Grain Market Research Project

FOOD AID TARGETING IN ETHIOPIA:
A STUDY OF HOUSEHOLD FOOD INSECURITY AND FOOD AID DISTRIBUTIONS

Daniel C. Clay
Daniel Molla
Debebe Habtewold

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Food Aid Targeting in Ethiopia: A Study of Household Food Insecurity and Food Aid Distributions

by

Daniel C. Clay*
Daniel Molla**
Debebe Habtewold***

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*Michigan State University
**Famine Early Warning System Project, USAID/Ethiopia
***Ministry of Economic Development and Cooperation

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1. INTRODUCTION

For more than two decades, annual distributions of hundreds of thousands of metric tons of food aid have been channeled into safety net programs designed to alleviate the impact of food shortages in Ethiopia. Despite the massive size and duration of this effort, there remain many unanswered questions about its effectiveness and about its longer-term impact on the population it is designed to benefit. Recently, government and donor concern about Ethiopia's increasing dependence on food aid, coupled with the implicit demand for greater accountability in its use, has spawned great interest and debate about how efficient the food aid targeting system is in ensuring that food reaches those who need it the most (Sharp 1997). A second, related fear is that large quantities of food aid, if poorly targeted, may depress market prices for food and may result in domestic production disincentives (Jayne and Molla 1995; Molla et al. 1997; Maxwell et al. 1994). Both of these concerns are expressed in Ethiopia's National Policy on Disaster Prevention and Management (TGE 1993a).

While there have been numerous evaluative studies made by NGOs and others on the impacts of specific food distribution programs in targeted areas, such studies tend to be qualitative, very localized, and anecdotal in nature. Almost always, they have been conducted by the implementers or sponsors of the food aid programs. A recent departure from this general rule is a broad-based evaluation of food aid targeting in Ethiopia sponsored by Save the Children Fund-UK (Sharp 1997). This study covers a considerable volume of literature on the subject and provides a broad overview of the issues. It has helped to clarify the extent of our knowledge about food aid targeting methods and under what circumstances they appear to be relatively more or less successful, based on examples of the various food aid programs and projects implemented in Ethiopia over the past several years.

Perhaps the most glaring void in our knowledge base on food aid targeting and its impacts is that left by the absence of empirical research on the subject. The need for a systematic, quantitative analysis of targeting efficiencies is overwhelming, especially given the large numbers of people concerned and volume of funds allocated to the problem of feeding Ethiopia's food insecure.

This paper examines the efficiency of food aid targeting in rural Ethiopia based on empirical evidence from a survey of a nationally representative sample of 4,166 farm households conducted by the Grain Market Research Project (GMRP) of MEDAC in collaboration with the Central Statistical Authority (CSA). The survey was administered in June 1995 and covered the 12-month period from the beginning of the 1995 *meher* harvest to the beginning of the 1996 *meher* harvest.

Food aid targeting is here defined as "restricting the coverage of an intervention to those who are perceived to be most at risk in order to maximise the benefit of the intervention whilst minimising the cost" (Jaspars and Young 1995). Our focus is on targeting at two levels. We first assess the degree to which the most food insecure areas (weredas) of the country are selected for food aid distributions; within these areas, we then determine how successful food

aid programs are at reaching their intended beneficiaries—the least food secure households.[1] Targeting errors of *inclusion* (distributions to food secure weredas and households) and of *exclusion* (no distribution to food insecure weredas and households) are estimated.

The remainder of this paper is organized as follows: Section 2 reviews historical trends in food aid distribution. Food aid targeting policies and practice are discussed in Section 3. Research methods and data are described in Section 4, and research results are reported in Section 5. The paper concludes in Section 6 with a discussion of key findings, future research needs, and policy implications.

[1] Our focus on the food insecure as the primary target of food aid deliveries is consistent with national policy (TGE 1993a) and is the appropriate focus for research on the production and marketing disincentive effects of food aid. We recognize, however, that some members of the donor community in Ethiopia contend that the food insecure should not be in all cases the primary target of food aid programs. Such alternative approaches to targeting are defended particularly in non-emergency cases aimed at "development" objectives, such as school feeding program or the promotion of on-farm conservation activities.

2. HISTORICAL TRENDS AND TYPES OF FOOD AID DISTRIBUTION IN ETHIOPIA

The quantity of food aid delivered to Ethiopia has fluctuated from year to year, depending on the extent of food supplied from domestic sources. The annual volume of cereal food aid has ranged from 200,000 metric tons to about 1.2 million metric tons or between 3.5% and 26% as a proportion of total domestic food grain production over the 1985-1996 period (Figure 1). Even in average years, the volume of cereal food aid in a given region can account for 25% or more of the total marketed supply of grain, and up to 50% in drought years. Depending on the manner in which the food aid is distributed, an injection of cereal food aid of this magnitude can affect grain market prices and/or domestic production incentives. This concern has been felt both by the government and donors, and the objective of limiting food aid distributions to the most needy and in ways that do not negatively impact long-term development objectives has become a priority. Also, changes in donor country agricultural policies, such as the elimination of the Common Agricultural Policy in Europe and reduced support to farmers in the United States, mean that food aid resources will likely become more scarce in the future and will almost certainly not be available in the large quantities made available in the 1980s and early 1990s.

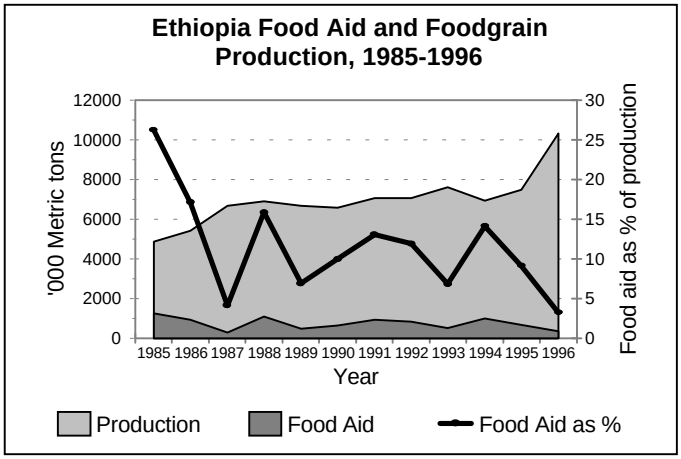

Figure 1

A substantial portion (over 80% in bad years) of the total annual food aid flow to Ethiopia has been used for emergency relief purposes (Aylieff 1993). And in times of emergency, the focus of food aid programs tends to be on the short-term objective of saving lives, rather than on longer-term development objectives. In more recent years, with the aim of linking relief with development, the government of Ethiopia has placed greater emphasis on development-oriented aspects of food aid programming. During the period of January-May, 1996, for example, the Disaster Prevention and Preparedness Commission (FDRE 1996) reports that 63% of the relief food was distributed through employment-generating schemes (Figure 2). Results of the present study show that, in terms of actual kilocalories of food aid received over a full twelve-month period, just over a third are linked to development programs. Both estimates are considerably below the current 80% development program goal of the Government of Ethiopia as stated in the *Food Security Strategy 1996* (FDRE 1996).

The major food aid commodities distributed in Ethiopia are cereals (93%), especially wheat, maize, and sorghum; these are followed by oils and fats, and pulses. Wheat constitutes the largest share and accounts for about 80% of the total volume of food aid supplied between

1992-1995 (Figure 3). Sorghum and maize account for about 8% and 3% respectively, while oils and fats make up another 3% of the total.

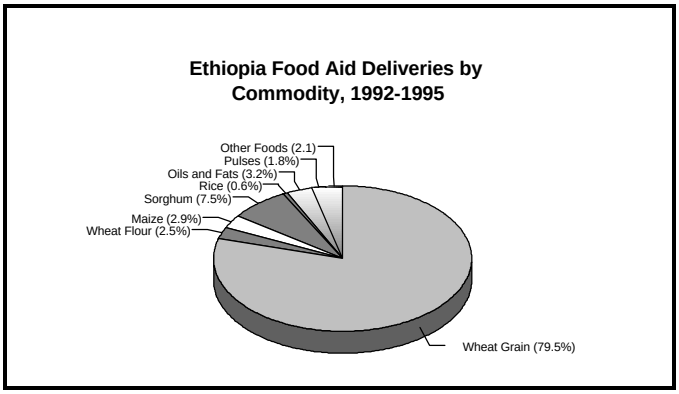

Figure 2

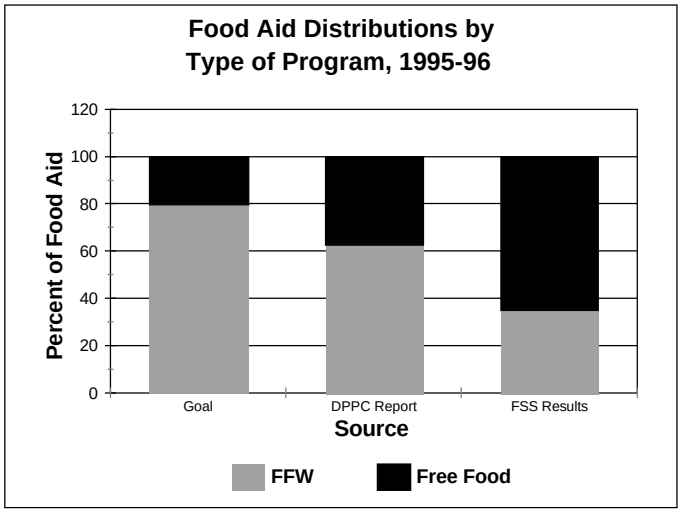

Figure 3

3. TARGETING FOOD AID: POLICY AND PRACTICE

Ethiopia's official food aid policy states that no able-bodied person should receive food aid without working on a community project in return. This is complemented by targeted free food aid for those who cannot work. The official goal, as described above, is to expand work-based food aid to the point where it accounts for 80% of all distributions (WFP 1995).

While emphasizing the need to give priority to disaster prevention programmes in all development endeavours, the National Policy on Disaster Prevention and Management (NPDPM) states that disaster relief should ensure adequate income transfer for disaster affected households, promote self-reliance among the beneficiaries, preserve assets to promote speedy recovery, be geared to eliminate the root causes of disaster vulnerability, and contribute to sustainable development. The policy advocates: community participation, giving priority to the most at-risk areas, coordination of efforts, and no free distribution of aid to the able-bodied among the affected population (TGE 1993a; TGE 1993b).

According to the NPDPM, local-level responsibility for selecting food aid beneficiaries lies with the wereda administration, which in turn is assisted by a committee of elders and community representatives at the kebele or peasant association (PA) level. Neither NGOs, nor the Disaster Prevention and Preparedness Commission (DPPC) have control over the selection of beneficiaries for food assistance. A list of beneficiaries is prepared and submitted to NGOs and/or the DPPC by each wereda committee. Wereda committees are comprised of representatives of the PAs, the wereda Ministry of Agriculture office, and the wereda administrative council.

Fully efficient food aid targeting, as defined above, includes only those intended to benefit from an intervention and excludes all those who are not intended to benefit from the intervention (i.e., no errors of *inclusion* or *exclusion*). But food aid interventions vary considerably, causing differences in how, and how well, targeting is carried out. Important differences can be found in the type of intervention (e.g., free food, employment generating schemes, food-for-work), the means used to identify the target group (e.g., self-, administrative, or community targeting), the type and amount of benefits associated with the intervention (e.g., kg of wheat or sorghum, litres of cooking oil), and the timing of the intervention. Of course, religious, cultural and political factors further complicate the targeting problem if they feature prominently among the factors that need to be considered when targeting beneficiaries.

Targeting methods can be broadly classified into three types:

Administrative targeting: This occurs when the beneficiaries of an intervention are administratively determined by those other than the intended beneficiaries, using such indicators as asset or livestock ownership, age and gender, nutritional status, access to resources such as land and family labour, etc.

Self-targeting: As the name implies, this type of targeting occurs when the type and amount of the benefit attracts only those who are intended to be beneficiaries of an intervention. The

use of below-market level wage rates and ‘inferior’ goods are typical of self-targeting interventions. This is the method advocated by the Ethiopian*Food Security Strategy* (FDRE 1996, p.25).

Community-based targeting: This is a targeting approach that involves community decisions about the eligibility of households to participate in food aid programs. Decisions are based on community members’ prior knowledge of each household's food security situation and coping ability.

There is no targeting method that is universally effective. Each type may work better under certain circumstances and usually includes some elements of the others. Many interventions involve a combination of the three types of targeting methods. For a detailed discussion of the advantages and disadvantages of these targeting methods, the reader is referred to Sharp's study of food aid targeting in Ethiopia (Sharp 1997).

4. DATA AND METHOD

4.1. Survey Data

The data examined in this research derive principally from a series of surveys conducted in 1995 and 1996 on a nationwide sample of rural households in Ethiopia. The sample frame and focus of the surveys are summarized below.

Sample Frame. From approximately 60,000 census enumeration areas (EAs) in Ethiopia, 614 were selected using a stratified random sample frame. From each of the 614 enumeration areas 24 households were randomly selected for enumeration under the Central Statistical Authority (CSA) Annual Agricultural Sample Survey. This survey program assigns one enumerator to each of the 614 EAs. Enumerators reside in or near their EAs and collect agricultural information from the nearly 15,000 sampled households at key periods during the year.

A 50% sub-sample (12 households from the original 24 in each EA) was randomly selected for the CSA's Household Budget Survey and the World Bank sponsored Welfare Monitoring Survey, both of which were conducted during two 2-month intervals: in June-July of 1995 and December-January 1995-96. The Food Security Survey, the results of which are analyzed in the present paper, was administered to a randomly selected sub-sample of 7 of these 12 households in July, 1996 for a total of 4,298 households.

Survey Contents: The Grain Marketing Research Project is in the process of consolidating, at the household level, data from the four surveys:[2]

1) Data from the CSA Annual Agricultural Sample Survey include crop production from both agricultural seasons (*Meher* and *Belg*), farm size and land use, farm inputs use and other farm practices, and livestock inventories.

2) The focus of the Household Budget Survey is on sources of income and both major and everyday expenditures.

3) The Welfare Monitoring Survey emphasizes education, health status, housing conditions, access to markets and social services, major assets owned, and nutritional status (including anthropometry).

4) The Food Security Survey addresses a broad array of grain marketing and food security issues.

These include: grain production and marketing, food aid use, impacts of food aid program participation, land ownership and use, household labor and demographics, and various

[2] It is important to note the unusual nature of this data set. It is extremely rare for data from divergent surveys such as these (and funded from different sources) to be available on a common sample of households. From a research point of view, this data set is unique in that, when merged, it will allow us to examine research questions that link the four areas covered by the individual surveys.

farming practices. Some of the key variables from the Food Security Survey examined in this study are described below.

4.2. Key Study Variables

Data from the Food Security Survey constitute the primary empirical basis of the present research. Selected variables from the Annual Agricultural Sample Survey and from other sources such as the Disaster Prevention and Preparedness Commission are also reported. Household food availability and food aid receipts are two variables that merit special attention here because of their importance to our analysis of food aid targeting efficiencies.

Food Availability: Household food availability is a variable that reflects the net amount of food grains (including *enset* as a substitute for grains in certain regions of Ethiopia) available for household consumption after adjusting for market transactions and food exchanges. It is computed as all inflows of food grains over the twelve month period November 1995 through October 1996 minus all outflows (other than consumption) over the same period. Since the survey was fielded in June-July 1996, only after the first 8 months of the year-long reference period, farmers were asked about how much grain, if any, they expected to sell or buy during the remaining four months of the period (i.e., until the next harvest). Because most grains are marketed during the first months after harvest, farmers' anticipated sales during the final 4 months amounted to a relatively small percentage (11.5%) of all food grain outflows during the year. Anticipated purchases constitute only 5.8% of total inflows (Table 1).

Table 1. Household Food Availability byInflow and Outflow Cateory (Excluding Food Aid)

Inflow/Outflow Category	Mean Household Food Grain Inflow and Outflow (in Kg)	Percent of Total Inflows or Outflows
	Inflows	
Production (Mehir)	1,117	74.6%
Production (Belg)	127	8.5%
Purchase	146	9.7%
Anticipated Purchases	87	5.8%
Exchanges Received	21	1.4%
Total Inflows	1,498	100.00%
	Outflows (net of consumption)	
Sales	297	83.4%
Anticipated Sales	41	11.5%
Exchanges Given	18	5.1%
Total Outflows	356	100.00%
Net Food Availability	1,142	

Thus, household food availability is calculated as the sum of own production, purchases, anticipated purchases, and food exchanges received,[3] minus sales, anticipated sales, and exchanges given. Table 1 shows the mean household food availability in kilograms and the relative importance of the various inflows and outflows. On balance, after market transactions and exchanges, farm households in Ethiopia had an average of 1,142 kg of food grains available for consumption. It is important to note that this measure of food availability does not include food aid distributions. We omit food aid distributions here because this measure of food availability is the indicator of food insecurity or "vulnerability" against which we will examine food aid receipts. In some of the analyses presented in the following section, food availability is reported as described here—on a kg basis; in other analyses it is converted to kilocalories per adult equivalent per person-day.

Food aid: Household food aid receipts, as reported by sampled households, is a variable with several important sub-categories. Farm households were asked how much food aid they

[3] Food exchanges include gifts of food plus food given/received in return for specific goods or services.

received and of what types of commodities, during which months, and under what types of programs they participated (e.g., free food, food for work). Overall, 20.0% of farm households participated in food aid programs during the 1995-96 reference period. Free food distributions account for the largest share (64.6%) of food aid received by sampled households, with the remaining 35.4% being distributed through food-for-work programs. Consistent with historical trends, wheat is the most commonly distributed (nearly 60%) food grain, though the proportion in wheat is lower than the normal 80% or so due to the local procurement of food aid grains in 1995-96, notably sorghum and maize. Peak months for free food distributions were May through August; participation in food-for-work programs peaked during April and May, when agricultural labor demand is relatively low.

For purposes of comparison, we have aggregated food aid receipts across months and then converted these annual totals to wheat equivalents and kilocalories. To avoid redundancy in the presentation of results, food aid amounts received from food-for-work and free food programs have been combined. This approach is based on the finding that, in nearly all instances, the two types of assistance show similar patterns and lead to similar conclusions. Exceptions to this general rule are duly noted in the text.

Comparing our survey estimates of food aid receipts with those reported by the DPPC as amounts delivered during the same 12 month period, we find striking similarities across all major regions (see Figure 4). Overall, our survey estimates amount to 82.6% of the DPPC's recorded deliveries. Since the DPPC estimates also include deliveries to urban areas and monetized food aid amounts, it is expected that they should be somewhat higher than the survey estimates, which do not capture urban and monetized food aid. This difference is especially evident in the "other killil" category, which includes Addis Ababa, Dire Dawa, and Harrar, all predominantly urban regions.

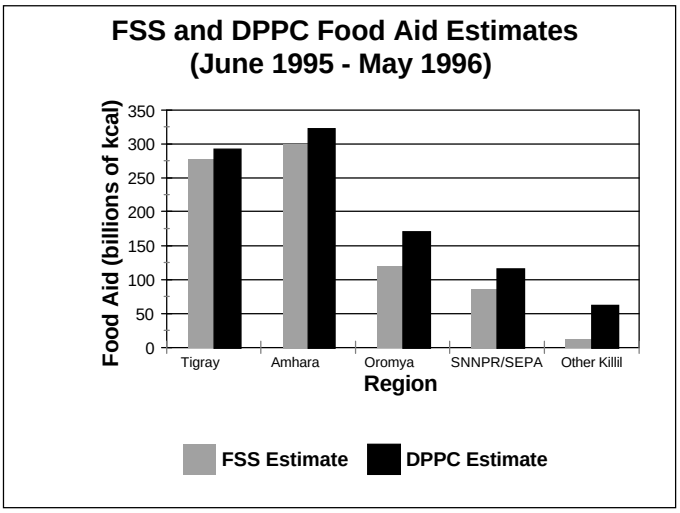

Figure 4

5. FINDINGS

We begin our review of findings with a discussion of the nature and scope of food aid participation and need in Ethiopia, at both the national and regional levels. This is followed by analyses of wereda-level, then household-level food aid targeting results. We conclude the section with an examination of the determinants of food aid distributions in Ethiopia and potential causes of targeting inefficiencies.

The present analysis focuses exclusively on crop-based households. The livelihoods of a small number (1.2%) of households in the Food Security Survey sample are based either on livestock production or non-farm activities.[4] Livestock-based households, often landless and nomadic, are concentrated in the regions of Afar, Somalie and Tigray; non-farm households are more broadly distributed across the country. The food security and food consumption of these two groups of non-cropping households are often defined in terms of the value of livestock and animal products (including meat and milk), or in terms of their earnings off-farm. Because of comparability problems in evaluating the food security of these households, they have been removed from the analysis.

5.1. Nature and Scope of Household-level Food Aid Participation and Need in Ethiopia

Results show that approximately 5.0 million households (56.8%) are food secure households (i.e., have available 1,680 or more kilocalories per person per day), while the remaining 3.8 million (43.2%) are deficit households (Figure 5).[5] In aggregate terms, the food secure households have available to them 7.9 million metric tons of wheat equivalents. The deficit households show a total food gap of 1.4 million metric tons (difference between food available and food needs at 1,680 kilocalories per person per day requirement). Food aid distributions reduced this deficit by approximately 8%, to 1.3 million metric tons. If food aid distributed to secure households had instead been given to deficit households (through better targeting), it would have reduced the food gap by another 9%.

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[4] The CSA sample frame is designed to include only households reporting some crop production. The small proportion of households (1.2%) here classified as livestock-based and/or non-farm households are due to slightly different definitions. For present purposes, livestock-based households are defined as those that produce less than one quintal (100 kg) of grains and possess five or more Tropical Livestock Units (TLU). Five TLU could consist of many combinations of animals (e.g., 2 cows and 36 sheep; a camel, three cows and 19 sheep; etc.). Non-farm households are those with at least 500 Birr in off-farm income and no significant crop or livestock production.

[5] The Government of Ethiopia has set the minimum acceptable weighted average food requirement per person per day at 2,100 kcal (FDRE 1996). Conventional wisdom in Ethiopia is that grains constitute 80% of the average Ethiopian diet, or 1,680 kcal. The rest comes from *enset* (false banana), root crops and livestock products. This analysis assumes 80% of the minimum caloric requirement to originate from grains and *enset*, which are used as the basis for our calculation of household net food availability. We recognize that the 80% figure represents only an approximate average for the country and that there is likely to be considerable regional and household variation in this requirement. We expect that data from the CSA Household Budget Survey will enable us to develop regionally-specific estimates of kilocalories consumed from grains and *enset*, for use in future analyses.

There is sufficient food available in the country, before food aid imports, to meet the nutritional needs (1,680 kcal PPD) of the entire population. Yet because food is unevenly produced and traded, a large segment of the population, the food deficit population, lacks access to the minimum nutritional requirement. Food consumption in the food secure households is, on average, nearly four times that of the deficit households. The Gini ratio of food availability in Ethiopia, based on these data, is 0.44, indicating high inequality in food access.

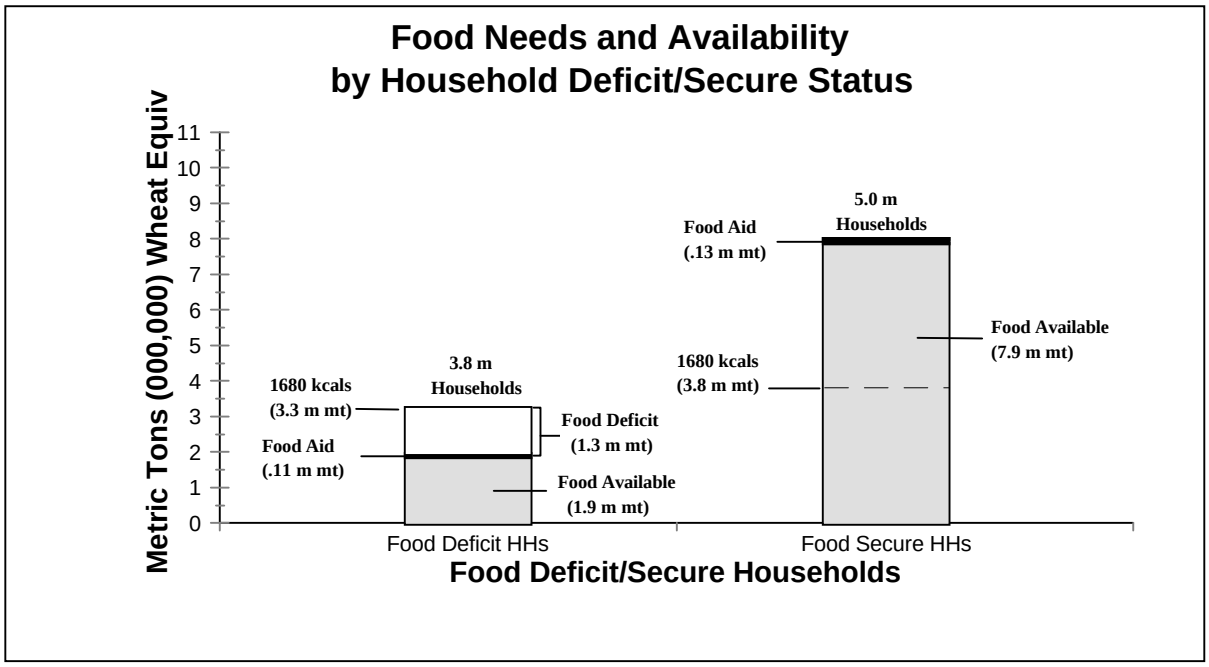

Figure 5

In absolute terms, food aid received by food secure households (.13 m mt) is slightly more than that going to food deficit households (.11 m mt). In relative terms, food aid accounts for 5.7% of grain consumption among deficit households and 1.6% among food secure households.

When expressed in terms of kcal per person-day, food aid distributions in 1995-96 are found to be highly concentrated in Tigray, a historically food deficit region (Figure 6). Tigray received approximately 8 times the national average food aid distribution of 105 kcal per person-day. This regional concentration of food aid is evident in both free food and food-for-work distributions. All other regions received food aid distributions at or below the national average. In absolute terms, households in Tigray and Amhara regions were the beneficiaries, in roughly equal proportions, of over 70% of all food aid distributed in the country.

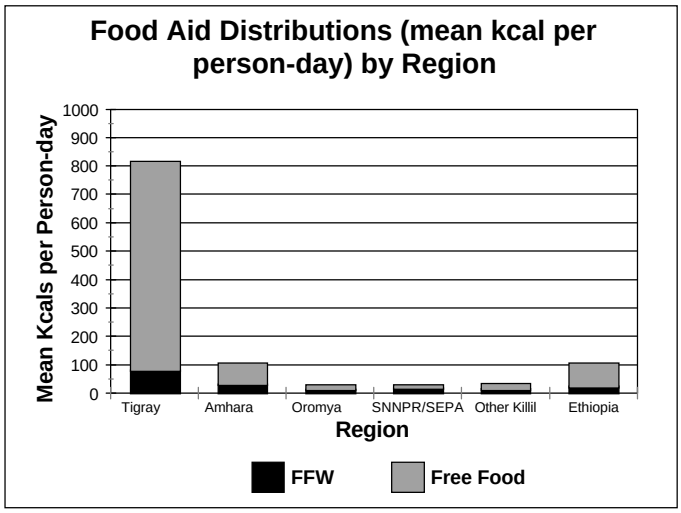

Figure 6

5.2. Stage 1: Targeting Weredas

Our analysis of food aid targeting efficiencies begins with a look at the selection of weredas relative to the magnitude of their food deficit. Wereda selection is the first stage in the DPPC's efforts to target food aid deliveries (DPPC 1995). Their goal is to assess the food needs of all weredas in the country and eventually to identify those areas of greatest vulnerability, those in need of food aid intervention.

How efficient was wereda targeting in 1995-96? Did the most vulnerable weredas receive food assistance? Answers to these questions can be gleaned from Table 2. Overall, 41.5% of the weredas in our sample contained one or more households reporting they received food aid during the past year.[6]

Efficient wereda-level targeting would mean that those weredas containing a large food deficit population would be the recipients of food aid programs. Table 2 shows the inefficiency in the current system's ability to target the most needy weredas. Sampled weredas are classified into quartiles according to the percentage of the sampled households in each wereda that are food deficit (<1680 kcal per person-day). For the first quartile (the most food secure), less than 19% of sampled households in each wereda in this group fall short of their daily food needs. For the fourth quartile, at the high extreme, 71 to 100% of households in these weredas are found to be food insecure. If weredas were reasonably well targeted, one would expect a higher percentage of weredas falling in quartile 4 to be food aid

[6] Undoubtedly, food aid programs reached more weredas than this but, by chance, none of our sample households were among the beneficiaries in these weredas and thus they are classified here as non-food aid weredas. Nonetheless, it is reasonable to assert that not all weredas received food aid and that the targeting process, however effectively it has been applied, has resulted in the distribution of food aid to certain weredas and not to others, largely as reflected in the food aid receipts of our sample households.

Table 2. Percentage of Weredas Receiving Food Aid by Level of Food Deficiency in Wereda for the 1995-1997 Season

	Wereda Food Deficit Quartiles				
	Quartile 1	Quartile 2	Quartile 3	Quartile 4	
Food Aid in Wereda	Low deficit weredas *(o-19% of hhs are deficit)*	Moderately low deficit weredas *(20-41% of hhs are deficit)*	Moderately high deficit weredas *(42-70% of hhs are deficit)*	High deficit weredas *(71-100% of hhs are deficit)*	All Weredas
Weredas Not Receiving Food Aid	59.3%	57.6%	59.3%	57.6%	58.5%
Weredas Receiving Food Aid	40.7%	42.4%	40.7%	42.4%	41.5%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
N	91	92	91	92	366

X^2 = .113 Sig = .99

recipients. However, there are no significant differences across these quartiles in terms of the percentage of weredas that are beneficiaries of food aid programs; all are within a single percent of the national average of 41.5%. A linear correlation between wereda percent deficit households and percent of households receiving food aid confirms the lack of statistically significant association between these two variables (r=.07, sig.=.19).

Given the significant effort invested by the DPPC in assessing food insecurity and estimating "affected populations" in these areas, it was a bit unexpected to find no positive association between need and food aid deliveries at the wereda level. We suspect that the absence of association is linked to the long-term build up and inflexibility of the food aid delivery system, an issue taken up in our concluding discussion.

5.3. Stage 2: Targeting Households

The second stage of food aid targeting occurs at the household level. As described in Section 3, household-level targeting can take on various forms. Self-targeting, administrative targeting, community-based targeting, and their many hybrid variations are all methods used in Ethiopia. The purpose of this section is not to compare these methods, but to assess the effectiveness of local-level targeting overall. We look first at regional variations in household food availability and food aid receipts, then at the age and gender of the household head as criteria for food aid eligibility.

There is significant regional variation in the amounts of food available to households through their own production and net transactions, and, most of all, through food aid receipts (Figure 7). In the aggregate, households in all five regions meet the 1,680 kcal requirement for food availability per person-day, even without the help of food aid. Because the 1995-96 harvest was unusually strong, it departs from the historical trend of deficit food production. Again, however, it is important to note that despite high production overall, inequalities in household food access means that there is a large segment of food deficit households in every region. In terms of food aid distributions, the region of Tigray stands out, despite maintaining a level of food security comparable to other regions.

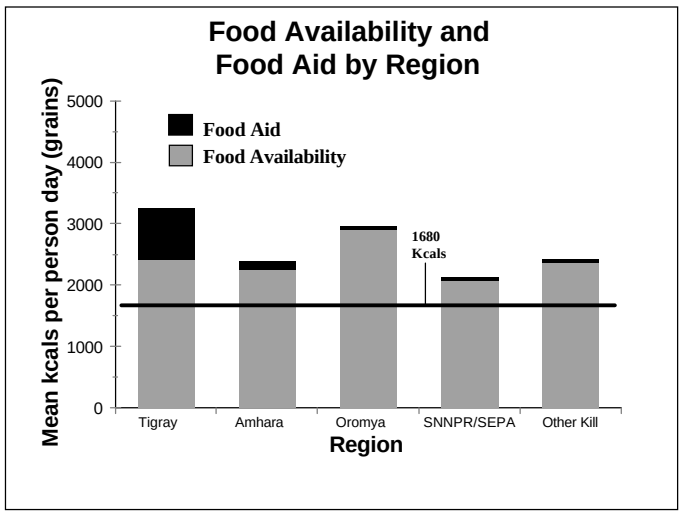

Figure 7

Given our earlier finding that food aid distributions in Ethiopia are sufficient to reduce the country's rural food gap by only 17%, even if perfectly targeted, it is not surprising that errors of exclusion would far surpass errors of inclusion in the distribution of food aid. Indeed, almost 80% of Ethiopia's deficit households are excluded from the system (Figure 8). Errors of inclusion, however, are significant as indicated by the nearly 20% of food secure households that are food aid beneficiaries.

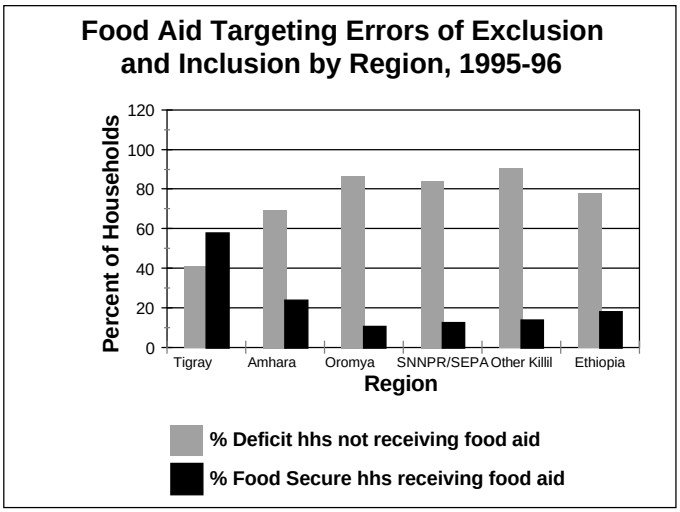

Figure 8

To varying degrees, most regions of the country conform to this national pattern. The one exception is Tigray, where errors of inclusion actually exceed errors of exclusion: approximately 40% of Tigray's deficit households are not on the food aid rolls, while nearly 60% of the food secure households are. This unusual pattern of targeting errors in Tigray is undoubtedly linked to the high per capita flow of food aid to the region reported earlier. More food aid will nearly always decrease exclusion errors while increasing inclusion errors.

The *Food Security Strategy* (FDRE 1996) identifies a need to target the aged and orphans as especially vulnerable groups. Conventional wisdom often adopted by NGOs and local

communities holds that female headed households likewise constitute an especially vulnerable group and should therefore be targeted for food aid. The Food Security Survey has no information on orphans, but from it we are able to isolate households headed by women and the aged.

Our findings do not support the commonly-held notion that female-headed households are more food insecure than are male-headed households. Net food availability (kcal per adult equivalent person-day) shows no significant difference when comparing male- and female-headed households (Figure 9). Despite their comparable levels of food availability, female-headed households receive more than 4 times the level of food aid received by male-headed households. In other words, women are being successfully targeted, but this targeting may not be appropriate.

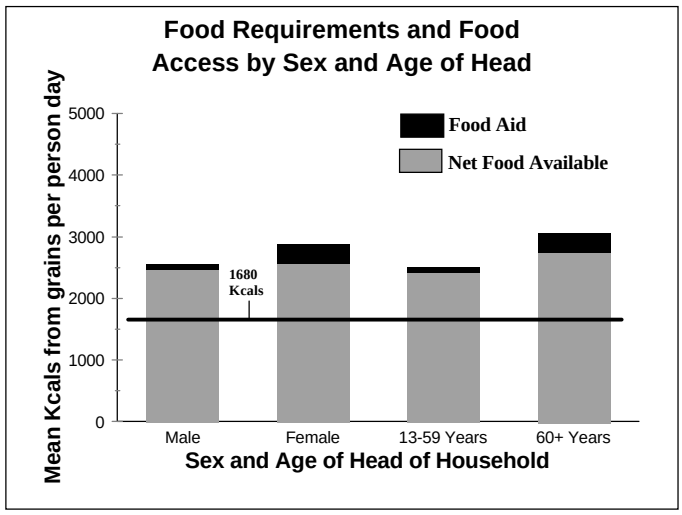

Figure 9

Figure 9 also calls into question the belief (conventional wisdom) that elderly heads of households are less food secure than younger household heads. Indeed, net food availability is higher in households headed by persons aged 60+ years than in younger households. Even though older heads of households are no less food secure than are younger heads, they receive disproportionately more food aid by a factor of four. Thus, as with female-headed households, targeting the aged may not be appropriate. However, this does not imply that gender and age inequalities do not exist *within* households—a proposition we are unable to test using the current data set.

It is important to note that when broken out by type of food aid program, all of the "over-targeting" of women and the elderly occurs in the distribution of free food; food-for-work receipts show no significant differences by gender or age.

5.4. Wereda-Level Versus Household-Level Targeting

Food availability varies more between weredas (77.1% of variation) than within weredas (22.9%), as shown in Table 3. This suggests that targeting of food aid at the wereda-level would have a greater payoff (all else equal) than targeting within weredas, i.e., at the household level.

Variation in the food aid distribution follows the same pattern described above, with greater variation between weredas (84.3%) than within weredas (15.7%). This implies that food aid targeting in Ethiopia does give more weight to targeting weredas than to targeting households within them, which is consistent with the variation in food availability.

Table 3. Comparison of Between Wereda and Within-Wereda Variation in Food Availability and Food Aid Distribution

	Food Availability ('000 Keal per person-day)		Food Aid ('000 Kcal per person-day)	
	Mean Squares	Percent of Variance	Mean Squares	Percent of Variance
Between-Wereda Variation	37,141	77.1%	6,855	84.3%
Within-Wereda Variation	11,088	22.9%	1,278	15.7%
F ratio	*3.35*		*5.37*	
F probability (sig.)	*0.0000*		*0.0000*	

Thus, the problem is not one of not giving appropriate attention to targeting weredas, but, as our results show, of failing to target the right weredas. Though 77.1% of the variation in food availability can be accounted for by targeting the right weredas, household targeting is also important. If we are interested in optimizing food aid distribution, there is clearly much room for improvement at both levels.

5.5. Comparison of Successful, Actual, and Random Food Aid Targeting Scenarios

As shown earlier, though 41.5% of sampled weredas received food aid in 1995-96, these were not always the most vulnerable weredas. Similarly, though 20% of households received food aid, these were not always the most vulnerable households. To understand the parameters of current food aid targeting and how it can be improved, it is instructive to compare the efficiencies of actual food aid targeting with hypothetical best and worst case scenarios as presented in Table 4.

Table 4. Comparison of Successful, Actual and Random Food Aid Targeting Scenarios

				Targeting at Household Level		
				Hypothetical	Actual	Hypothetical
Targeting at Wereda Level	Percent of weredas targeted (a)	Percent of deficit hhs located in targeted weredas (b)	Percent of hhs in targeted weredas that are deficit hhs (c)	Estimate of percent of deficit hhs that would receive food aid if *randomly* targeted within weredas (b x c) (d)	Percent of deficit hhs that received food aid as *actually* targeted within weredas (e)	Estimate of percent of deficit hhs that would receive food aid if *successfully* targeted within weredas (f)
Hypothetical: *Successful Targeting* of Least-Food-Secure Weredas *(>45.9% hhs w/food deficit)*	41.5%	69.4%	72.3%	50.2%		69.4%
Actual: *Actual Targeting* of Weredas in 1995-96	41.5%	46.6%	44.5%	20.7%	22.3%	46.6%
Hypothetical: *Random Targeting* of Weredas	41.5%	41.5%	41.5%	17.2%		41.5%

For purposes of comparison across the three scenarios, we assume:

1) that the amount of food aid available for distribution is sufficient to cover all deficit households in the selected weredas,[7] and

2) that resources and infrastructure are sufficient to reach a constant 41.5% of the country's weredas (see column a), the level currently achieved .

The middle row of Table 4 reports the results of actual targeting of weredas in 1995-96. It shows that 41.5% of weredas were targeted and that these weredas contained 46.6% of all the food deficit households in Ethiopia (col. b). Column (c) reports the percent of households in the selected weredas that were deficit households, as opposed to food secure households.

[7] In the "actual case" scenario, the percentage of households that received food aid (44.5%) was slightly below the percentage classified as deficit in the selected weredas (46.6%). This is a slight violation of the assumption that food aid would be sufficient to cover *all* deficit households in the selected weredas. The resulting bias introduced is very minor and does not seriously affect the conclusions drawn from this comparison.

When compared to the top row, or best case scenario, we can see that actual practice (middle row) is well below this theoretical maximum. In this best case, the 41.5% of weredas targeted are those with the very highest rate of food deficit (>45.9% deficit households). Our results show that these weredas contain 69.4% of all needy households, considerably higher than the 46.6% located in weredas actually selected.

Alternatively, the worst case scenario assumes a completely random selection (no targeting) of households.[8] Where 41.5% of weredas are randomly selected, they will contain 41.5% of all deficit households. Compared to the actual practice scenario, current practice appears only marginally more effective than the random case, isolating 46.6% versus 41.5% of Ethiopia's food deficit households.

The last three columns (d, e and f) compare the same three scenarios as they relate to household targeting *within* weredas. Beginning with actual practice, we find that 22.3% of all deficit households were reached by the current food aid targeting system (col. e), again only a marginal improvement over the 20.7% that would have been achieved through random distribution to households within the selected weredas. As reported in column (f), theoretically perfect targeting of households would of course have reached all 46.6% of the country's needy households living in these weredas, effectively doubling the targeting efficiency.

We note that under current resource and infrastructure limitations, the very best that could be achieved would be to reach 69.4% of the food deficit population. The very worst, random targeting, would reach only 17.2% of this population. At the current rate of 22.3%, there is little argument that the system shows room for improvement. Columns (d and f) also reveal the relative merits of focusing on wereda versus household level targeting. Fully successful wereda targeting, coupled with random household distribution within those weredas, would reach 50.2% of the food deficit population. Conversely, random wereda selection coupled with completely successful identification of needy households within them would result in a lower, 41.5% targeting efficiency.

[8] Taking random targeting as the "worst case" scenario assumes that those in charge of food aid targeting both at the wereda and household levels are genuinely committed to reaching the least food secure households. Of course the *absolute* worst case would involve "negative targeting," or all food aid purposefully going to the most food secure, but we find that such a scenario would not be heuristically helpful in this analysis.

Table 5. Deficit Households: Success/Failure of Targeting, Mean Size of Deficit and Importance of Food Aid to Eliminating Food Deficit

Targeting Success/Failure	Percent of Food Deficit Households (N=1,801) (a)	Mean Size of Deficit Before Food Aid (kcal PPD) (b)	Mean Food Aid Received (kcal PPD) (c)	Mean Food Deficit After Food Aid (kcal PPD) (d)	Percent of Deficit Reduced by Food Aid (e)
Wereda not targeted	53.4	722	0	722	0
Wereda targeted but household not	24.3	734	0	734	0
Wereda and household targeted	22.3	765	452	313	59.1
Total	100	735	101	634	13.2

Turning our focus to the 1,801 food deficit households in our sample (Table 5), we can begin to understand the impact of our targeting successes and failures. As indicated above, only 22.3% (column a) of Ethiopia's deficit households were food aid beneficiaries in 1995-96. Another 53.4% did not receive food aid because their weredas were not targeted, and the remaining 24.3% of deficit households were not selected as beneficiaries even thought there were food aid programs in their weredas. Column (b) indicates that those who were targeted differed little from those who were not, in terms of the degree of food deficit they faced; deficits ranged from 722 to 765 kcal per person-day.

The "success story" in this table, of course, emerges from the deficit households that were fortunate enough to be selected as food aid beneficiaries. Their average deficit of 765 kcal per person-day was reduced by 313 kcal, or 59.1%. To households living on the margin and so badly in need of assistance, such an increase can have a substantial impact on their health and well-being. For these households there is a safety net in place and undoubtedly it is making a difference. When broken out by region, our data reveal that these households are disproportionately located in the Tigray and Amhara regions.

5.6. Determinants of Food Aid Distributions and Targeting Errors

The absence of association between food insecurity and food aid receipts causes us to probe at the reasons for this unexpected finding and the food aid targeting errors from which it arises. By breaking out food aid distributions by level of food availability, region, and historical pattern of food aid receipts, we hope to shed light on this question. To estimate the independent effects of key food aid determinants, this section concludes with a multivariate analysis (ANOVA and OLS regression) of household-level food aid receipts.

5.6.1. Food Aid Distribution by Household Food Availability and Region

To further examine the association between food availability and food aid distributions, we have classified households into four groups based on their food availability (Figure 10). The lower two availability groups are comprised of food deficit households: the <1,000 kcal per person-day group isolates the "extreme deficit" households, many of whom consume less than half the required minimum 1,680 kcal required from grains. The other is the "moderate deficit" group that ranges from 1000 to 1,679 kilocalories per person-day. The remaining two groups enjoy, respectively, moderate and high food security, with the "high food security" households consuming, on average, twice the minimum kcal requirement.

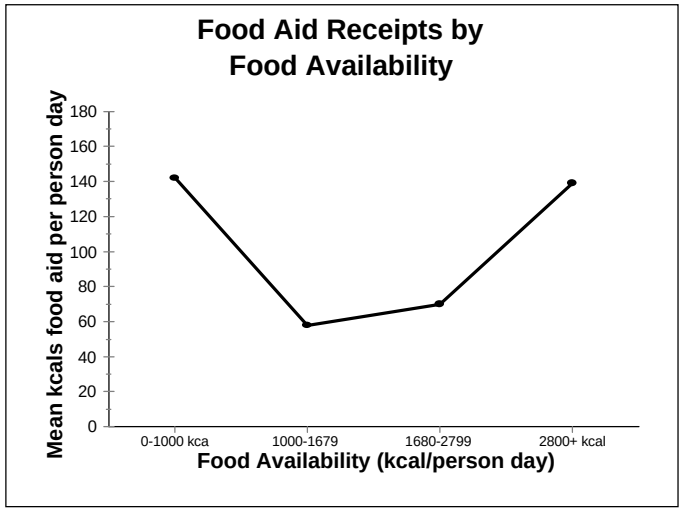

Figure 10

An important feature of this figure is the concentration of food aid among households in the two extreme categories of food availability. While this is desirable for the extreme deficit group, we must question why it appears among the high food security households.

Table 6. Mean Food Aid (Kcal) Received per Person-day and Percent of Households Receiving Food Aid by Region and Food Availability Group

	Region											
	Tigray		Amhara		Oromia		SNNPR		Other		Ethiopia	
Food Availability Group	mean kcal	% rec food aid	mean kcal	% rec food aid	mean kcal	% rec food aid	mean kcal	% rec food aid	mean kcal	% rec food aid	mean kcal	% rec food aid
Extreme Food Deficit (<1000 kcal)	949	35.2	119	20.5	31	20.6	21	39.1	75	14.3	142	26.5
Moderate Food Deficit (1000-1679 kcal)	197	13.2	100	25.9	19	20.0	42	26.8	8	14.3	58	22.2
Moderate Food Security (1680-2799 kcal)	501	25.2	86	31.5	12	21.7	40	18.8	40	42.9	70	26.2
High Food Security (2800+ kcal)	1,212	26.4	124	22.0	36	37.8	27	15.2	22	28.6	139	25.2
Total	817	100.0	105	100.0	25	100.0	30	100.0	35	100.0	103	100.0
(N=)	275	159	1,256	336	1,571	180	940	138	116	14	4,158	826
Sig.	0.78	0.61	0.76	0.0	0.13	0.01	0.06	0.28	0.54	0.84	0.44	0.00

The pattern of food aid distribution across categories of food availability shown in Figure 10 is broken out by region in Table 6. Concentrations of food aid among the two extremes, the least and most food secure groups, is found in most but not all of Ethiopia's major regions. Tigray stands out in this regard with disproportionately large distributions going to its most

food secure households, those with 2,800 or more kilocalories available per person-day. Amhara and Oromia follow the same pattern, though less dramatically. The Southern region differs from the others in that its extreme groups receive less food aid than the two middle groups. Only the combined "other" group begins to conform to the goal of providing relief to households that need it most. It is important to note that although the F probability is not significant for any of the overall distributions, selected individual values are significantly different from other values. Also, the finding that most regions show the same overall distribution of food aid across categories of food availability markedly increases our confidence in these estimates.

Table 6 also reports the percent of households receiving food aid by food availability and region. The results support the finding that the more food secure households are as likely or, in some regions, more likely to receive food aid than are the less food secure households. This is particularly evident in Oromia, where nearly 60% of the households receiving food aid come from the more food secure groups.

Thus, these findings suggest that the absence of association between food need and food aid distributions may be due in large measure to the high volume of food aid flowing to the most food secure households.

5.6.2. Food Aid Distribution in 1995-1996 by Historical Pattern of Food Insecurity

Food aid distributions in 1995-96 closely followed the historical pattern of food insecurity in Ethiopia. Figure 11 shows that households are more likely to receive food aid in the current year if they received food aid in past years. The relationship is strong and significant: food aid distributions grow increasingly higher as the number of past years of food aid increases. Households with 5 or more years of food aid in the past receive more food aid than all others by a wide margin.

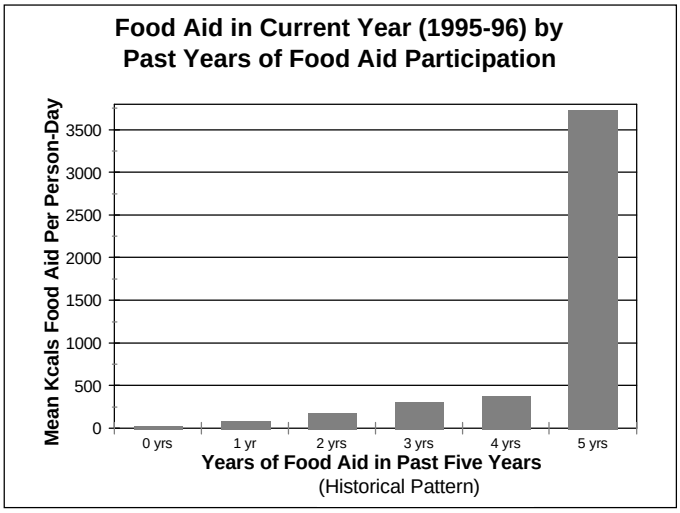

Figure 11

Years of past food aid is an indicator of the extent to which the food aid system has built up presence and infrastructure over time. The existence of such a build-up is a powerful predictor of ongoing food aid deliveries. Households in the regions of Tigray and, to some degree, Amhara are the most likely of all to have received food aid in past years, a reflection of the severity of drought and famine known to those areas.

5.6.3. Food Aid Receipts: Analysis of Variance

To further examine the finding that food aid is concentrated at the two extremes of the food availability continuum and to test whether the distribution holds up when other influences are

Table 7. ANOVA and Multiple Classification Analysis of Food Aid Distributions by Food Availability and Region, Controlling for Covariates*

	Predicted Mean Kcal Food Aid per Person-day			
	Unadjusted (a)	Adjusted for Factors (b)	Adjusted for Factors and Covariates (c)	Sig. of main effects
Food Availability (kcal) per person-day				0.484
Extreme Food Deficit HHs (<1000 kcal)	141	117	97	
Moderate Food Deficit HHs (1000-1679 kcal)	58	72	71	
Moderate Food Security HHs (1680-2799 kcal)	70	76	75	
High Food Security HHs (2800+ kcal)	133	135	152	
Eta/beta	0.02	0.02	0.02	
Region				0.000
Tigray	829	824	455	
Amhara	99	102	64	
Oromya	23	22	80	
SNNPR or SEPA	30	29	86	
Other killil	35	38	79	
Eta/beta	0.13	0.13	0.06	

*Covariates (sig.): Age (.024) and sex (.023) of head; food aid in wereda (.763); land (.696); TLU (.523); off-farm income (.976); household labor (.181); years of food aid (.000); and rainfall (.776).

held constant, we conducted an analysis of variance and multiple classification analysis of food aid receipts using total kilocalories of food available per person-day as the primary factor. The model also tests the independent effects of region as a determinant of food aid distributions, and of other variables included in this study. Table 7 above reports the results of this analysis; we discuss them in the order reported.

Food Availability: The unadjusted means in column (a) confirm earlier observations that households in the extreme deficit and high food security categories tend to be the primary beneficiaries of Ethiopia's food aid programs. Column (b) adjusts for the influence of region on this distribution. Our conclusion from Table 7 is that the relationship between food availability and household food aid receipts is not conditioned by region. Nor is it significantly affected by a battery of covariates thought to have a potential impact (column c).

Region: The powerful effect of region on food aid receipts remains strong and significant, even when controlling for food availability (column b) and our set of covariates. The flow of food aid to Tigray is shown to be exceptionally high at all levels, though it is reduced from a predicted mean of 824 to 455 kcal per person-day when adjusted for the influence of the covariates. The covariate primarily responsible for this reduction is previous years of food aid. In other words, part of the reason why food aid receipts in Tigray are so high in this particular year (1995-96) is because they have been high there in past years and the aid continues to flow. Remaining differences in the amount of food aid received by households in Tigray, compared to all other regions, are due to factors not measured in this study.

Table 8. OLS Regression Model of Food Aid Receipts by Food Availability and Other Determinants

Independent Variables	Descriptive Statistics Mean /percent	Food Aid Receipts (Kcal) Per Person-day (*beta*)
Food availability per person-day *(Kcal)*	2,499 kcal	0.01
Nbr years of food aid received over past 5 yrs	0.46 years	0.17*
Food aid in wereda *(% other hhs in wereda wl food aid)*	20.0%	0.01
Livestock ownership *(TLU)*	1.68 TLU	-0.01
Tigray region *(dummy)*	1 = 6.6%	0.06*
Amhara region *(dummy)*	1 = 30.2%	-0.01
Oromya region *(dummy)*	1 = 37.8%	0.00
SNNPR region *(dummy)*	1 = 22.6%	0.00
Land holdings (*ha*)	1.2 ha	0.00
Adult family labor *(>14 yrs)*	2.3 persons	-0.02
Years living in community	6.8 years	0.01
Education of head of hh *(scale: 1=illiterate to 8=post sec)*	1.6	0.02
Age of head of household *(years)*	44.4 years	0.04*
Sex of head of household *(1=male, 2=female)*	1 = 81.1%	0.05*
Off-farm income *(Birr)*	86 birr	0.00
Avg rainfall in wereda *(mm)*	1,170 mm	0.00
Avg elevation in wereda *(m)*	2,041m	0.00

5.6.4. OLS Regression Model of Food Aid Receipts by Food Availability and Other Determinants

The results of this linear regression (Table 8) reinforce what we have learned from the preceding analysis of variance. In short: food aid receipts are not determined by need (food available per person-day). Rather, they are determined by:

1) past participation in food aid programs,

2) regional effects (Tigray), and

3) characteristics of the head of household—women and aged heads are targeted independent of their need.

Other variables such as off-farm income, livestock ownership, rainfall and elevation, and residence in regions with relatively low food aid flow have no effect on household participation in food aid programs.

6. CONCLUSIONS, RESEARCH IMPLICATIONS, AND POLICY RECOMMENDATIONS

The purpose of this study has been to examine food aid targeting efficiencies and the determinants of food aid distributions in Ethiopia during the 1995-96 agricultural year. Based on data from a nationwide, randomly selected sample of 4,166 farm households we have derived a set of findings and conclusions that we believe will help inform ongoing debate in the area of food aid targeting. Key findings from this study are summarized and discussed below.

Even in this relatively good harvest year, 43.2% of Ethiopia's farm households are food insecure, or have available for consumption less than the minimum daily nutritional requirement of 1,680 kilocalories in grains. Food aid programs, either in the form of free food or food-for-work are vital to the health and well-being of these deficit households. Deficit households, when properly targeted, succeed in raising their level of food availability from 735 kcal per person-day to 1,217 kcal, or by an average of 59% through the receipt of food aid. However, due to unsuccessful food aid targeting overall, only 22.3% of the deficit households are selected as beneficiaries. The remaining 77.7% of food insecure households have no food aid safety net.

A key finding of the study is that there is no significant association between household food availability (need) and food aid receipts (either free or food-for-work) during this sample year—a result of high errors of exclusion and inclusion at both the wereda and household levels. This finding holds true even when controlling for other key characteristics of the households such as age, gender, and education of household head, off-farm income, land and livestock ownership, family labor availability, and fundamental agroecological characteristics of weredas such as rainfall and elevation.

Our results also show that, all else equal, improved wereda-level targeting has greater potential for reducing these errors than does improved household-level targeting. There is greater variation between weredas in terms of household vulnerability than there is within weredas.

Four factors have been identified as causes of the high level of targeting error and the resulting low correlation between food insecurity and participation in food aid programs. They are as follows:

Needy and well-off are beneficiaries: First, the primary beneficiaries of food aid programs are found to be households at the extremes in terms of food availability: those with the least food available and those with the most food available. This pattern seems to hold across numerous regions of the country. While targeting efficiencies are enhanced by the provision of food aid to the most vulnerable group, they are seriously reduced by the flow of food aid to highly food secure households. Sharp, in her 1997 review of food aid targeting in Ethiopia, and Hill (1994) have alluded to the potential for community-level factors to unduly influence the system in the selection of beneficiaries. Such factors may include, "deliberate manipulation of distribution systems by those in control... resistance by local authorities to the

general principle of prioritizing the needy, and the political use of food aid for electioneering" (Sharp 1997, p. 34). Our data do not permit us to count out these sorts of explanations for why highly food-secure households receive the quantities of food aid that they do.

Over emphasis on women and the aged: Second, the *Food Security Strategy* (FDRE 1996) and the beneficiary selection criteria used by several key NGOs involved in the distribution of food aid underscore the special vulnerability of women and the elderly under conditions of food shortages. Our data show that a disproportionate number of female and aged heads of households received food aid, irrespective of their food needs. We found that households headed by women and those aged 60 years and above are not less food secure than those headed by men or younger farmers. Thus, the practice of targeting women and the aged, to the extent that it is used exclusively in place of truly need-based criteria, has contributed to increased targeting error.

Lack of flexibility in the food aid system: Third, the strongest determinant of food aid receipt is the number of years in the past that households have received food aid. This is largely because years of food aid reflect the progressive build-up of "institutional capacity" in the food aid delivery system over time. By this we mean the investments made by government agencies and NGOs in such things as personnel, contacts and knowledge of the area, offices, trucks, and institutional reputation. All of these investments create a compelling reason to continue the flow of food aid to the same areas it has always gone—areas known for chronic drought and food shortfall. Because of the tremendous flow and momentum built up in the food aid delivery system, altering its course to meet the needs of deficit households in other areas that may not benefit from the same extent of infrastructure and institutionalization, is a formidable challenge, one that was not met in 1995-96. Improving the flexibility of the food aid delivery system to extend or shift the safety net when conditions require is a concept that clearly needs greater attention; current inflexibilities in the system are a major cause of food aid mistargeting in Ethiopia.

Regional concentration of food aid: Fourth, households in the region of Tigray are far more likely to receive food aid, regardless of need, than households in any other region, thereby decreasing targeting efficiency. Part of the reason for this disproportionate flow of food aid to the region is that Tigray is one of the country's historically deficit areas in which a significant investment in food aid institutional capacity has been made. The region also has substantial community-based development projects and large public works programs (micro-irrigation, dam construction, soil conservation, etc.) that are implemented as food-for-work activities. Because of the labor-intensive nature of these projects, it is conceivable that a large number of food secure households may benefit from participating in them. As Sharp (1997) puts it, "despite the openness and fairness of the community targeting system in Tigray, the tendency to spread food aid within communities, and the pressure on the *baito*[9] members to include as many people as possible, seem to be the same here as elsewhere."

But only about half of Tigray's success in attracting food aid can be accounted for by such built up capacity and infrastructure. Multivariate analysis reveals that other factors must also

[9] *Baito* is the smallest administrative unit in the Tigray region, comparable to the peasant association (PA), elsewhere in the country.

be taken into consideration, factors not measured in this study. As with the finding described above regarding the flow of food aid to the most food secure households, inconsistencies between stated national food aid targeting goals and the delivery system as it is practiced, may be worthy of deeper consideration and further research. Such research should have two objectives: first, to directly test the hypothesis that the institutionalization of food aid can be detrimental to targeting objectives, particularly in harvest years that do not conform to historical patterns; and second, to examine the types of disincentive effects that observed targeting errors may exert on food grain production and marketing in areas where they may occur, and to which the Bellmon Amendment is specifically addressed.[10]

We believe it is important to conclude this report by reiterating that this is a cross-sectional study conducted during a relatively good harvest year. Most regions of Ethiopia reported strong agricultural yields, even the chronically deficit regions such as Tigray and Dire Dawa. It is conceivable that in a more typical year, or even in a particularly bad year, that some of our conclusions would differ from those reported in this study.

We must also note, however, that most of the improvement during good harvest years such as this one invariably accrues to the more productive and already food secure households. It is estimated that during the relatively poor production years of the late 1980s, 52% of Ethiopia's population fell below the 2,100 kcal per person-day (FDRE 1996). By contrast, during the current and relatively good year, with food availability up 30% or more above levels in the late 1980s, the proportion of food insecure households has declined only modestly to 43.2%. This suggests that the size and conditions of the 1995-96 deficit population may not be so different after all. Nonetheless, to answer this question and to strengthen the generalizability of present findings, there is need to replicate this study during at least one average and one relatively poor harvest year.

Based on the results of this study and subsequent discussions with major participants in the food aid delivery system, several key study implications and recommendations for improving food aid targeting in Ethiopia have emerged. They are as follows:

6.1. Area Targeting

Increase flexibility in the food aid delivery system: Ethiopia's food aid delivery system has built up capacity primarily in areas of chronic food deficit. As a result, food aid continues to flow to these historically deficit areas even in years such as 1995-96 when some of the more severe food shortages are found in other areas of the country. The key challenge is to modify the system in ways that will make it more flexible, with the

[10] The Bellmon Amendment, Section 401(b) of the United States Government's Agricultural Development and Trade Act of 1990 (the Farm Bill), the authorizing legislation for the PL 480 Title II food aid, requires that:

1) adequate storage facilities are available in the recipient country at the time of exportation of the commodity to prevent the spoilage or wastage of the commodity, and
2) the distribution of the commodities in the recipient country will not result in a substantial disincentive to or interference with domestic production or marketing in that country (USAID 1985).

capacity to respond to food needs *wherever* they may occur. The government of Ethiopia, together with the major food aid donors and NGOs involved in food aid deliveries, must begin to address this critical problem. We believe that the most successful approach will include an open forum for debate and review of available options.

Emphasize area targeting: More emphasis should be placed on identifying the most food insecure weredas (area targeting) as the first step in the food aid targeting process. Efficient area targeting has a greater likelihood of reaching vulnerable households, and possibly at lower cost, than does household-level targeting. lso, the effectiveness of household targeting may be enhanced by accurate area targeting, at least in those areas where all or most households are food insecure.

Complete area targeting guidelines: Current efforts by the DPPC in the preparation of food aid targeting guidelines at the national and regional levels and for the various socio-economic systems (sedentary agriculture, pastoralists, cash-crop producing areas, etc.) should be finalized and implemented.

Coordinate crop production estimates: The Central Statistical Authority, the Ministry of Agriculture, the Food and Agriculture Organization Crop Assessment Missions, and others currently publish annual crop production estimates. These estimates are often inconsistent and, at times, even contradictory in their implications for food aid programming. As crop production estimates currently constitute the basis upon which needs assessments are made, it is important that efforts be made to understand differences in the methodologies used and to coordinate their interpretation for purposes of a unified approach to food aid deliveries in Ethiopia.

Improve early warning capacity: Ongoing efforts by the DPPC to improve its early warning capacity and methodologies should be strengthened. A more accurate and efficient early warning system constitutes an important element to improved area targeting.

Expand area vulnerability profiles: Current efforts by the DPPC to prepare vulnerability profiles for disaster-prone areas should continue and be expanded to cover more areas. Vulnerability profiles facilitate needs assessment and the identification of appropriate interventions in the areas they cover.

6.2. Household Targeting

Underscore national policy on food aid targeting: Consistent with the National Policy on Disaster Prevention and Preparedness, priority should be given to targeting the most food insecure and poorest of the poor households in emergency (employment generation schemes) as well as food aid development (food-for-work) projects. Wereda and peasant association officials currently hold authority for the local-level selection of food aid beneficiaries. Increased sensitization and awareness of the National Disaster Prevention

and Preparedness Policy should be pursued aggressively to facilitate a better understanding of the National Policy among those entrusted to implement it.

Rethink the guidelines and criteria used for identifying the most vulnerable households: The current focus on women and the elderly is not an effective way to target food insecure households. Indicators that reflect household food availability *per adult equivalent* will help improve targeting efficiencies.

Eliminate local pressures that undermine effective targeting: Actively reinforce the importance of targeting vulnerable households and assist local-level food aid administrators in eliminating the pressures and incentives to distribute food aid to the more food secure households.

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ANNEX 1.

GRAIN MARKET RESEARCH PROJECT HOUSEHOLD SURVEY (1995/96 CROP YEAR): COMPARABILITY WITH CENTRAL STATISTICAL AUTHORITY AGRICULTURAL SURVEY

Jean Charles Le Vallée

The household-level analysis in this report is derived mainly from two sources. The Grain Market Research Project (GMRP) household survey, implemented in June 1996, and the Central Statistical Authority (CSA) Agricultural Survey, implemented in December 1995. The CSA survey is drawn from a nationally-representative sample of 14,800 households using the CSA sampling frame. The GMRP survey involved 4,218 households included in the CSA survey (hence the GMRP sample is a sub-sample of the CSA survey) and is also nationally-representative with respect to the major agricultural regions of the country, namely Tigray, Oromiya, Amhara, and Southern Regions. The following sub-regions are also considered nationally-representative: Tigray (Tigray); North and South Gonder, East and West Gojam, Agewawi, North and South Wello, Wag Hamra, North Shewa and Oromiya zone (Amhara); East and West Welega, Illubabor and Jima, North, East and West Shewa, Arsi, Bale, Borena, East and West Harerge and Somali (Oromiya); Yem, Keficho, Maji, Shekicho, Bench, North and South Omo, Derashe, Konso, Hadia, Kembata and Gurage, Sidama, Gedeo, Burhi and Amaro (Southern regions). The remaining smaller regions, Afar, Somali, Beni-Shangul and Gumuz, Gambella, Harari, Addis Ababa and Dire Dawa, do not contain sufficient observations for the survey to be considered strictly representative of their region.

The purpose of this annex is to present descriptive statistics on the comparability of key variables contained in the GMRP Household Survey (1995/96 crop year) and the CSA Agricultural Survey (1995/96 crop year). This annex focuses on three key variables in agricultural production: meher crop production, crop area cultivated, and household fertilizer use.

For grain crop production, there are three different national estimates available for the meher season: (a) farmer recall from the GMRP Household Survey; (b) farmer recall from the CSA Agricultural Survey; and (c) crop-cut estimates from the CSA Agricultural Survey (Table 1). Crop cutting involves direct physical measurement within the fields harvested while farmer recall estimates are obtained through surveying farmers after the crops have been harvested (1-2 months after in the case of the CSA Agricultural Survey and 4-5 months afterward in the case of the GMRP survey).

Table 2 shows the correlation coefficients of the three measures of production, with the household being the unit of observation. Strong correlations can be found between the GMRP and CSA farmer recall estimates, particularly for maize, wheat, barley and millet. Correlation coefficients are generally lower between the CSA crop-cut estimates and either the CSA or GMRP farmer recall estimates.

Table 1. National Meher Grain Production Estimates

Source of Estimate	Estimated Production (million metric tons)
GMRP Household Survey Farmer Recall	7.84
CSA Agricultural Survey Farmer Recall	8.51
CSA Agricultural Survey Crop-cut	9.27

As is the case with the CSA data, it is generally found that the measurement of production from crop cuts result in higher estimates than the estimates from farmer recall. A review of the empirical tests of crop-cut versus farmer recall data collection supports the conclusions that crop-cut estimates of production result in upward biases due to a combination of errors (Murphy et al. 1991, Poate and Casley 1985, Verma et al. 1988). These errors relate to biases resulting from poorly executed techniques (Rozelle 1991), large variances due to heterogeneity of crop conditions within farmer plots (Casley and Kumar 1988), and non-random location of sub-plots and tendencies to harvest crop-cut plots more thoroughly than farmers (Murphy et al. 1991). Verma et al. (1988) found that farmer estimates are closer to actual production (derived from weighing farmers' harvests) than crop-cut estimates. In general, tests of crop-cut estimates in Africa have been found to be overestimated by between 18% and 38% (Verma et al. 1988). Farmer recall was also found to result in a smaller variance in production estimates than crop-cut estimates. On the other hand, crop-cut estimates were found to provide more accurate measurements of crop yield.

Table 3 provides estimate of total cropped area by killil. Using the crop-cut method for estimating area, the results give 8 million hectares nationally for both sample sizes.

ANOVA tests were made on production and area data to see if the sub-sample (GMRP survey) was statistically different of the bigger sample size (CSA survey), in other words, if the sub-sample was representative of the bigger sample if randomly selected. At the national level and also at the regional level (i.e. killil), for all grains, we found no results that showed that these two sample sizes were significantly different at the 0.01 level: thus the sub-sample is representative of the bigger sample.

A comparison of mean household fertilizer use can be found in Table 4. Both sample sizes give very similar results.

Table 2. Correlation Coefficients of the Three Measures of Production

	Grain groups	GMRP production (FR)	CSA production (FR)	CSA production (CC)
Maize	GMRP production (FR)	1,000**		
	CSA production (FR)	636**	1000	
	CSA production (CC)	222**	128**	1000
	Number of observations	2370	4352	4304
Wheat	GMRP production (FR)	1		
	CSA production (FR)	702**	1000	
	CSA production (CC)	228**	269**	1,000
	Number of observations	1106	2101	2120
Teff	GMRP production (FR)	1,000		
	CSA production (FR)	470**	1,000	
	CSA production (CC)	384**	285**	1000
	Number of observations	2112	4105	4044
Barley	GMRP production (FR)	1,000		
	CSA production (FR)	676**	1,000	
	CSA production (CC)	347**	269**	1000
	Number of observations	1391	2637	2613
Sorghum	GMRP production (FR)	1,000		
	CSA production (FR)	410**	1,000	
	CSA production (CC)	423**	333**	1000
	Number of observations	1852	3608	3552
Millet	GMRP production (FR)	1,000		
	CSA production (FR)	622**	1,000	
	CSA production (CC)	416**	284**	1000
	Number of observations	424	822	806
Pulses	GMRP production (FR)	1000		
	CSA production (FR)	200**	1,000	
	CSA production (CC)	109**	224**	1000
	Number of observations	1785	3354	3322
Oil seeds	GMRP production (FR)	1000		
	CSA production (FR)	537**	1,000	
	CSA production (CC)	369**	103**	1,000
	Number of observations	666	1250	1193

** Correlation is significant at the 0.01 level (2-tailed)

Table 3. Total Crop Area Compared Between Both Surveys

Killil	Area (MHa) CSA Survey n=14512	Area (MHa) FSS Survey n= 3653
Tigray	481	484
Afar	24	21
Amhara	2938	3116
Oromiya	3617	3533
Somali	60	58
Benishangul	95	93
SNNPR	6978	7188
Gambela	101	39
Harari	44	45
Addis Ababa	98	96
Dire Dawa	74	59
Total	7.94	8.05

Table 4. Mean Percentage of Households Using Fertilizer by Killil.

Killil	% hh fert use (CSA survey)	% hh fert use (GMRP Survey)
Tigray	45	40
Afar	13	3
Amhara	39	36
Oromiya	49	45
Somali	6	6
Benishangul	23	28
SNNPR	36	29
Gambela	0	0
Harari	81	83
Addis Ababa	97	79
Dire Dawa	34	29

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