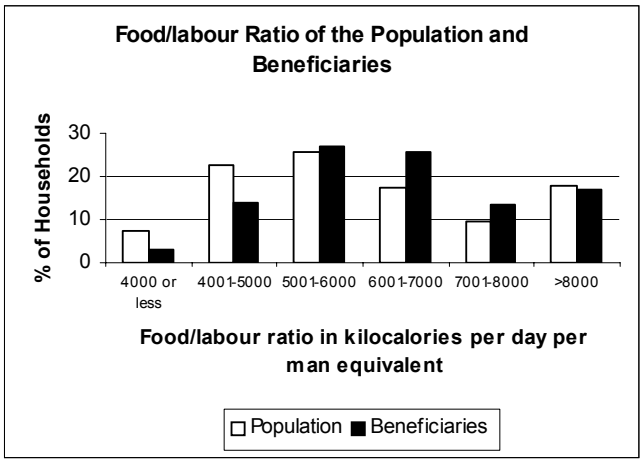
Methods: evaluation

A beneficiary profile survey was carried out during January. A random sample of 206 crop beneficiaries were interviewed capturing information on household: structure, assets ownership, crop production, constraints, coping strategies, food use and diversity.

A further survey was mounted in March and April 2004 to assess the beneficiary selection and the impact of the program. The timing was determined by the funding cycle and was late enough to give sensible estimates of the performance of beans but too early to assess the yield of groundnuts or the response of maize to fertiliser. 118 non-beneficiary households, 63 crop beneficiary households and 82 chicken beneficiary households were interviewed.

In June 2004 AAH food security staff carried out informal interviews in about 40 beneficiary households to assess crop yields and fertiliser response and mortality rates of the chickens. In March 2005, they returned to interview 28 chicken beneficiary households.

Results: targeting



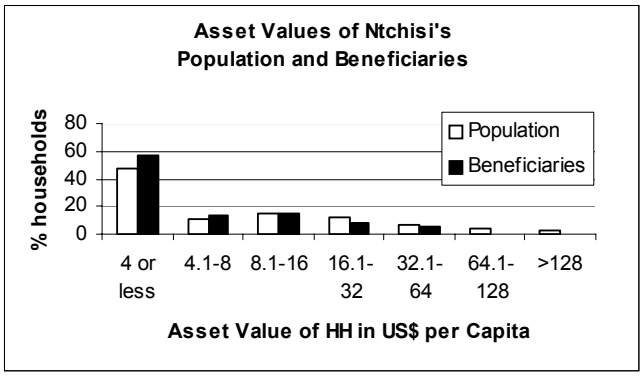


Figure 1 compares the distribution of food-labour ratio for the population as revealed in the initial beneficiary selection survey and in the beneficiaries of crop inputs as revealed in the profile survey of January 2004. We succeeded in excluding about half of the households with food-labour ratio below 5000 kcals per day per man equiv and including substantially more in the range from 5001 to 8000 kcals. For reasons unknown, we did not select a larger proportion of highly dependent households (>8000 kcals).

Very few households (fig 2, note logarithmic scale) had asset values in excess of US$8 per head. A larger proportion of households below this threshold were included and most of the very rich households (>$64 per head) were excluded.

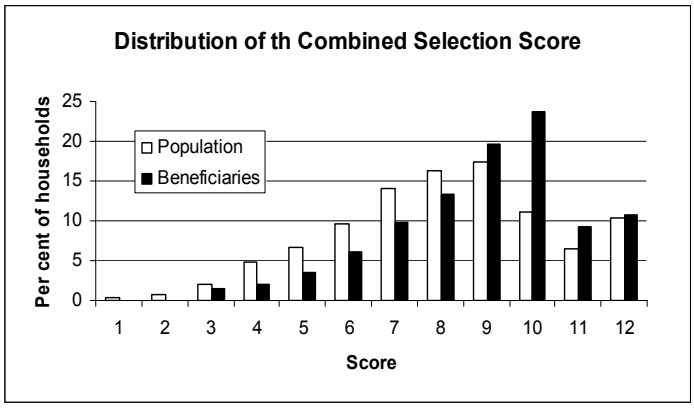


Figure3 shows the distribution of a combined dependency-poverty score similar to the original selection score but based on the same class intervals as figs 1 and 2. We did succeed in moving the distribution of beneficiaries in favour of the most dependent and the poorest. 46% of the population and 63% of the beneficiaries had a combined score greater than 8. The inclusion error was thus 100-63 = 37%. We do not have comparable data for chicken beneficiaries.

Results : Physical and financial outputs.

95% of beneficiary households used their groundnut seed and typically grew a plot of 0.1 ha producing 80 kg of kernel per household. They reported that without the seed they would have grown unfertilised maize with an output of about 30 kg. 95% grew the beans and most of them intercropped into maize, about 0.25 ha at 150 kg/ha. All the households used their fertiliser and most used it for maize, a few for tobacco. At the time of this distribution, fertiliser was readily available in the local markets at a cost of about US$18 per 50 kg bag. Many rural households cannot afford this (see above on assets) and therefore grow the maize without fertiliser on permanently-cropped and exhausted land. From informal interviews, average yields of this unfertilised maize were estimated at 300 kg/ha or 120 kg per household. Most households spread the available fertiliser over all their maize at about 40 kg N/ha, well below optimum. Respondents emphasised that this made possible yields of 1500 kg/ha or 600 kg/household. The response of 480 kg extra maize per household to 17 kg of fertiliser N per household is consistent with published responses. The beneficiaries claimed that fertiliser raised their yields five fold and this is consistent with the AAH survey. Very few households used their vegetable seeds and these have been excluded from the outputs. In June 2004, mortality was estimated in the chicks at 15%.

Table 2. Physical and financial outputs from the distribution.

Input	Production or response per household.	Value per household, US$	Overall value US$
Groundnut seed	80 kg kernel	25	48,364
Bean seed	38 kg beans	16	29,536
Fertiliser	480 kg maize	44	87,273
less opportunity cost groundnuts	30 kg maize	-3	-3,891
Total for crop beneficiaries		82	161,282
Chicken beneficiaries		25	12,364
Total value added			173,646

Crop products have been valued at farm gate prices, immediately after harvest which were about half of the price those pertaining 8 months later during the hungry season.. The average household which received the crop package benefited to the extent of US$82, about equal to the value of their total annual staple food requirement. The value added over 2000 households was estimated at US$161,000.

Because the chickens had just begun to lay, it was difficult to value them. We originally valued the cocks at $3.6 for their carcass and the hens at $7.3 for their egg-laying potential. Allowing for mortality of 15%, the average value added per household was $25 and over 500 beneficiaries was $12,000. Informal interviews in March 2005 indicated that only about one third of the female chickens (31 out of 91 received) remained in the beneficiary household, the majority of losses being attributed to Newcastle disease since August 2004. However many of the recipients had valued the egg production before the hens had died and some retained chicks.

Thus the total value added was US$173,000 or 180% of the cost of materials delivered at district headquarters ($96,000). At pre-harvest (January 2005) prices, the value added would be at least $300,000.

Discussion: targeting.

While the piloted targeting methodology did succeed in selecting a higher proportion of highly dependent and poor families than was present in the baseline population, the immediate reaction to these results was that they were disappointing and did not justify the considerable effort in interviewing and data processing 3500 households. This was somewhat mitigated when the errors in other Malawian programmes (see below) were considered. An inclusion error below 10% would have been preferable and it was feared that our exclusion error was also high because of the limited time available for administering questionnaires. AAH is confident that, subject only to the veracity of the respondents in describing their household structure and assets, the selection process worked well up to the application of names to distribution cards. However, AAH could not be confident about the distribution of those cards, partly because names and spellings of villages and households in Malawi are very fluid and it is not always easy to retrace a named household. Distributors of entitlement cards may have become frustrated and given the cards to the incorrect families. Some village authorities, resentful of our selection process, may have consciously redistributed entitlement cards according to their own priorities. The degree to which the inclusion error was attributable to the 40% of beneficiaries not selected by questionnaire cannot be quantified, but it is certainly too big for this to have been the only problem.

In the Chewa culture, women tend to remain close to their parents after marriage and polygamous husbands rotate among their wives, often over more than one village. Such polygamy is not obvious to the casual observer and it was surprising to discover that 55% of our beneficiary households shared the husband with at least one other household. This invalidates the food-labour ratio calculation for more than half of our households. It could be corrected in principle by dividing the husband's food requirement and labour input among all of his households but AAH is not aware of any dependency calculations in Malawi which have recognised this problem.

We estimate a 37% inclusion error and suspect that our exclusion error is also high. Though disappointing this compares quite well with some other Malawian experiences.

Levy and Barahona (2001) evaluated the Government of Malawi/UK DFID Targeted Input Programme (seed and fertiliser) and the following table is reproduced from their Table 8. The "target" can be taken as the poorest three groups, giving an inclusion error of 14.0 + 21.4 = 35%.

Table 3. Percentage of beneficiaries and non-beneficiaries in different wealth groups of the 2000-01 TIP programme (After Levy and Barahona, 2001)

	Poorest	Second group	Middle group	Fourth group	Least poor
Non-beneficiaries	26.4	13.6	18.9	16.6	24.5
Beneficiaries	29.2	18.3	17.1	14.0	21.4

Using data from the Surveillance programme from April to June 2003, based on 284 households and wealth groups, based on household assets and livestock ownership.in six districts across Malawi, we were able to compare beneficiaries and non-beneficiaries of the General Food Distribution organised by WFP from July 2002 to May 2003. There was no difference in wealth ranking between beneficiaries and non-beneficiaries. If the intention had been to target the two poorest groups (40% of the population), then the inclusion error was 18.5 + 20.0 + 23.1 = 62%.

Table 4. Percentage of beneficiaries and non-beneficiaries of the general food distribution in each wealth group (Data from the AAH/GoM Surveillance programme)

	Poorest 20%	Second group	Middle 20%	Fourth group	Richest 20%
Non-beneficiaries	20.5	20.1	20.1	20.1	19.2
Beneficiaries	18.5	20.0	18.5	20.0	23.1

Nyirongo et al (2003) published a similar analysis of the General Food Distribution based on a much larger sample and the table below is based on their Figure 10.1. Again, assuming the targeting of the two poorest groups, the inclusion error is 21 + 25 + 22 = 68%.

Table 5. Percentage of beneficiaries and non-beneficiaries in each wealth group (After Nyirongo et al, 2003)

	Poorest	Second group	Middle group	Fourth group	Least poor
Non-beneficiaries	9	17	22	26	27
Beneficiaries	14	16	21	25	22

Effective targeting is not being achieved in Malawi and attempts continue to target vulnerable households, including HIV/AIDS-affected households, in a variety of programmes using methods which have previously been unsuccessful.

The comments about targeting by Levy and Barahona (2001) are highly pertinent to this study. Unfortunately, they do not seem to have influenced government, NGOs or United Nations Agencies. Among other things, Levy and Barahona argue that:

- There is a very real cultural resistance to the proposition that there are gradations of poverty within village communities ("we are all poor here") and that therefore there is resistance to poverty targeting
- Identifying the 20 to 30% "least poor" is reasonably simple but differentiating between levels of poverty in the remaining 70 to 80% is much more difficult
- Effective targeting in Malawi is possible but the costs would be very high.

After considering this intervention and its evaluation, the AAH Food Security team in Malawi did not feel that it had cost-effectively targeted dependent and poor households. While some of the imperfections in the targeting methods could be overcome with the value of hindsight, this would only be at the cost of even more resources spent on targeting. It is a moral judgement as to what proportion of the total cost should be spent on targeting. If targeting these vulnerable households is considered an absolute priority, then the detailed questionnaire method piloted here along with the labour-intensive beneficiary validation techniques

suggested by Levy and Barahona (2001) could work. Against this must be weighed the reduced expenditure on the inputs themselves. Irrespective of targeting, they raise food output and improve the return to labour in the community. The team felt it would be better in future to use less labour intensive targeting methods and greater involvement of the community itself in the selection process.

Discussion: physical and financial outputs.

In its impact on the target area, the intervention was successful in adding value of around US$80 to households, many of whose total assets were initially less than $40 per household. At the maize prices used for this valuation, this would have purchased a typical household's annual supply, assuming they took 80% of their food energy from maize. The results were not so good for chickens at $25 per household but this may have been because the evaluation was done in June 2004. It was not then possible to value the egg production only to put a value on the hen when it is ready to lay. The value of output was 180% of the cost of the materials as delivered to the district headquarters which must also be regarded as a good result.

The vegetables seeds were little used, partly because the rainfall in 2003-04 was low so that there was not much water in the streams to feed small scale irrigation. Only a few households have a tradition of dry season (winter) vegetable production and we were unable to do the planned training to accompany the vegetable seed because of problems with chicken vaccination and a subsequent disinclination to use Ministry of Agriculture staff.

Groundnut and bean seed are a real constraint on farming systems in this context where most of the cash cost for these crops is for seed and about 12% of the crop must be retained for seed. Therefore, many of the beneficiaries would not have grown these crops but for the donation of seed and would have either have grown unfertilised maize (which is much less profitable) or have fallowed the land.

For maize, where only about 3% needs to be retained for seed (even in unfertilised crops), the cost of seed is less of a problem. The main cash cost, unattainable to at least half of the households, is fertiliser. Even on the local varieties and regrown hybrids which is the typical mix for this part of Malawi, the response to fertiliser is dramatic. The five-fold response claimed by our beneficiaries is consistent with observation of the growing crop. It is important to recognise the importance of this for HIV/AIDS-affected households. The total labour input for the fertilised crop is slightly higher (fertiliser application, extra weeding and of course extra harvesting labour) but not more than two-fold. The fertiliser response therefore represents a 2.5 fold increase in output per unit of labour. No other labour-saving or labour-enhancing technology (eg animal draft, reduced tillage or herbicide use) can compete with this performance. In the short term, indeed, any attempt to enhance the return to labour in unfertilised crops is likely to fail. Longer term, better rotations or agroforesty systems might offer other labour-enhancing possibilities.

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