Food Security Research Project

TOWARD A RESEARCH AGENDA TO PROMOTE HOUSEHOLD ACCESS TO FOOD IN ETHIOPIA

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Toward A Research Agenda to Promote Access to Food by Vulnerable Groups through Food Transfer Arrangements and Food Markets

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1.   Introduction

The objective of this report is to review available evidence on the potential to promote access to food for vulnerable groups in Ethiopia through two main methods: (a) food transfer programs, and (b) appropriate policies influencing the food marketing system. These issues are examined with a view to identifying priority issues for analysis under the MEDAC/MSU/USAID Food Security Project in Ethiopia. In particular, the report:

a.   presents trends in food aid and food production in Ethiopia, and provides preliminary evidence of the possible disincentive effects of food aid on agricultural production incentives and investments in the food marketing system.

b.   discusses the costs and benefits of various food aid transfer programs, and highlights major unresolved issues requiring further analysis to guide Ethiopian policy makers' decisions on strategies to promote household food security.

c.   presents a set of "guiding principles" to minimize the trade-offs between meeting vulnerable groups' immediate food needs and promoting agricultural productivity growth over the long run.

d.   identifies important unresolved issues for further analysis, in order to guide Ethiopian policy makers' decisions on ensuring household access to food through an appropriate mix of market and transfer mechanisms.

Results are considered preliminary and exploratory, and are intended to promote discussion and lead to a consensus two-year workplan to guide research under the MEDAC/MSU/USAID Food Security Project in Ethiopia.

The report is organized as follows. Section 2 discusses the critical role of the food marketing system as a means to promote agricultural productivity growth and ensure household access to food. Section 2 also discusses the potential conflicts between food aid programs and food market development. Section 3 presents trends in food production, food aid, and food prices, and highlights the need for a better understanding of the factors affecting food prices in Ethiopia. Section 4 discusses specific alternative forms of food aid transfer programs, and their potential impact on food markets. Section 5 presents a set of principles to guide policy on ensuring access to food by vulnerable groups. Finally, Section 6 presents a proposed workplan for guiding research under the MEDAC/MSU/USAID Food Security Project in Ethiopia.

2.   The Role of Food Markets and Transfer Programs in Promoting Household Food Security

Food security is defined as the ability for all individuals in society to be able to acquire a supply of food necessary for to lead normal, healthy lives. An individual can achieve food security by either having sufficient resources to grow enough food or having enough income to buy it. Food insecurity is, conversely, defined as lack of access to sufficient food.

Food insecurity can be addressed by either (a) giving food directly to the poor (food transfers), and/or (b) raising incomes and reducing the cost of food purchased through the market by raising productivity throughout the "food system."[1]

There is a tendency for many administrators and practitioners to view appropriate responses to food insecurity in terms of non-market based programs, in which food and/or income is transferred administratively, by government or non-governmental organizations, to recipient households.[2] This is a natural tendency, as the existing performance of the food system often fails to provide adequate access to food to many people. However, transitory problems of food access, while set off by drought and other temporary crises, have a number of chronic and structural causes that require structural solutions. Chronic poverty is the major reason why such large numbers of households in Ethiopia are especially vulnerable to temporary crises.

2.1 Relationship between food security, productivity growth, and markets

The solution to chronic poverty and food insecurity is productivity growth. Without productivity growth, incomes and employment cannot rise much over the long run, and redistribution cannot be effective if there is not much to redistribute. Sustained productivity growth, in the histories of most higher-income countries, has involved an evolution from subsistence-oriented, household-level production toward an integrated economy based on specialization and exchange. The movement away from subsistence makes possible a new set of production possibilities using inputs acquired through exchange, allows the household and the economy to benefit from the economies of size that accompany specialization, spreads risk of supply and demand shocks over a broader geographic area, and ultimately broadens the household's consumption choices (Staatz et al. 1993; Bromley and Chavas 1989).

A broad-based approach to food security in Ethiopia must involve long-run productivity growth in agriculture, since 85% of the population is engaged primarily in farming. But the history of economic development also indicates that productivity growth has almost never occurred without the emergence of efficient and reliable markets. Reliable markets (a)

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[1]The "food system" refers to the entire chain of activities involved in getting food on consumers' tables, from seed research to input supply, to farm production, to commodity distribution, storage, processing, and final sale to consumers.

[2]Throughout this report, we use the term "food transfer programs" to include all administrative, non-market programs to transfer food to vulnerable groups, including direct relief distribution, food-for-work, cash-for-work, distribution through Kebele shops, etc.

provide the means to adopt cost-reducing technologies at various stages in the food system (e.g., seed and fertilizer distribution); and (b) offer incentives for rural households to shift from a subsistence-oriented pattern of production and consumption to more productive systems based on specialization and gains from exchange (e.g., generating greater amounts of income from high-valued crops and non-farm activities and using the income to buy food). Sustained improvements in household access to food in Ethiopia will require the development of more reliable food and input markets, involving a movement away from subsistence-oriented, household-level production toward an integrated economy based on specialization and exchange.

Long-run productivity growth in agriculture will come primarily from input intensification. It is unrealistic to expect food production to sustainably grow at 3% per year to match population growth under low-input, traditional technology conditions (Ruttan 1991). This is especially the case where expansion of good-quality crop land is nearly exhausted, as in Ethiopia. In such cases, further production growth must come primarily from yield growth. It is well-accepted that intensification, where it has occurred, has involved a coordinated system of input supply and delivery, farm finance, reliable access to output markets, and an effective agricultural research and extension system. Sustained yield growth of 3% or more per year has almost never occurred without a coordinated system of input delivery, output markets and financial markets.

Yet the growth process that makes higher living standards possible also makes farm households more dependent on the performance of a broader set of exchange systems for inputs, consumer goods, and income. Rural households have little control over these systems. The risk of relying on unstable markets is particularly high for households operating at the margin of survival, where small fluctuations in real income can have disastrous consequences. Many households and firms have responded to the uncertainty and transaction costs of markets by internalizing exchange within highly personalized social or kinship arrangements (e.g. within the village or along ethnic or kinship lines) and through self-sufficiency or subsistence production patterns (Jayne et al. 1994). Therefore, some degree of reliability and predictability in markets -- for inputs, credit, commodities, and labor -- are necessary to facilitate the kinds of specialization and investments leading to sustained and broad-based productivity growth.

In Ethiopia, strategies to promote rural productivity and income growth have been overshadowed by emergency and public-work food aid programs. By default, these food aid-driven programs have become the major forms of development assistance to rural households, but the long-run consequences of these programs on food production growth and the development of food markets are little known. While much effort has been recently focused on the need to design short-run disaster relief programs in a manner that contributes to long-run develop (the famous "relief to development" continuum concept), there are severe limits on the extent to which emergency assistance programs, however they are designed, can substitute for long-run development strategies.

Food aid-driven public works programs can, with the needed technical expertise, create assets such as trees, roads, conservation investments, and dams to facilitate rural productivity growth. But these assets clearly cannot substitute for a coordinated food system that induces significant input intensification and generates the leaps in productivity required to close Ethiopia's massive food deficit and foster an agricultural transformation.

However, even the most efficient food and input markets will never be able to ensure access to food for all people.   As in all countries, food and/or income transfer programs will always be necessary in Ethiopia to protect those without purchasing power. Much solid research has been carried out in this area (see Webb, von Brau, and Yisehac 1992; Webb et al. 1994). This report underscores the potential for substantial improvements in food access that can come through developing markets so that they work better for the poor and vulnerable, especially during transitory crises.

2.2 Trade-offs between food transfer programs and productivity growth?

A major policy goal in Ethiopia is how to design food and income transfer programs to ensure access to food by vulnerable groups in ways that do not adversely affect the development of a food marketing system that stimulates production incentives, income growth, and more affordable food over the long run.

In this regard, there is longstanding concern over the disincentive effects of food aid, specifically the effects of food aid on market prices and production incentives (see Singer 1989; Owusu 1989; Dearden and Ackroyd 1989; Fitzpatrick and Story 1989; Lavy 1990). If food aid is transferred only to households without purchasing power, then there would be a negligible reduction in effective demand resulting from food aid, and no production disincentives. However, if free food is transferred to those who would have otherwise purchased their grain from the market, or they sell onto the market some of their food aid, then the effects on prices could, over the long run, depress production incentives. The fear that imported food aid is disrupting food markets and depressing domestic food production has raised concerns that Ethiopia is becoming increasingly dependent on food aid and increasingly unable to feed itself on a recurrent basis. This report presents cursory evidence on the extent to which food aid is depressing food production incentives, and identifies a set of analytical issues to guide Ethiopian policy makers (e.g., RRC, EFSRA, EGTE, MEDAC) on the design of appropriate food transfer programs that complement rather than impede the long-run development of markets.

A second issue that will be very important in the future is how Ethiopia will adapt to declining donor food aid resources in the future. Changes in U.S. farm policy and the GATT (Generalized Agreement on Tariffs and Trade) have already resulted in lower levels of surplus food production among the world's major food producers, and consequent lower levels of food aid from major donors. It is increasingly likely that this will affect the magnitude of food aid pledged to Ethiopia. If Ethiopia can no longer rely on 600,000 to 1,000,000 tons of food aid to counteract its structural food deficit, what policies and food transfer programs should be put in place to ensure food security for those households with limited purchasing power? To what extent can an appropriate mix of stabilization and market policies be developed to perform some of the food security tasks that transfer programs currently perform?

A third issue involved in determining the appropriate mix of food transfer and market mechanisms to promote food security in Ethiopia involves the national and regional supply response to food price changes. Specifically, if food aid transfer programs can or do depress market prices, to what extent does this depress domestic production? Also, how much additional food would be supplied to consumers if the level and/or stability of food prices

were to rise as a consequence of possible floor price policies. What proportion of rural households actually possess the resources to respond to higher food prices, and what would be the distribution of gainers and losers from such a policy?[3] Finally, what would be the treasury costs of a floor and/or ceiling price policy, and what gains in food security could have been achieved by devoting these funds to other investments or food transfer programs.

3. Trends in Food Market Prices and Food Aid

3.1. Food Production and Food Aid Trends

While basically self-sufficient in cereals[4] until the early 1980s, Ethiopia has not been able to meet its own food needs since the severe 1984 drought (Figures 1 and 2). The disruption to peoples' livelihoods and the decumulation of productive assets from the 1984 drought was of such a magnitude that the country has never fully regained its ability to feed itself. This underscores the potential effects of drought on agricultural productivity, and the need to have in place viable mechanisms for ensuring access to food by vulnerable groups as the first line of defense before they adopt more extreme coping mechanisms (migration, distress sales of assets) that cripple long-run productivity growth.

Figure 1 also shows that food aid (and to a much lesser extent, imports) have increasingly filled the gap between food production and consumption requirements. However, even when including food aid and imports, per capita cereal consumption has fallen from a range of 150-170 kgs per capita between 1979-1983 to a range of 125-140 kgs from 1984-1994 (Figure 3).

It is widely believed that of the 6 to 7 million tons of cereal produced in Ethiopia, about 15% to 25% is sold and traded in markets. This would imply an annual marketed volume of about 1 million to 1.75 million tons, depending on the harvest.

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[3]Assessing the effects of such policies on household access to food requires knowledge of the proportion of net food buyers and sellers in rural areas, and estimations of supply response under alternative food policy scenarios.

[4] Approximately 70 percent of the food requirements in Ethiopia is met from cereals. The rest comes from pulses, roots and tubers, animal products, etc.

Figure 1. Food Production, Food Aid, and Consumption Requirements, Ethiopia, 1974-1994[5].
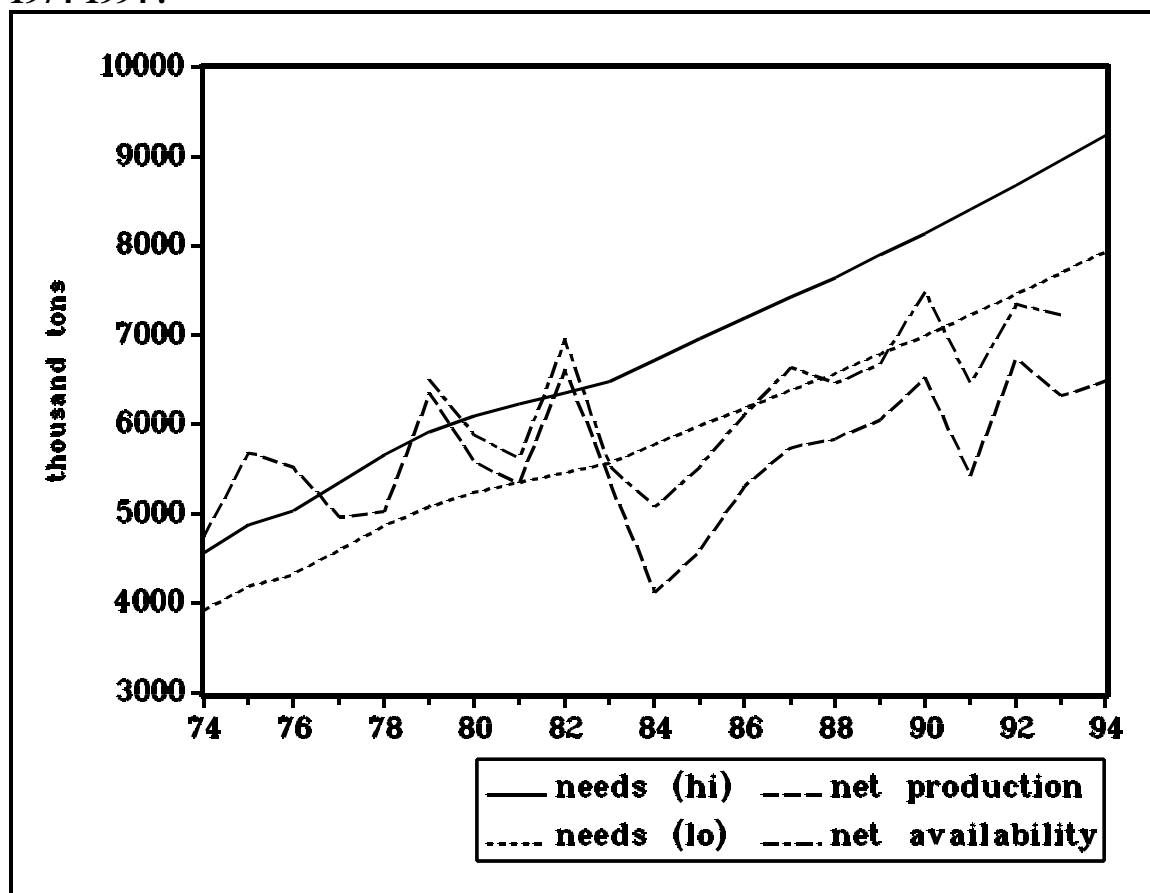
Source: computed from data provided by Central Statistics Authority.
notes: Food production, availability and requirements include cereals only.

Needs (hi):   Cereal consumption requirements based on population * 225 kgs per person per year
                        (recommended by Ethiopian Medical Association) * .7. Cereals make up approximately 70% of
                        the average Ethiopian's calorie intake.

Needs (lo):   Consumption requirements based on population * 182.5 kgs per person per year (RRC estimated
                        ration requirement for relief situation for non-working person) * .7.

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   [5] The years refer to September of the indicated year to August of the next year. For example, 1974
refers to September 1974 through August 1975.

Figure 2. Ethiopia's Net Food Deficit, 1974-1994.
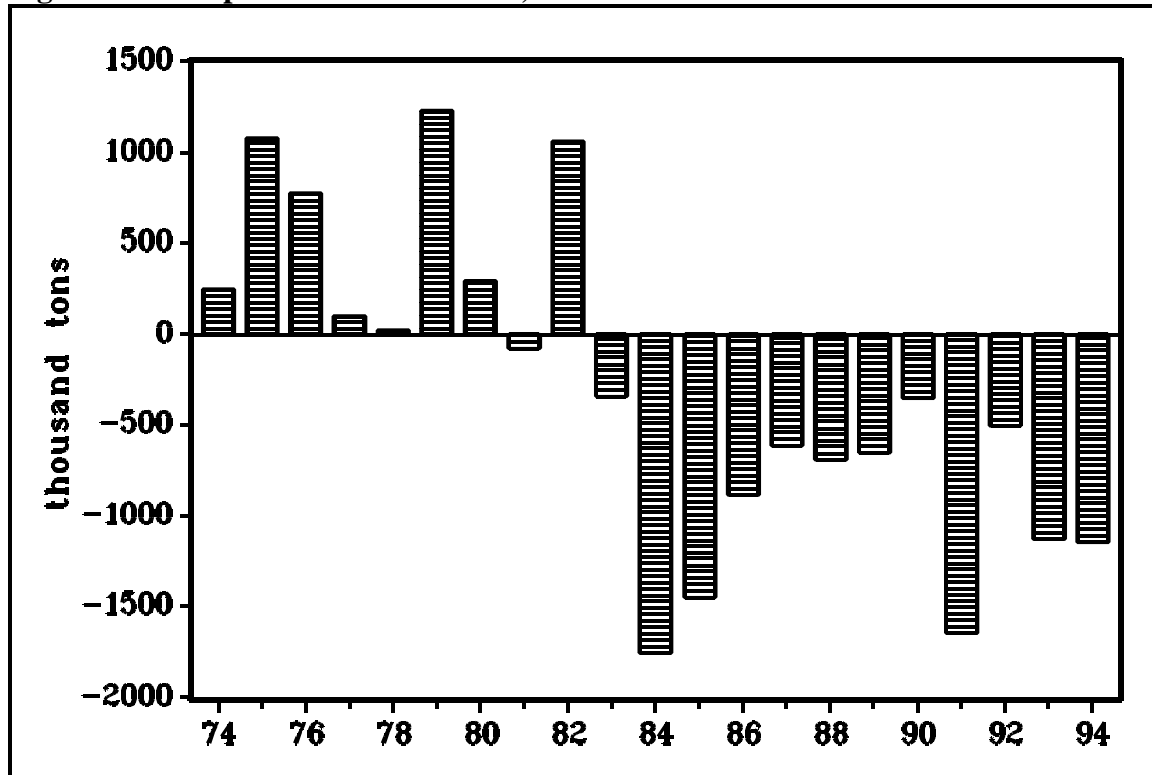
Source: computed from data provided by Central Statistics Authority.

Figure 3. Per Capita Food Consumption from Domestic Production and Total Food Availability, 1979-1994.
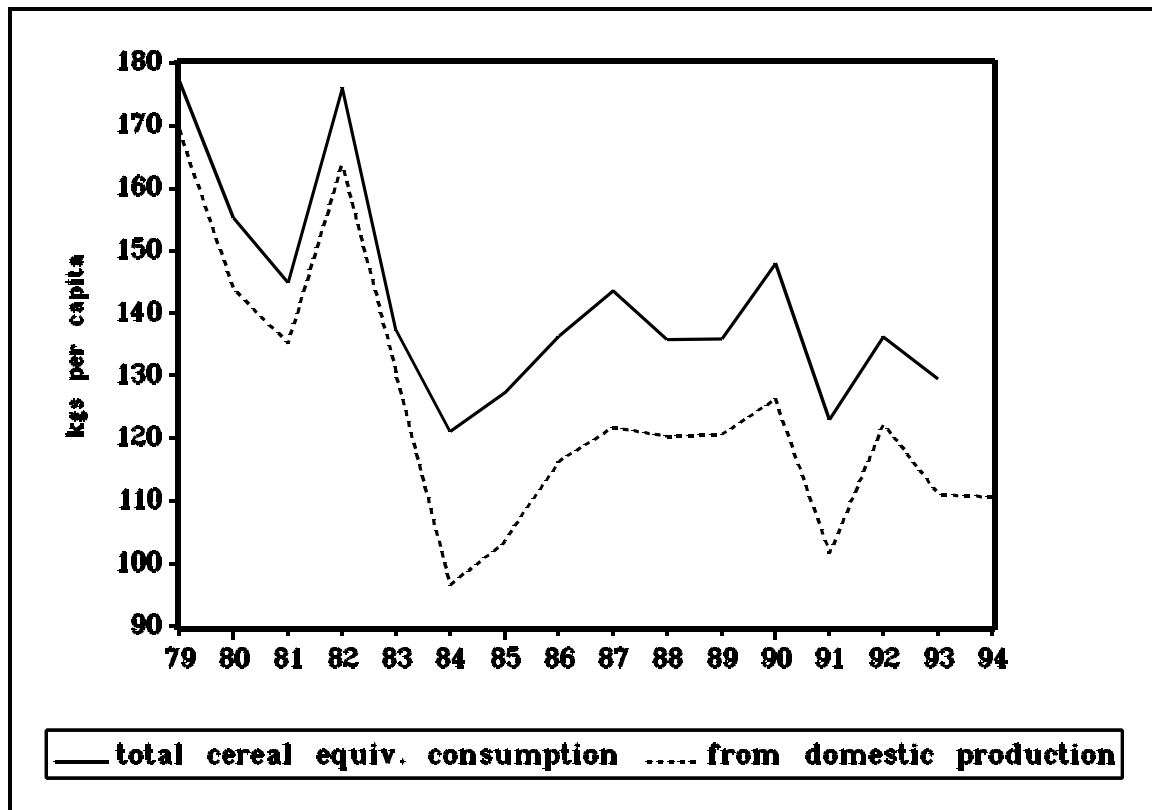
Source: computed from data from Central Statistics Authority.

The annual volume of cereal food aid has fluctuated from 200,000 tons to about 1.2 million tons over the 1984-1993 period. About 90% of this cereal aid has been in the form of wheat. In a normal year, the volume of cereal food aid could account for 25% or more of the total marketed cereal supply in Ethiopia. Depending on the manner in which the food aid were distributed, an addition of cereal supply of this magnitude could be expected to exert some influence on food market prices. In a drought year, food aid may account for up to 50% or more of total marketed supply.

Figure 4 presents the average monthly volume of cereal food aid destined for Ethiopia arriving at the ports of Massawa, Assab, and Djibouti over the period 1987-1994. Interviews with several NGOs indicate that there is approximately a 6 to 8 week time lag between the arrival of food aid at the ports and its distribution to recipients in Ethiopia. While the highest volume of food aid might be expected arrive shortly before the lean season (September-November) when many households deplete their own grain stocks, the data indicate very little seasonal variation. To the extent that food aid is released immediately after the main post-harvest months (January-March), potentially adverse effects on farm production incentives might be expected.

Since 1993, the Emergency Food Security Reserve Authority (EFSRA) has been tasked with operating as a "food bank", essentially storing grain from donors and releasing it to NGOs and others at appropriate times in the season. Provided that the EFSRA or other appropriate agency has sufficient storage capacity, the potential disincentive effects and disruption to markets could be mitigated through stockholding of donor commodities, and releasing them to NGOs and others at appropriate times. A viable market information system, including a mechanism for accurately forecasting future price movements, could assist government agencies and NGOs in determining appropriate food aid release policies.

Figure 4. Seasonality of Food Aid Arrivals at Eritrean/Djibouti Ports Destined for Ethiopia, 1987-1994.
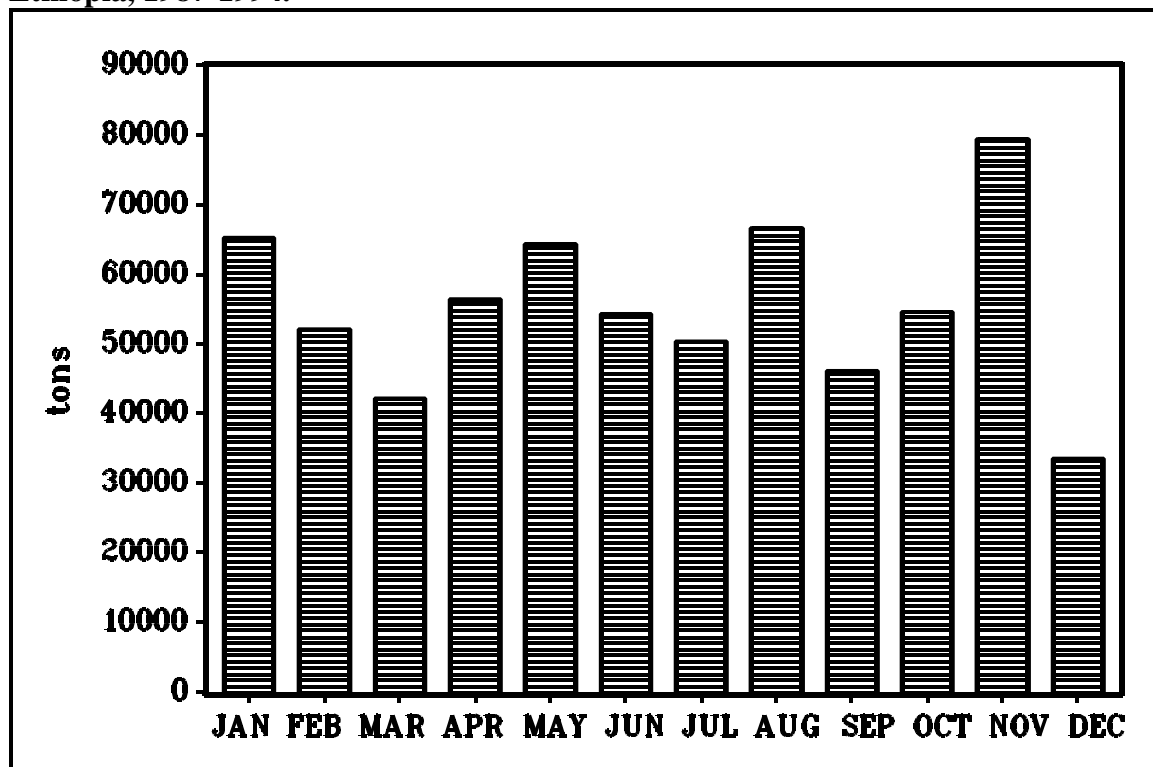
source: World Food Programme data files (1995).

3.2.   Food Market Price Trends

Figures 5, 6, and 7 present monthly retail prices of maize, white wheat, and white teff, deflated by the consumer price index, in Addis Ababa markets. Linear time trends are calculated for the periods before and after grain market liberalization. Addis Ababa real prices for white wheat, mixed wheat, white teff, barley, and sorghum have exhibited a downward trend since market liberalization in 1990. White and mixed wheat and have especially declined in the post-reform period. Maize prices, which increased by 8.2% per year on average from 1987 to 1990, increased by only 1.7% per year from 1990 to 1994.

Preliminary econometric estimation also indicates a downward trend in white wheat, maize, and barley prices in Addis Ababa since grain market liberalization in 1990, after controlling for rainfall, food aid arrivals, seasonal trends, and lagged own and lagged substitute grain prices (see Annex 1 for technical details as to model specification and estimation results). These results are all statistically significant at the 10% level. Post-reform price trends for white teff and mixed wheat are also downward, but are not significant at the 10% level. The conclusion of declining post-reform grain prices support earlier findings by Dercon (1993).

Results also indicated that the two-month moving-average of food aid arrivals at Eritrean ports destined for distribution in Ethiopia was negatively associated with local maize and white barley prices (at the 2% and 6% levels, respectively). While these results should be interpreted cautiously (see Annex 1), the indication is that food aid may be of sufficient magnitude in Ethiopia as to affect food prices in Addis (and potentially numerous other markets not included in this assessment). Interestingly, there was no significant effect of lagged food aid arrivals on Ethiopian white wheat prices. This may be because the quality of food aid wheat is perceived to be of inferior quality compared with local wheat, and is perhaps of limited substitutability with local wheat. The crops most affected by food aid appear to be the crops consumed by the poorer groups in Addis, maize and barley. However, it is believed that a substantial portion of food aid wheat is sold by recipients to obtain cash to buy less expensive foodstuffs. To the extent that this occurs on a widespread basis, the effect of food aid on local cereal prices would be complex.

There may be numerous factors responsible for the apparent decline in real food prices since grain market liberalization in 1990. Potential determinants of lower real food prices may include: (a) a decline in food marketing costs after the controls on private trade were lifted; (b) relatively good harvests since the reform period; and /or (c) effects of food aid. To guide future food policy, especially with respect to potential commodity price stabilization, food aid monetization (i.e., sales of food aid by the state onto the market to influence market prices), future analysis may be designed to better understand the factors affecting food market prices in Ethiopia, and the behavior of food markets more generally.

Figure 5. Retail maize prices, Addis Ababa, Ethiopia, 1987-1994.
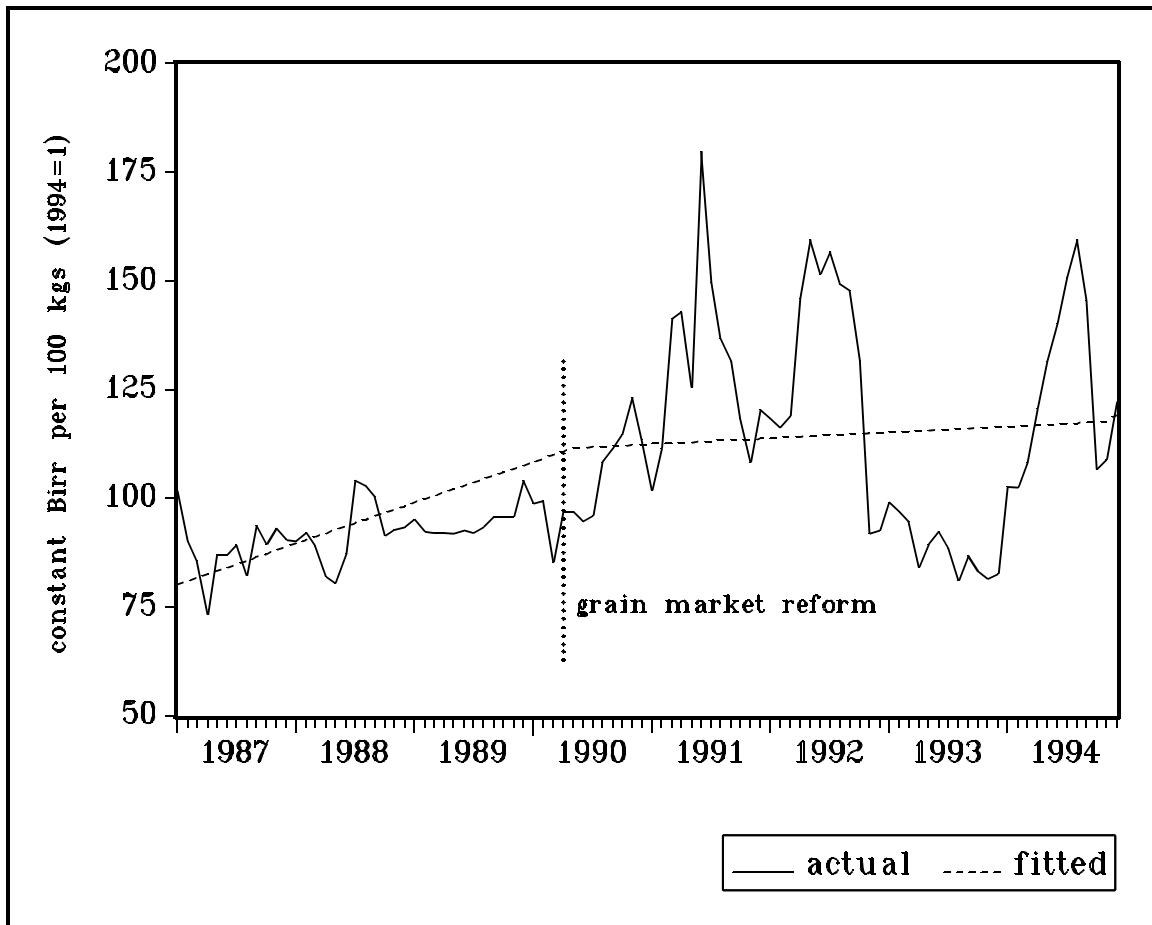
Source: EGTE data files

Figure 6. Retail white wheat prices, Addis Ababa, Ethiopia, 1987-1994.
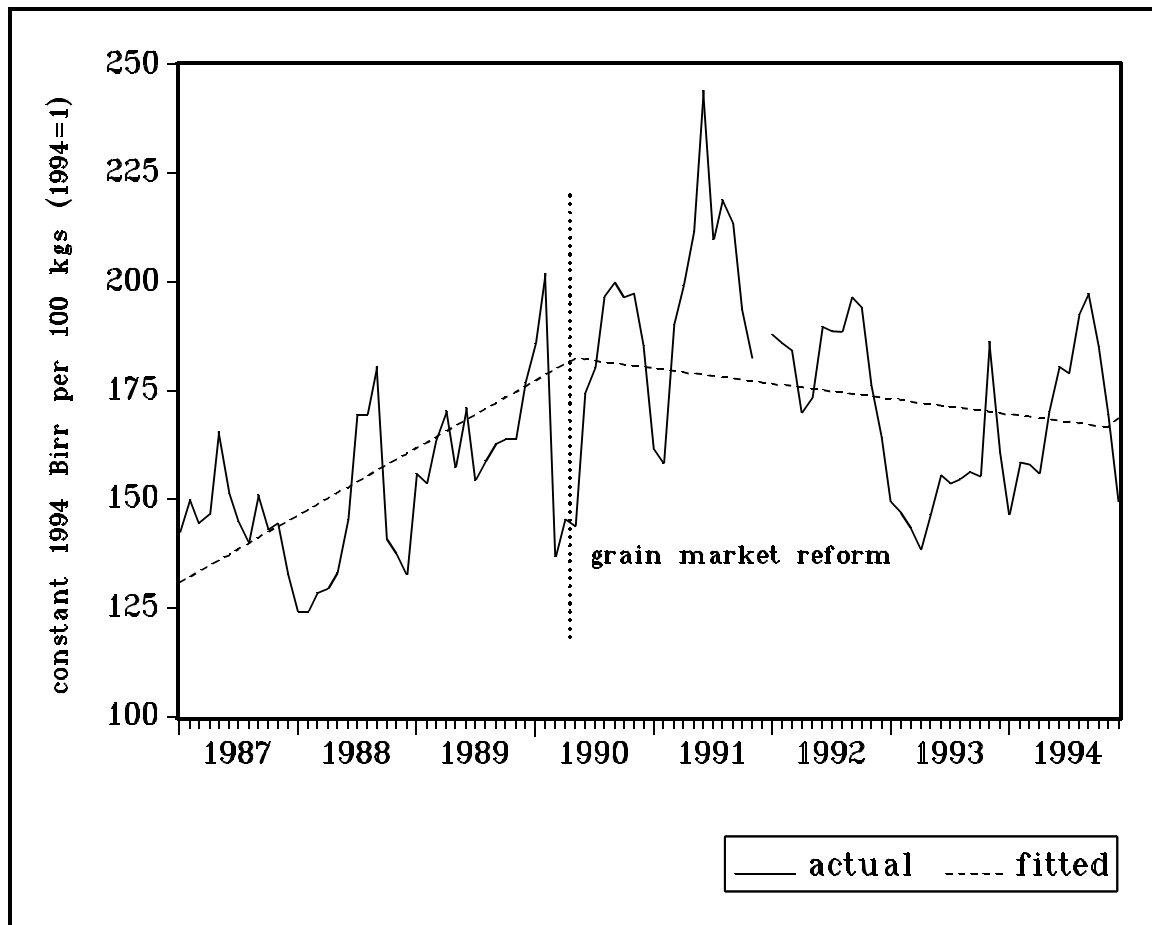
Source: EGTE data files

Figure 7. Retail white teff prices, Addis Ababa, Ethiopia, 1987-1994.

Source: EGTE data files
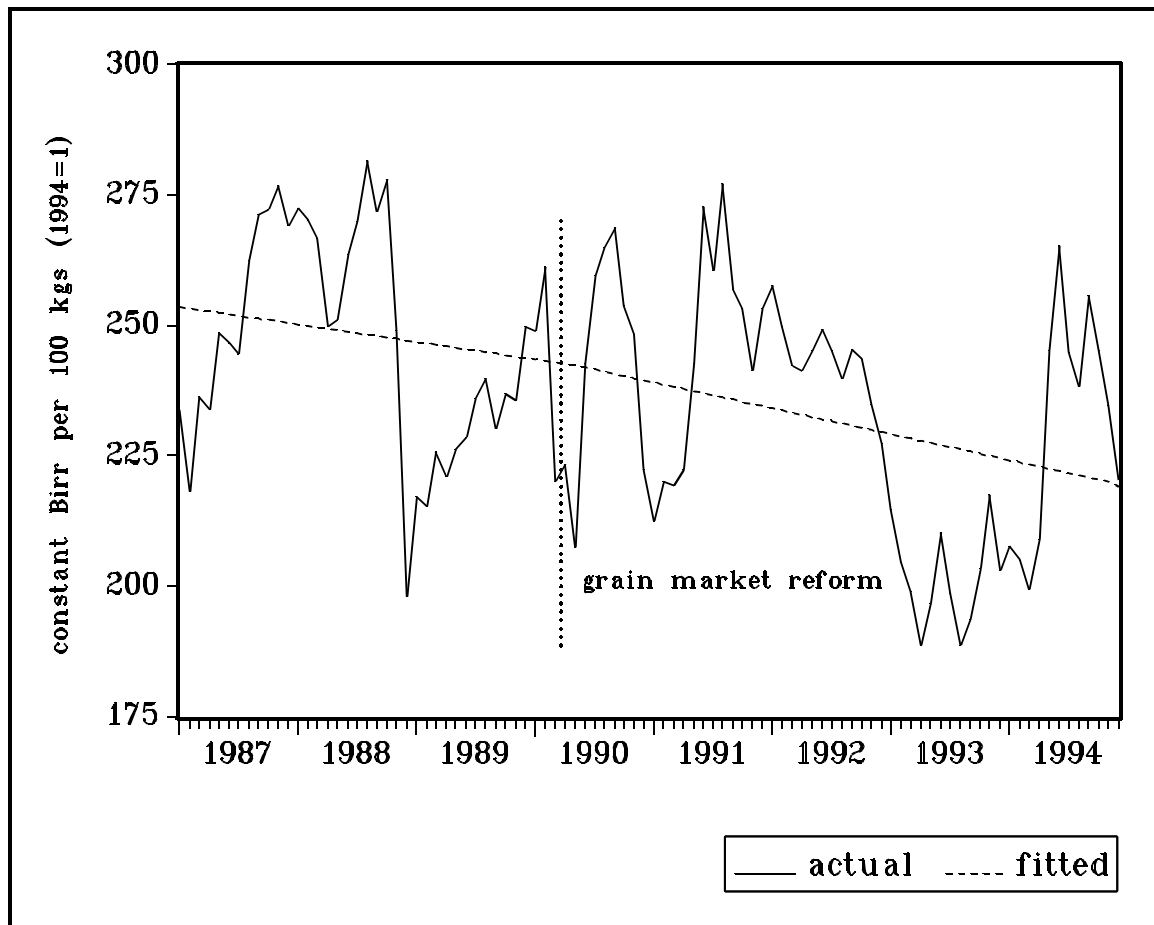
4. Alternative Approaches to Target Vulnerable Groups and their anticipated Effects on Food Markets

Given some preliminary evidence that food aid released in Ethiopia is of a magnitude capable of influencing grain market prices and production incentives, the question arises as to how donors, NGOs, and governments can address the twin objectives of:

(a)   designing food and income transfer programs that ensure vulnerable groups' access to food, especially during emergencies, while at the same time

(b)   ensuring that incentives for long-run growth in domestic food production are not adversely affected.

This section provides a brief examination of selected forms of market-oriented and transfer programs to promote vulnerable groups' access to food, and identifies important unresolved issues for further research.

4.1.   Direct distribution of food aid:

Direct food aid distribution programs can be classified into three broad types: (a) those where food is transferred to and consumed by households lacking money to purchase food; (b) those where food is transferred to households with sufficient money to purchase food; and (c) those where food is transferred to households that sell some or all of the food aid in order to buy other types of food.

If food aid were transferred to and consumed by only households lacking purchasing power, the market demand for grain would not be affected. Only those lacking effective demand would acquire food, and there would be no depressing effect on food market prices. However, to the extent that food aid were received by households with effective demand (i.e., those that would have purchased food in the market unless they received food aid), such programs would reduce the demand for food in the market and thus exert a depressing effect on market prices.

Large and ill-timed releases of food aid can also create uncertain fluctuations in prices, causing losses for marketing agents, increased marketing costs, and depressed investment in the marketing system. The goal of food transfer programs is to ensure access to food to households lacking purchasing power while not adversely affecting farm production incentives or investments in the food system that stimulate agricultural production.

More complex price effects could occur if households receiving food aid sold it and used the cash to buy less expensive foodstuffs. Anecdotal evidence from Ethiopia suggests that this is a widespread practice for households receiving donor wheat. Wheat is widely regarded as being consumed disproportionately by the upper income groups in Ethiopia. If many food aid recipients sell wheat to buy cheaper cereals like maize or sorghum, we might expect the price of wheat to decline while the prices of maize and sorghum rise. If this phenomenon is widespread due to large releases of wheat, unpredictable price fluctuations might result with potentially disruptive effects on food markets and marketing agents. A better understanding of how emergency food aid and commodity choice are affecting food markets and production

incentives in Ethiopia is crucial to guide future Government policy on food targeting programs.

4.2   Food-for-work and cash-for-work programs

The Government of Ethiopia's food aid policy is 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 RRC plans to expand such food-for work and cash-for-work schemes over the next five years to the point where 80% of relief is in these forms, while the other 20% is distributed free for those unable to work (World Food Programme, 1995).

One report conducted by IFPRI in Bangladesh indicated that cash-for-work programs were more efficient than food-for-work programs in transferring resources to households. Under the cash-for-work program, it cost 1.3 dollars to transfer 1 dollar to the household. The food-for-work program cost 2.5 dollars to transfer 1 dollar to the household.

Injections of money into communities from cash for work programs also have the effect of increasing demand for food in the market and raising food prices. To the extent that cash-for-work is used extensively, the resulting effect on food prices may jeopardize vulnerable households who were not able to participate in the programs (including households that would otherwise have had adequate income to purchase food were it not for rising food prices due to injections of cash into the local economy). A combination of cash-for-work and food distribution programs (e.g., food-for-work or monetization) might minimize potential adverse side-effects of public works programs on the wider community. Given the Government of Ethiopia's interest in food-for-work and cash-for-work programs as means to target vulnerable groups, further research is necessary to ensure the development of effective transfer programs with minimal adverse side-effects on non-participating households.

4.3.   Food and ceiling price stabilization policies

As a means to buffer vulnerable consumers from large food price surges during droughts and other production shortfalls, numerous countries have attempted to manage food prices in the market through the release and/or accumulation of stocks and through trade policy. The goal of a ceiling price policy is to keep food prices at tolerable levels and alleviate transitory food insecurity that might otherwise result from drastic increases in prices. However, the stabilization of food prices is a complicated and potentially costly endeavor, especially in a country such as Ethiopia, where (a) important commodities, such as teff, are not traded on world markets; (b) a number of grains feature prominently in consumption patterns; and (c) there is substantial regional variation in cereal consumption patterns. For example, in the south and southwest regions of Ethiopia, maize is the dominant cereal commodity, while sorghum is widely consumed in the Harar region, and teff dominates in the northern regions. Also, there appears to be widespread mixing of sorghum and/or maize with teff in the

preparation of njera especially among lower income groups.[6] This raises the question as to which commodity should form the focus of a stabilization program (if any) and what would be the cost of such a program to the treasury.

The potential complications arising from attempts to stabilize one commodity are illustrated by the following example. Assume that EGTE is tasked with the social function of defending a floor and ceiling price for maize. In the event of a poor harvest, EGTE may be compelled to release maize stocks (or import maize) sufficient to drive the market price of maize down to the ceiling price level. The depressed price of maize may induce households to sell off stocks of teff or wheat in order to buy maize for consumption, thereby putting upward pressure on maize prices and requiring even greater resources on the part of EGTE to keep the price of maize at or below the ceiling price. Information on the extent of integration between markets (i.e., the extent to which market information in one market is transmitted to other markets) is also important in this regard. Information requirements for an accurate assessment of the costs and benefits of a food price stabilization program is discussed in more detail in Section 5.

4.4. Guidelines for developing strategies to promote access to food by vulnerable groups

Based on experience from research in a number of African countries (e.g., Jayne et al. 1994), MSU has identified several "guiding principles" for defining a research agenda to promote access to food by vulnerable groups through food transfer arrangements and the market

(1.) *Focus on achieving productivity gains in the food system as the most important long run approach to promoting food security.* Growth is itself an effective option for reducing poverty and food insecurity. Government and donor disaster relief programs to protect vulnerable groups' access to food during transitory crises will be more successful and less costly when combined with strategies to alleviate the chronic causes of poverty. This requires a focus on achieving productivity gains in the food system that increase incomes and reduce the real costs of food over time.[7] The scale of vulnerability to drought and other transitory crises in Africa is primarily due to structural causes of poverty related to low-productivity agricultural systems.

(2.) *Focus on how food and income transfer programs can be designed to promote the long-run development of the food system − the basis for providing food for most people over the long run − in addition to providing food to people in the short run.* We have provided examples of how emergency and program food aid can help or hinder the development of competitive food markets. Better synergies between disaster relief programs and long run development of the food system can be facilitated by:

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[6]Initial investigation indicates that, in some areas, njera can be made with up to 50% sorghum substituted for the more expensive teff.

[7]This brings up a range of issues addressed in the companion workshop paper on agricultural productivity by Howard et al.

(a) encouraging governments and donors to invest in local analytical capabilities to better understand the behavior of the food system into which food aid is injected;

(b) encouraging donors to coordinate food and income transfer activities;

(c) eliciting information from an array of private traders and other participants in the food system regarding how markets would respond to the influences of proposed food and income transfer programs; and

(d) working with government agencies, trade associations, and other non-state organizations to invest in critical public goods, such as market information systems, communication networks, a process for establishing legal foundations of markets, and contract enforcement capabilities.

(3.) *Focus on understanding how food consumption patterns vary by income group and region, to exploit the potential to improve vulnerable households' access to food through self-targeted commodities.* The choice of commodity to be distributed through food transfer programs or commercially by agencies such as EGTE may have a significant effect on the food security status of vulnerable households. For example, some analysts have questioned whether wheat is the most appropriate commodity to distribute in food aid programs in Ethiopia, since it is widely believed that wheat is consumed disproportionately by upper-income groups in most regions. If this were indeed true, then it is questionable that wheat food aid would provide the same level of benefit to the poor as a program distributing the same dollar value of a more self-targeted commodity (e.g., maize in some regions). Accurate knowledge of consumer behavior is also critical to provide estimates of the costs and potential effectiveness of food price stabilization programs, monetization programs, and other mechanisms designed to promote household food security.

(4.) *Focus on the cost and reliability of food supplies to rural areas as a component of non-farm, livestock, and other income diversification strategies designed to promote access to food over the longer run.* It is difficult to exploit cash crop/non-farm employment and income opportunities when food markets cannot assure a reliable supply of food to buy in rural areas and when the costs of making food available in rural areas are so high that other activities become inviable. Poorly designed export promotion programs have exacerbated food insecurity when unreliable food markets were not in place. The principle here is to promote the functioning of food markets as a means to allow rural households the opportunity to engage in higher-valued crop and non-farm activities without jeopardizing their access to food.

(5.) *Focus on developing local analytical expertise to help guide food system development.* Lasting policy change depends critically on governments' actual belief in the analysis supporting the reforms. There is ample experience showing that governments that have reluctantly undertaken reform programs have reversed them and reimposed the old system of price and trading controls as soon as a drought or other transitory shock has occurred. The demand for, and credibility of, food security policy analysis is enhanced by a collaborative research process in which the views and interests of local researchers and government analysts are incorporated from the beginning. The process of generating local ownership of research findings helps to create a greater credibility in the results as well as a common empirical foundation for donor/host country dialogue. In these ways, the manner in which

food policy research is undertaken heavily determines the usefulness of the research findings themselves.

5. Analytical Agenda

The foregoing discussion and cursory analysis points to some priority issues for future analysis under the MEDAC/MSU/USAID Food Security in Ethiopia Project. The analytical agenda presented below is intended as a foundation for discussion, to be further refined by the Project Technical Committee to reflect the priority policy issues among the various participating agencies of the Government of Ethiopia. The analytical agenda is designed to provide information to Ethiopian policy makers on the expected outcomes, costs, and benefits of alternative strategies to ensure access to food by vulnerable groups in Ethiopia. The agenda focuses on market-oriented mechanisms, reflecting the fact that much research continues to be carried out on targeting through food transfer programs in Ethiopia.

5.1 Potential issues for further analysis

This section identifies three key areas for future analysis under the topic of "Strategies to Promote Household Access to Food":

Policy Issue #1: Costs and Benefits Associated with a Cereal Price Stabilization Policy
There has been some discussion in Ethiopia regarding the consequences of running a floor and/or ceiling price program for one or more cereals. The costs and benefits associated with alterative floor and ceiling prices could be evaluated with respect to:

(a) household expenditures on food, differentiated by income group and region; and resulting impact on food security;

(b) treasury costs associated with alternative programs;

(c) food self-sufficiency ratio (production/consumption requirements) and import requirements;

Various stabilization scenarios can be evaluated, depending on

(i) choice of commodities to be stabilized (e.g., maize, wheat, or all crops);

(ii) weather (e.g., yield outcomes based on drought, normal and good harvest scenarios);

(iii) type of stabilization program (e.g., floor price, ceiling price, or both?).

(v) different exchange rate scenarios. For example, how would a 10% devaluation of the Birr/SDR exchange rate affect outcomes a, b, and c above.

Approach: The above questions can be addressed, for example, through simulation analysis. Household survey data would be augmented by available secondary data to obtain regionally-disaggregated parameters for a spatial equilibrium-type model. Sensitivity analysis would

provide indications of the robustness of the results to particular assumptions.

Policy Issue #2:   *Effects of alternative food aid programs on food market prices and domestic production incentives.*

An accurate understanding of how different food aid programs (e.g., food-for-work, relief) affect food market prices and domestic food production would be important both for government policy makers, donors, and NGOs concerned with food security. For example, RRC, EFSRA, and NGOs may be interested in the expected effect on market prices in a particular wareda resulting from the release of 5,000 tons of wheat in a relief program. To what extent would this affect local market prices for various cereal commodities, and what would be the expected effect on local food production incentives?

Approach: An accurate assessment of this issue would require disaggregated information on commodity prices, food aid distribution (commodity, volume distributed, type of program, location, and date distributed), rainfall, and other available information on the wareda level. Econometric models could be developed to assess the statistical correlation between the volume of food aid distribution and market prices, controlling for factors such as rainfall, seasonality, et. Several NGOs have expressed an interest in such a model as a means to better guide the design and implementation of their food aid programs.

5.2   Key information requirements for analysis of all four policy issues

Adequate assessment of all three policy issues identified above will require detailed micro-level information on the behavior of rural households, marketing agents, and consumers, to develop a better understanding of how production and consumption would respond to a range of potential food transfer and market-oriented policies. For example, there is very little empirical evidence available to assess how various food transfer programs affect market price levels and instability, and how changes in the level and stability of prices affects production and consumption patterns in Ethiopia. There is also little information on the proportion of rural farm households in Ethiopia that are net purchasers of food, and who therefore may be hurt by policies designed to raise food prices to promote production incentives. How would farm technology adoption (e.g., improved seed varieties and fertilizer) be affected by the price level of particular food crops, what would be the expected production response, and what proportion of rural households possess the resources to respond to such incentives? A more disaggregated household-level database is critical to inform these issues.

There also appears to be little information on how cereal consumption patterns vary by region and by income strata. This information is also necessary to evaluate the attractiveness of potential food security programs based on "self-targeted" cereals. A "self-targeted" commodity is one that is eaten primarily by the poor; hence strategies to reduce the price of that commodity will improve their access to food through the market. This objective must be weighed against the potential production disincentive that might result from attempts to reduce commodity prices through the market. It is anticipated that "self-targeted" cereals vary by region in Ethiopia.

Information would also be necessary on the cross-price and own-price elasticities of demand

for the various cereals. If all cereals were highly substitutable in consumption, then attempts to depress the price of one cereal through price stabilization or monetization of food aid would also depress the prices of all cereals. Very little information currently exists to inform this issue. The findings could provide important guidance to Ethiopian policy makers on how the market can be effectively and appropriately structured to promote access to food by vulnerable groups.

An illustrative example is given of how identification of self-targeted commodities may promote access to food at little cost to the treasury. Assume that research is able to identify that sorghum and maize are purchased primarily by low-income consumers in most regions of the country. The EGTE, RRC, or EFSRA could be tasked with importing sorghum or maize, to be monetized and released onto the market later in the season. This would exert downward pressure on cereal prices for the poor, without necessarily involving great leakage to higher-income consumers who prefer other cereals. The cost of the program would be equivalent to the volume imported times the difference between the import price and the monetized selling price (which itself is a function of the volume imported). To defray these costs, government could request that donor resources are provided to support this program rather than existing less-targeted programs. A reliable market information system would allow careful monitoring of the monetization program, and provide feedback to Government and its operating agencies (e.g., EGTE, RRC, or EFSRA) on appropriate volumes to monetize and at what price. However, it is unlikely that any single cereal commodity serves as a self-targeted commodity in all regions of Ethiopia, and hence the potential to exploit opportunities for self-targeting would become more complicated, and dependent on accurate regionally-disaggregated information on food consumption behavior.

6.   Summary

This report has examined the potential to ensure access to food for vulnerable groups in Ethiopia through two main methods: (a) food transfer programs, and (b) appropriate policies influencing the food marketing system.

The report presents trends in food aid and food production in Ethiopia, and provides cursory evidence of the possible disincentive effects of food aid on agricultural production incentives. We also discuss the potential adverse effects of food transfer programs on the long run development of the food marketing system. A reliable and well-functioning food marketing system reduces the number of households vulnerable to food insecurity and the associated cost of protecting them through food transfer programs.

The report also underscores the possible implications for Ethiopia of less food aid being available from major food aid donor countries resulting from recent U.S. agricultural policy and the GATT.

The report discusses the costs and benefits of various food transfer programs, and highlights major unresolved issues requiring further analysis to guide Ethiopian policy makers' decisions on strategies to promote household food security.

Finally, the report presents a set of principles to guide policy on food aid and food marketing policies, and presents a proposed research agenda to guide further analysis under the

MEDAC/MSU/USAID Food Security Project in Ethiopia.

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Annex 1

**Technical Information on the Preliminary Estimation
of Effects of Food Aid Releases on Food Prices**

The model

One approach to modeling price effects would be to build a structural econometric model consisting of behavioral equations to explain the supply and demand decisions of all participants in the market, including producers, consumers, traders, and state agencies involved in food marketing. However, this would require a large model which embodies many overidentifying restrictions drawn from economic theory. These restrictions usually take the form of excluding variables from particular equations in order to motivate a particular economic interpretation for the model. Of course, it is not necessary to work with large systems because there are methods for estimating individual structural equations embedded within a larger system. However, estimating price effects in individual equations only provides information on the effects of price on the behavior of the particular agent being modeled (e.g. on producers if a supply equation is being estimated). A structural approach to estimating the effects of market reform on equilibrium prices would require structural equations for all market participants at each stage in the system, from production to marketing to consumption.

A potential problem with large-scale structural models is that the restrictions used to identify the model may not be valid. A multi-market structural model of a vertical marketing chain is complicated, particularly when it involves international trade. But economic theory often only provides weak guidelines on how identification can be achieved. For example, Sims (1980) has shown that if expectation variables enter an equation then it is almost impossible to exclude any relevant variable which is known at the time expectations are formed, because these variables will enter through the expectations term. If incorrect identification restrictions are imposed then the model can provide misleading results (Jayne and Myers 1994; Tomek and Myers 1993; Sims 1982)

An alternative is to directly specify a reduced form model for equilibrium food price levels. Such a model would include variables that might be included in structural models drawn from economic theory, but otherwise the model is left relatively unrestricted. Data availability will also affect what can be feasibly estimated. Historical price correlations are summarized by including lagged variables, and statistical criteria are used to determine how many lags to include (Judge et. al. 1985, Chapter 16). The advantage of this approach is that the minimally- restricted reduced form provides flexibility which allows the model to be consistent with a wide range of alternative economic structures (Tomek and Myers 1993). The disadvantage is that structural information on the effects of price on the supply or demand decisions of particular market participants is not available. Nevertheless, the main goal of this analysis is confined to estimating the *net* effect of food aid volumes distributed in Ethiopia on domestic market price levels. A reduced form approach is very well suited to this task.

To test for statistical differences in the trend of real food prices before and after structural change, price-dependent spline functions are specified. Spline functions are a class of models that allow for a continuous function to be estimated, but one that can take on a

different slope after structural change. If linearity is assumed, such a model is called a piecewise linear regression, and in this case it consists of two straight line segments that are continuous at the point of structural change (Pindyck and Rubenfeld 1986). This approach is in contrast to models (using, for example, slope and intercept shifters) that result in a discontinuity in the function before and after structural change. The attractiveness of the spline function approach is that it will not result in a price estimate during the last pre-reform time period that is greatly different from the price estimate in the first post-reform time period. Assuming that food prices are not discontinuous, but that their relationship to exogenous and lagged-endogenous variables may nevertheless be altered under structural change, a spline function approach would be appropriate.

The basic model used for country-level estimation is:

$$(1) \quad P_t = b_0 + b_1 * X_t + b_2 * TREND_t + b_3 * D_t * (TREND_t - REFORM_{t0}) + \varepsilon_t$$

where P_t is the deflated price of the food commodity; X_t is a vector of predetermined variables hypothesized to affect P_t (i.e., variables plausibly contained in structural supply and demand functions); $TREND_t$ is a time trend, $REFORM_{t0}$ is the time in which structural break occurs (a constant); and

$$D_t = \quad 1 \text{ if } t > t0$$
$$0 \text{ otherwise}$$

For years before and including the structural break, $D_t = 0$, and

$$E(P_t) = b_0 + b_1 * X_t + b_2 * TREND_t$$

After the structural change, $D_t = 1$, and

$$E(P_t) = b_0 + b_1 * X_t + b_2 * TREND_t + b_3 * TREND_t - b_3 * REFORM_{t0}$$

or $\quad E(P_t) = (b_0 - b_3 * REFORM_{t0}) + b_1 * X_t + (b_2 + b_3) * TREND_t$

Note that before structural change, the average monthly change in price levels is given by b_2. After structural change, the average monthly price change shifts to $b_2 + b_3$. As shown in more detail by Pindyck and Rubenfeld (1986), there is no discontinuity in the relationship.

Equation (1) is estimated using monthly data for Addis Ababa and Jimma. The vector X_t in (1) includes monthly observations on: lagged 3-month moving average of rainfall at weather stations in or near the respective market area; monthly dummy variables to account for seasonal price patterns; lagged consumer price index; lagged Birr/US$ exchange rate; and the 2-month lagged quantity of cereal food aid arriving in Eritrean and Djibouti ports.

A major limitation of this model is that its level of aggregation may obscure potential localized effects on market prices. If markets were perfected integrated, then food releases in one region would be expected to ripple through to markets in other regions. However, it is widely believed that food markets in Ethiopia are only weakly integrated. In such a case, food aid releases may have large effects on prices in one area, but not necessarily on prices in the markets being monitored, in this case Addis Ababa and Jimma. Thus, this preliminary

assessment would be expected to underestimate the actual effect of food aid releases on market prices. Future analysis is designed to examine the relationship between food aid releases and prices on the wareda level, and the transmission of prices between markets, to provide a more accurate assessment of factors affecting food market prices.

A second limitation is that the structure of food marketing system in Ethiopia changed dramatically after 1990. Quotas and official fixed prices during the 1980s gave way to a more liberalized marketing system after 1990. The spline function specification allows for shifts in the slope and intercept of price levels, but this is an imperfect procedure for accounting for structural change. Future analysis may be able to focus on the post-reform period entirely through the pooling of times series data across a number of markets.

Data

The sources of the data used in this analysis are as follows:

Commodity price information (Ethiopian Grain Trading Enterprise 1995); consumer price index (Central Statistics Authority); exchange rate, gross domestic product, and population (International Monetary Fund 1995); rainfall (NMSA National Meteorological Bureau, Government of Ethiopia).

Data was available to estimate equation (1) back to January 1987. However, concerns have been raised over the reliability of EGTE price data before late 1991. Equation (1) was therefore estimated over two periods to examine the sensitivity of the findings to sample period. In this preliminary report, estimation results for Addis Ababa are presented in the Annex for the January 1987 to December 1994 period only. Full results will be included in the forthcoming final report.

TABLE A4: Ethiopia

Dependent Variable is (Y_1) is retail maize price, Addis Ababa markets (Birr/quintil)
SMPL range: 1987.01 - 1994.12   Estimation Procedure: Seemingly Unrelated Regression
Number of observations: 84

VARIABLE	COEFFICIENT	T-STATISTIC
Constant	10.52	0.64
3-month MA Food Aid	-7.42	-2.33
APR	2.83	0.76
MAY	7.79	1.90
JUN	8.74	2.08
JUL	10.54	2.32
AUG	11.74	2.12
SEP	15.76	2.12
OCT	11.74	1.51
NOV	7.59	1.27
DEC	4.65	1.17
JAN	-0.50	-0.12
FEB	-0.00	-0.00
3-month MA Rainfall(-1)	-0.06	-2.18
Time 87	0.12	0.78
Time 91	-0.10	-1.98
Y_1(-1)	-0.16	-1.52
Y_2(-1)	0.08	0.61
Y_3(-1)	0.86	10.66
Y_4(-1)	0.02	0.34
Y_5(-1)	0.08	1.07

$$R^2 = 0.844$$
$$\text{Adj } R^2 = 0.79$$
$$\text{F-Statistic} = 17.23$$
$$\text{DW} = 1.64$$

TABLE A5: Ethiopia

SYS - Iterative SUR // Dependent Variable is (Y_2) in retail white wheat price, Addis Ababa markets (birr/quintil)
SMPL range: 1987.01 - 1994.12
Number of observations: 83

VARIABLE	COEFFICIENT	T-STATISTIC
Constant	64.11	3.12
3-month MA Food Aid(-1)	-1.97	-0.48
APR	2.83	0.76
MAY	7.79	1.90
JUN	8.74	2.08
JUL	10.54	2.32
AUG	11.74	2.12
SEP	15.76	2.12
OCT	11.74	1.51
NOV	7.59	1.27
DEC	4.65	1.17
JAN	-0.50	-0.12
FEB	-0.00	-0.00
3-month MA Rainfall(-1)	-0.02	-0.67
Time 87	0.24	1.17
Time 91	-0.52	-2.00
Y_1(-1)	0.24	2.41
Y_2(-1)	0.23	1.32
Y_3(-1)	0.39	2.79
Y_4(-1)	-0.14	-1.51
Y_5(-1)	0.03	0.33

R^2	= 0.72
Adj R_2	= 0.63
F-Statistic	= 8.18
DW	= 1.98

TABLE A6: Ethiopia

SYS - Iterative SUR // Dependent Variable is (Y_3) is retail mixed what price, Addis Ababa markets (birr/quintil)
SMPL range: 1987.01 - 1994.12
Number of observations: 83

VARIABLE	COEFFICIENT	T-STATISTIC
Constant	22.57	1.34
3-month MA Food Aid(-1)	-3.93	-1.83
APR	2.83	0.76
MAY	7.79	1.90
JUN	8.74	2.08
JUL	10.54	2.32
AUG	11.74	2.12
SEP	15.76	2.12
OCT	11.74	1.51
NOV	7.59	1.27
DEC	4.65	1.17
JAN	-0.50	-0.12
FEB	-0.00	-0.00
3-month MA Rainfall(-1)	-0.03	-1.25
Time 87	0.24	1.46
Time 91	-0.21	-2.05
Y_1(-1)	-0.10	-0.96
Y_2(-1)	0.09	1.17
Y_3(-1)	0.78	5.85
Y_4(-1)	-0.02	-0.38
Y_5(-1)	0.07	0.93

R^2 = 0.85
Adj R^2 = 0.80
F-Statistic = 17.84
DW = 2.07

TABLE A7: Ethiopia

SYS - Iterative SUR // Dependent Variable is (Y_4) is retail price, white teff, Addis Ababa markets (Birr/quintil)

SMPL range: 1987.01 - 1994.12

Number of observations: 84

VARIABLE	COEFFICIENT	T-STATISTIC
Constant	75.65	3.56
3-month MA Food Aid(-1)	-3.51	-0.92
APR	2.83	0.76
MAY	7.79	1.90
JUN	8.74	2.08
JUL	10.54	2.32
AUG	11.74	2.12
SEP	15.76	2.12
OCT	11.74	1.51
NOV	7.59	1.27
DEC	4.65	1.17
JAN	-0.50	-0.12
FEB	-0.91	-0.89
3-month MA Rainfall(-1)	-0.04	-1.22
Time 87	-0.50	-2.24
Time 91	-0.44	-1.60
$Y_1(-1)$	0.02	0.18
$Y_2(-1)$	-0.01	-0.09
$Y_3(-1)$	0.15	1.50
$Y_4(-1)$	0.63	6.44
$Y_5(-1)$	0.05	0.56

R^2	=	0.76
Adj R^2	=	0.68
F-Statistic	=	10.22
DW	=	1.69

TABLE A8: Ethiopia

SYS - SUR // Iterative Dependent Variable is (Y_5) is retail price, white barley, Addis Ababa markets (Birr/quintil)
SMPL range: 1987.01 - 1994.12
Number of observations: 81

VARIABLE	COEFFICIENT	T-STATISTIC
Constant	10.99	0.50
3-month MA Food Aid(-1)	-8.41	-1.88
APR	2.83	0.76
MAY	7.79	1.90
JUN	8.74	2.08
JUL	10.54	2.32
AUG	11.74	2.12
SEP	15.76	2.12
OCT	11.74	1.51
NOV	7.59	1.27
DEC	4.65	1.17
JAN	-0.50	-0.12
FEB	-0.00	-0.00
3-month MA Rainfall(-1)	-0.08	-2.45
Time 87	0.28	1.26
Time 91	-0.46	-2.04
Y_1(-1)	-0.03	-0.25
Y_2(-1)	0.33	1.79
Y_3(-1)	-0.06	-0.59
Y_4(-1)	0.09	0.92
Y_5(-1)	0.58	5.26

R^2	=	0.70
Adj R^2	=	0.60
F-Statistic	=	7.13
DW	=	1.86