RESEARCH REPORT

FAMINE IN ETHIOPIA: POLICY IMPLICATIONS OF COPING FAILURE AT NATIONAL AND HOUSEHOLD LEVELS

Patrick Webb
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FOREWORD

This study argues that famines are preventable. What was once a universal threat to human life is now found primarily in Sub-Saharan Africa. Africa is likely to be the only continent to experience a continued high level of famine mortality during the 1990s, as well as an increase in absolute poverty. Therefore, the current challenge facing policymakers and research organizations such as IFPRI is to reduce the negative effects of famine in Africa and to lay the foundations for its longer-term eradication.

This research by Patrick Webb, Joachim von Braun, and Yisehac Yohannes was designed to contribute to a better understanding of the root causes of famine and thereby to identify appropriate policies and projects for famine mitigation. As part of a larger IFPRI research effort on famine, this study complements a parallel study conducted on famine in Sudan that was presented in Research Report 88.

Until recently, the design of improved famine interventions has been hampered by a lack of detailed knowledge about who suffers most and why, and what can be done about it. Answers to these questions were sought by the authors through detailed field surveys in seven famine-affected areas of Ethiopia. An analysis of the roles of drought and market failure in famine was also pursued based on secondary data. The research findings demonstrate that drought and war are important, but only partial, contributors to famine. The underlying factor that makes famine possible is poverty—absolute poverty at both the national and household levels.

Thus, a policy focus on removing poverty becomes a key element of any famine-prevention strategy. The creation of a macroeconomic environment favorable to private enterprise contributes to such a strategy. But public action will also continue to have an important role to play in famine mitigation; for resource poor, vulnerable households, there is no simple, market-led alternative to effectively targeted policies and programs. Close, and continuing, interaction between IFPRI and Ethiopia's policymakers is focused on identifying and aiding the implementation of such policies and programs.

Per Pinstrup-Andersen
Director General

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1

SUMMARY

Government policies in Ethiopia are developing in favor of market liberalization, democratization, and the rule of law. The international finance community is now more willing to invest development capital in the country. These are essential first steps toward the eradication of famine but are not sufficient in themselves.

A transitory phenomenon in Ethiopia before the 1980s, famine has evolved into an almost structural problem that can no longer be addressed by short-term, crisis-response measures. Sound information is urgently needed for comprehensive policy reform to prevent famine.

This study provides detailed empirical information to support the debate on policy reform. It finds that while the experience of famine in the 1980s varied across the country, underlying conditions were often the same: proneness to production fluctuations, lack of employment opportunities, limited household assets, isolation from major markets, low levels of farm technology, constraints to improvements in human capital, and poor health and sanitation environments. Famine symptoms are thus the outcome of an interaction between policy failure and socioeconomic, health, and environmental factors.

While all households in the drought-affected regions studied were affected, the impact of famine varied by household according to income and asset base. Results from seven survey locations show that relatively wealthier households (the top third of households in the sample, with an average annual income of US$100 per capita) coped better than the poor (the bottom third of households, with an annual income of US$42 per capita). During the 1980s, wealthier households achieved drought-year cereal yields three times higher than poor households—300 kilograms versus 111 kilograms per hectare. As a result, output from the wealthier households was also higher, reaching an average of 38 kilograms per capita in 1985, compared with only 9.5 kilograms per capita in poor households. Income distribution also affected consumption, which decreased to one meal or less per day among 63 percent of the poorest households, compared with only 43 percent of the wealthier group.

These findings suggest that even where almost everyone is extremely poor, the depth of poverty is important in determining the impact of famine. This emphasizes the need for better targeting of absolute poverty by relief interventions and for targeting of productive investment to famine-prone regions as well as to the surplus zones of the country.

Household responses to famine can be grouped in three stages: risk minimization, involving crop and herd dispersal, nonfarm income diversification, and asset and other savings accumulation; risk absorption, involving the sale of livestock and nonproductive assets, a search for new sources of income, and collection of debts; and risk-taking to survive, involving reduced consumption, the sale of productive assets, and reduced socialization. Since wealthier households have more assets, better access to credit and

other social support, and more nonfarm income than do the poor, they are better able to protect their level of consumption during drought-related food crises.

Although the overall trend of rainfall in Ethiopia during the past 25 years has shown only a small decline, fluctuations between years and regions have been large. In 1984, rainfall was 22 percent below the long-term mean, and most regions suffered. In other years, severe droughts affected only parts of the country. The absence of any rainfall-production correlation between regions underlines the potential for improved interregional movement of food inputs and production resources. The upgrading of rural transport, in association with appropriate market development policies, holds promise for food-security improvement.

Household vulnerability to famine increases during protracted drought through progressive depletion of food stocks and capital assets. The worst recent droughts were the culmination of at least two years of poor rainfall. In future, however, single-year droughts may be sufficient to trigger famine where stocks and resources have not yet been rebuilt. This danger highlights the importance of an efficient early warning and intervention capability.

Fluctuations in food consumption are largely determined by fluctuations in domestic production (a correlation of 0.76), which is strongly linked to drought. Cereal production per capita has declined by an average of 4 kilograms per year since the 1960s. Food aid and imports have cushioned this decline, but links between domestic production, food availability, and famine remain close because of poor market integration. Much could be gained from programs aimed at stabilizing production at higher levels. Research for improved drought-resistance in cereals, increased small-scale irrigation, and programs of erosion control are critical for raising and stabilizing supply.

Marketing constraints (both physical and policy-driven) were important in determining the geographical impact and degree of purchasing-power collapse. A close relationship is found between food shortage and real increases in cereal price. Analysis suggests that, under the previous (highly restrictive) policy regime, a 10 percent fall in cereal production resulted in an average price increase of 14 percent. Under the prevailing conditions of effective household demand and the trade, food aid, and stockholding policies, price explosions were associated with the production fluctuations of the 1980s.

Consumer substitution between major cereals caused prices for all grains to move up together. Yet there were substantial lags in price movements in different markets by region because integration between regional and central markets is limited. Price developments in provincial markets are largely driven by local developments. Although lagged, integration between off-the-road markets and their provincial capitals is fairly strong. However, continued interregional market segmentation and limited effective purchasing power among the poor make reliance on a market-driven solution to famine prevention unlikely in the immediate future. Price liberalization and the freeing up of markets for food, labor, and capital are essential to longer-term growth, but these actions alone cannot remove food insecurity without complementary investment in poverty alleviation.

Targeting of the poorest households by relief interventions had mixed success. Households consuming only one meal a day during the famine did generally receive more food aid than households consuming three meals. But the amounts received

were small for everyone—an average of 180 kilograms per household during the worst year.

Feeding camps were also vital to emergency relief despite the drawbacks of dislocation and contagion. At some camps, more than two-thirds of the children admitted were less than 65 percent of standard weight-for-height. Over 70 percent of the children came from the poorest and middle-wealth households.

Labor-intensive public works were widely used as a tool for food or income transfer during and after the famines. Few projects targeted the poor, relying on the assumption that public works are self-targeting. This had a limited effect since the poorest and wealthier households participated equally. However, short-term income transfers were crucial to food security during crisis years. On average, more than 90 percent of the food wage was consumed at home. Indeed, few participants felt that a cash wage would have been more desirable. This indicates that where markets are constrained by deficient infrastructure, restrictive policies, or crisis events, food wages still have an important role to play. Where markets function well, cash disbursal may be the preferred option. A careful consideration of more flexible payment modalities by wage type is required.

The long-term impact of public works depends on their technical quality and usefulness as perceived by participants. Many projects have suffered from deficiencies in technical design, an imbalance between food inputs and essential nonfood inputs, and institutional weaknesses. On the other hand, feeder-road construction was found to have strong income multiplier effects in the medium term, and erosion-control activities have been much improved through trial and error.

Asset transfers (ox and seed distribution) were used to rebuild farming systems. Some targeting was achieved, yet many of the poorest households, including female-headed households, were left out. Many oxen died due to lack of food or disease; others were sold before the next cropping season because the immediate need for food was so great.

The distribution of production-enhancing agricultural technologies, as an approach to famine prevention, had mixed results. A new plow was received by more poor than wealthy households, but its performance was disappointing and its long-term impact negligible. The crossbreeding of local cows with exotic strains for increased milk production was technically successful, but unsustainable. Crossbreeds yielded six times more milk but consumed three times more feed and were more susceptible to disease.

The study underlines the importance of combating the root causes of poverty, through rural economic growth, as the key to preventing famine. Such growth necessitates peace, popular participation in government, and a narrow set of policy and investment priorities. In the short-term these policies should include the institutionalization of emergency-code legislation and stabilization of food entitlements in famine-prone areas, through transfers and decentralized stocking. For the longer term, emphasis should be on promotion of agricultural growth through technological change and commercialization, employment creation through labor-intensive public works that upgrade rural infrastructure and halt natural-resource degradation, and improved health and human resources.

2

CONCEPTS AND RESEARCH APPROACH

The Famine Debate

Progress has been made during the 1980s in the search for improved understanding of the causes of famine and of appropriate public action required to prevent it (Sen 1981; Drèze and Sen 1989). It is now recognized that food crises arise from a complex interaction between supply, distribution, and demand factors. While a focus on the supply side is necessary, it is insufficient for famine prevention. Thus, traditional emphases on production failure that ascribe a prominent role to drought (Degefu 1988; Endalamaw 1988), ecological degradation (Constable 1984; Hurni 1988; Dejene 1990), military action (Cliffe 1989; Lancaster 1990; de Waal 1991), or policy mismanagement (Lirenso 1983; Gamaledinn 1987; Luling 1987; Winer 1989) have recently been complemented by a shift in focus to other areas. For example, the key roles of purchasing-power collapse (closely linked to employment conditions) and market failure have gained widespread recognition (Goyder and Goyder 1988; Rahmato 1988; ONCCP 1989). The many elements considered, and their interaction, are no longer seen as alternatives but as complements.

Recognition of the multifaceted nature of famine causation (and prevention) has given impetus to varied public attempts at protecting food entitlements through short-term transfers, not only of food but also of employment and income. It has also confirmed that the longer-term sustainability of public action depends on an economic growth strategy that alleviates poverty while backing public commitment to famine prevention with the necessary resources. Many essential elements of such a long-term strategy are widely recognized, including agricultural growth, rural income diversification, and improvements in the health environment of the poor (ONCCP 1989; IFAD 1989).

However, a number of important research questions remain. These include, What criteria should guide funding support for public (national-level) versus private (household-level) action for famine mitigation? What policies can be designed to cope with the short- and long-term dynamics of famine causation, thereby preventing crises through sustainable development?

This report seeks to shed light on such questions by identifying the principal links between supply failure, distribution failure, demand failure, and famine in Ethiopia at the national, regional, and household levels.

Research Tasks and Approach

The broad conceptual framework of this research is described in detail in a parallel study on famine in Sudan (Teklu, von Braun, and Zaki 1991) and is only

briefly outlined below. Primary household-level data, specifically collected for this report, are employed with a focus on project experiences and household coping strategies under famine conditions. The research seeks an improved understanding of household (private) coping capacities, both for reducing the shock of drought and for mitigating the effects of famine, with a view to strengthening public action in these domains.

In Ethiopia, both private and public capacities for minimizing drought impact and for coping with famine are currently weak. The potential for private initiatives, relying on private wealth and access to functioning markets, is severely limited. The same is true of public-sector administrative capacities, especially at the regional and district levels. Thus, in the medium term, a combination of appropriate private and public actions will be essential to famine prevention.

The five principal questions addressed by this report are

1. Which population groups are worst affected by famine?
2. What do these groups do themselves (through "coping mechanisms") to mitigate the effects of famine?
3. How important is drought in affecting food supply in Ethiopia, and do drought-related supply failures bear any blame in recent famines?
4. How important is good market and transport infrastructure in reducing the consumption effects of production failures?
5. Are the most vulnerable households effectively reached by famine relief and rehabilitation projects? For example, what role should food aid, feeding camps, employment-generation activities (public works), asset-distribution projects, and agricultural-technology transfers play in mitigating famine and in rebuilding the post-famine economy? What policies and programs would be the best for coping with drought and famine in the long run?

While the literature relating to such questions may be voluminous, it rests on poor empirical foundations. Goyder and Goyder (1988), for example, note that there remain "a number of serious gaps in our understanding about how Ethiopian famines affect individual households and how they cope with famine." Cutler (1985) similarly argues that "research into human response to drought should be an urgent undertaking. For Ethiopia, in particular, we need to know why some populations are more vulnerable than others." (For similar views, see Baulch 1987; Harrison 1988; Wolde-Mariam 1988; Campbell 1990.)

Given finite resources for public intervention, answers to these questions are crucial to the design of effective and cost-efficient policies and projects for reaching people most at risk. The present study therefore addresses such information gaps by focusing on primary and secondary data that provide insights into the structural and distributional causes and effects of famine. To do this, the household-level impact of famine is analyzed in the wider context of the performance of the overall food economy.

Conceptual Framework

A number of key terms should be defined at the outset. Famine is defined in this study as extreme, geographically concentrated food-consumption shortfalls that re-

sult in chronic loss of body weight and a rise in mortality.[1] The key symptoms of famine include sharp shortfalls in food consumption (even when starting from low levels in absolute terms), increased reliance on foraged foods that are unusual to the normal diet, irretrievable disposal of productive assets, community dislocation (increased distress migration and outmigration of entire families), and a jump in excess mortality above "normal" rates due to long-term undernutrition. The causes of famine include declining food availability, reduced access to available food due to climatic disruption, armed conflict, economic disruption, and massive income decline resulting from factor or product market disruptions. All of the above may, in various combinations, establish food-entitlement failure.

A root cause of famine is poverty, which is seen as an endogenous outcome of resource availability and of policies dictating resource use. However, not all of the "poor" (in absolute terms, most Ethiopian smallholders are poor by world standards) are necessarily vulnerable to famine (Watts and Bohle 1992). It is a combination of depth of poverty and degree of risk of entitlement failure that defines vulnerability. Thus, the greater the depth of their poverty and the higher their risk of entitlement failure, the more vulnerable households are to famine. This study shows that the characteristics of vulnerability include limited range of income sources, low asset base, and limited access to social networks for mutual assistance.

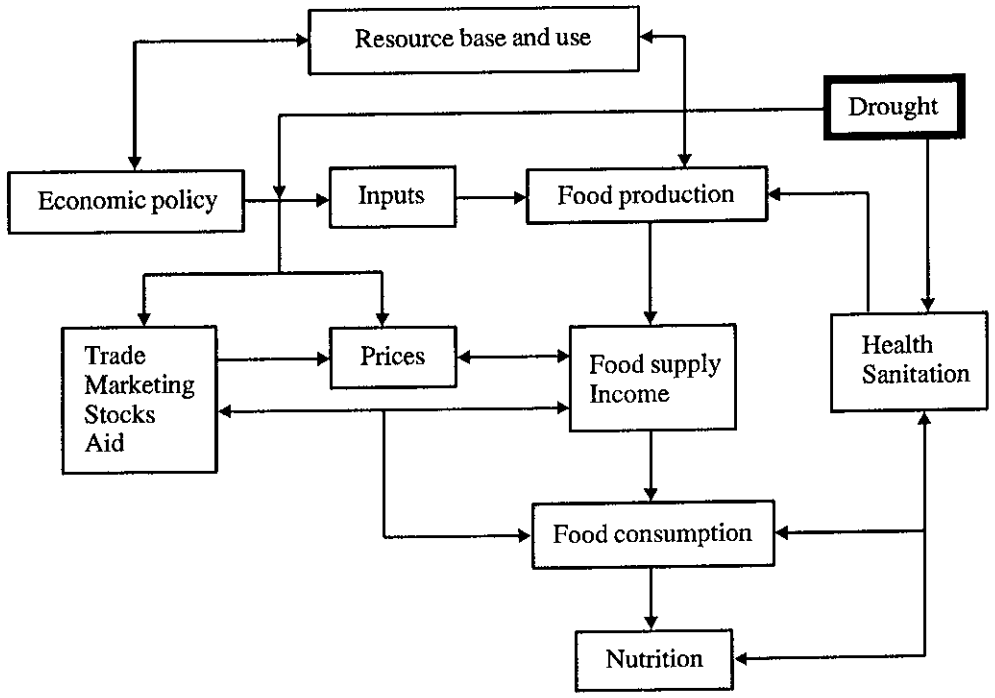
Links between various sectors of the economy, and their relationship to drought, are conceptualized as in Figure 1. This figure shows that famine-related malnutrition results from numerous relationships linking the macro- and microelements of the national economy. Drought has a direct effect not only on annual production but also on the sustainability of the resource base, on stocks, aid, and prices, and on immediate consumption potential. "Normal" year economic policies and investment priorities have a crucial bearing on the severity of "abnormal" production years. And the "normality" of production levels is influenced by pricing and food-supply policies. Thus, by examining the factors that contribute to (1) production levels and shortfalls, (2) the performance of markets during drought years, (3) the failure of purchasing power among the poor, and (4) the links between 1, 2, and 3, the analysis aims to shed light on factors that are crucial to policies for assisting the vulnerable in their battle against drought and hunger. This kind of integrated analysis can provide the basis for rational policy reform aimed at escaping the costly cycle of short-term crisis management, recovery, and renewed crisis.

Data Sources

This report is based on both primary and secondary sources. Secondary data are derived largely from Ethiopian government agencies such as the Central Statistics Authority, National Meteorological Services Authority, Ministry of Agriculture, and the former Office of the National Committee for Central Planning. While much maligned, government figures were infrequently found to be overtly politically ma-

[1]For details of the debate on the definition of famine, see Seaman, Holt, and Rivers 1978; Currey 1978; Sen 1981; Rivers 1988; Drèze and Sen 1990; de Waal 1990; Osmani 1991.

Figure 1—A conceptual framework for the analysis of linkages between food supply, consumption, and nutritional status, with special consideration of drought



nipulated. However, it should be noted that the quality and quantity of such data often leave something to be desired. Wherever possible, cross-checks were made between government statistics and those of donor or nongovernmental organizations (NGOs); where figures were found to be irreconcilable, they were discarded. Nevertheless, care should always be taken in interpreting such data. Note is made in the text or in the footnotes to tables where particular caution is required.

The primary data represent intensive, repeat-visit interviews, spread over more than a year (1989/90), with almost 550 households. Data collection was conducted by a team of 22 carefully trained enumerators (male and female), closely supervised by three senior supervisors and the IFPRI project leader. The enumerator staff all spoke at least two local languages.

Given the distressing nature of the interview topics, great care was taken to get to know respondents, to spend as much time as possible with them, and to be sensitive during interviews. Multiple visits permitted cross-checking and verification of information gathered. Thus, while household recall data is never perfect, a high degree of reliability is ascribed to these data.

Chapter Outline

The analysis begins in Chapter 3 with an overview of major historical and contemporary famines in Ethiopia. Chapter 4 provides a detailed examination of the household-level effects of famine derived from a household-level conceptual framework. Private coping mechanisms are considered, as well as the production, income, and consumption effects of famine according to household socioeconomic characteristics. The question of famine causation is considered in Chapter 5, with the focus on drought-induced production shortfalls and the policy environment in which production takes place. The evolution of crop prices and the role of market disintegration in food crises are analyzed in Chapter 6. In Chapter 7 an assessment is made of local relief and rehabilitation interventions, and of costs as reported by project-implementing agencies. This analysis provides a preliminary step toward an evaluation of alternative policy measures in the fields of agriculture, trade, and infrastructure investment in response to drought. The final chapter discusses policy conclusions arising from the analysis and makes a number of recommendations concerning further steps to be taken for improved famine mitigation as well as prevention.

3

A RECORD OF DROUGHT AND FAMINE IN ETHIOPIA

Although few elements of the famine debate enjoy a consensus of opinion, there is broad agreement in the literature on at least two basic points. First, droughts and food shortages in Ethiopia are not new phenomena. Second, the definition and analysis of such events demands recognition of many diverse variables and their complex interrelationships. It is appropriate, therefore, to start the present analysis from these two points.

Historical Record of Drought and Famine

Ethiopia's history is punctuated by famine. A literature review yields a list of recorded drought and famine crises (Table 1). While the distribution of these occurrences is biased toward the past 200 years (the period for which most detailed records exist), such crises have been traced as far back as 250 B.C.

In total, 39 periods of food shortage and excess mortality or both have been identified. Most events have been concentrated geographically into two broad zones. The first comprises the central and northeastern highlands, stretching from northern Shewa through Wollo and Tigray into eastern Eritrea (Figure 2).[2] The second is made up of the crescent of low-lying agro-pastoral lands ranging from Wollo in the north, through Hararghe and Bale, to Sidamo and Gamo Gofa in the south. Of the crises listed in Table 1, more than half are concentrated in these two zones.

Why have these two areas been disproportionately stricken by drought and famine? Three closely interrelated factors make these zones different from other parts of the country: population pressure, agro-ecological resource base, and climate. High population concentration in areas of poor resource base increases vulnerability to drought because the asset base relative to population is so shallow. Average population density at a national level for 1989 was 40 per square kilometer (Kloos and Zein 1988; Gutu, Lambert, and Maxwell 1990). However, 88 percent of the population is concentrated in highlands more than 1,500 meters above sea level, where it reaches densities in excess of 200 per square kilometer (Gryseels and Anderson 1983; Hurni 1988). Although upland farmers have migrated into the lowlands during the past hundred years as these lands have been progressively cleared for cultivation and

[2]Regional names follow those commonly used prior to the reorganization of boundaries in 1987. The term "province" is used for the largest internal administrative divisions. Eritrea and Tigray are included in the text as provinces. No political inferences are intended to be attached to this term.

Table 1—A chronology of Ethiopian droughts and famines

Date	Region Affected	"Triggers" and Severity
253-242 B.C.	Ethiopia	Deduced from low Nile floods
1066-72	Ethiopia and Egypt	Deduced from low Nile floods and Egyptian famine
1131-45	Ethiopia	Severity unrecorded
1252	Ethiopia	First of seven famine years during next 30 years
1258-59	Ethiopia	Severity unrecorded
1272-75	Ethiopia	Severity unrecorded
1314-44	Ethiopia	Severity unrecorded
1435-36	Ethiopia	Severity unrecorded
1454-68	Ethiopia	Severity unrecorded
1543-62	Hararghe	Attributed to God's anger at murder of Emperor Gelawdeos
1618	Northern Ethiopia	Emperor forced to evacuate headquarters
1772-74	Ethiopia	Widespread human suffering
1796	Northern Ethiopia	Famine triggered by locust invasion
1800	Ethiopia	Large human and livestock death toll
1812-16	Tigray	Severity unrecorded
1826-27	Ethiopia	Failure of cotton and grain crops
1828-29	Shewa	Much human mortality
1831	Tigray	Severity unrecorded
1835-38	Tigray and Eritrea	Drought, cholera epidemic; high human and cattle loss
1864-66	Tigray and Gondar	Heavy human death toll
1876-78	Tigray and Awash Valley	Heavy livestock death tolls
1880	Tigray and Gondar	Much loss of livestock
1888-92	Ethiopia	Drought and spread of rinderpest caused loss of nine-tenths of cattle and one-third of human population
1895-96	Ethiopia	Minor drought; loss of livestock and human lives
1899-1900	Ethiopia	Drought deduced from levels of Lake Rudolf and low Nile floods
1913-14	Northern Ethiopia	Lowest Nile floods since 1695; grain prices said to have risen thirtyfold
1920-22	Ethiopia	Moderate drought, similar to 1895-96
1932-34	Ethiopia	Deduced from low level of Lake Rudolf in northern Kenya
1953	Tigray and Wollo	Severity unrecorded
1957-58	Tigray and Wollo	Rain failure in 1957; locusts and epidemic in 1958
1962-63	Western Ethiopia	Very severe
1964-66	Tigray and Wollo	Undocumented; said to be worse than in 1973/74
1969	Eritrea	Estimated 1.7 million people suffering food shortage
1971-75	Ethiopia	Sequence of rain failures; estimated 250,000 dead; 50 percent of livestock lost in Tigray and Wollo
1978-79	Southern Ethiopia	Failure of Belg rains
1982	Northern Ethiopia	Late Meher rains
1984-85	Ethiopia	Sequential rain failure; 8 million people affected; estimated 1 million dead; much livestock loss
1987-88	Ethiopia	Drought of undocumented severity in peripheral regions
1990-92	Northern, eastern, and, southwestern Ethiopia	Rain failure and regional conflicts; estimated 4 million people suffering food shortage

Sources: Charles A. Wood, "A Preliminary Chronology of Ethiopian Droughts," in *Drought in Africa*, ed. David Dalby, R. J. Harrison Church, and Fatima Bezzaz (London: International African Institute, 1977), 68-73; Richard Pankhurst, *The History of Famines and Epidemics Prior to the Twentieth Century* (Addis Ababa: Relief and Rehabilitation Commission, 1984); H. Wolde-Michael, "The History of Famine in Ethiopia" (1985, mimeographed); Taffesse Wolkeba, "Hydrological and Meteorological Aspect of Natural Disaster in Ethiopia" (paper presented at the Disaster Prevention Symposium, Ethiopian Red Cross Society, Addis Ababa, 4-7 September 1985); John Iliffe, *The African Poor: A History* (Cambridge: Cambridge University Press, 1987); Workneh Degefu, "Some Aspects of Meteorological Drought in Ethiopia," in *Drought and Hunger in Africa: Denying Famine a Future*, ed. Michael Glantz (Cambridge: Cambridge University Press, 1987); Berhane Gizaw,

Table 1—(Continued)

"Drought and Famine in Ethiopia," in *The Ecology of Health and Disease in Ethiopia*, ed. Zein Ahmed Zein and Helmut Kloos (Addis Ababa: Ministry of Health, 1988), 75-81; Asfaw Gedion, "Disaster Prevention and Preparedness Plan in the Context of the Five-Year Plan" (paper presented at the National Conference on a Disaster Prevention and Preparedness Strategy for Ethiopia), Addis Ababa, 5-8 December 1988; Relief and Rehabilitation Commission, *Food Supply of the Crop Dependent Population in 1990* (Addis Ababa: RRC, 1990); Famine Early Warning System Project, "How Close to Famine?," *FEWS Bulletin* 5 (1991): 2.

Notes: In this compilation exercise, one faces the problem of defining parameters. Few food crises in Ethiopia have resulted from catastrophic events such as floods or earthquakes (although some have certainly been associated with epidemics and warfare). Instead, as has been reported for other parts of Africa, food shortages tend to take on famine proportions after their effects have become cumulative (Corbett 1988). Thus it is hard to say exactly when a food shortage or famine actually started and ended. While some analysts refer to notable crisis years in Ethiopia, such as 1958 and 1973, others claim that "during the 20-year period between 1958 and 1977, about 20 percent of the country was under famine conditions each year" (Fraser 1988, 20; see also Wolde-Mariam 1984). The analysis in this case clearly depends on the indicators used to define the problem and on how far back one wishes to extend the chain of causal relationships.

malaria has been eradicated, the bulk of the population still congregates in the milder, nonmalarial lands at 2,000-2,600 meters above sea level (Kloos and Zein 1988). It should also be remembered that with an annual growth rate of over 3 percent, this population is expected to reach almost 67 million by the year 2000 (IUCN 1989).

In some regions, the concentration of people and animals has led to deforestation (less than 4 percent of the country is currently forest-covered), overgrazing, and the cultivation of marginal lands (Dejene 1990). Soil erosion and loss of organic matter from cropping also adds to a decline in the potential productivity each year (Ethiopia, Ministry of Agriculture/FAO 1984; Hurni 1988). The regional severity of this soil degradation is shown in Figure 3. The worst areas are closely correlated with the drought- and famine-prone regions outlined above. The high degree of land degradation, particularly in the northern highlands, plays a large part in increasing the susceptibility of farming systems to environmental shocks (Dejene 1990; Stahl 1990).

It is important to note, however, that neither land degradation nor high population concentration is as significant in the extreme lowlands—the second broad zone of drought and famine vulnerability, largely populated by agro-pastoralists and pastoralists. Population density is lowest of all in the lowlands of Eritrea, Hararghe, and Bale. Here, problems of subsistence are focused more on lack of rainfall and poverty of soils than on soil degradation. The availability of forage to support livestock and the terms of trade between livestock and grain are the key elements of the lowland economy that dictate population size and location (Upton 1986; Donaldson 1986; Coppock and Reed 1992).

The crisis-prone areas are closely correlated with present-day drought propensity as calculated by Ethiopia's National Meteorological Services Agency (Degefu 1987, 1988). In other words, the regions most likely to succumb to drought in the next few years are the same as those that have suffered more than most in the past.

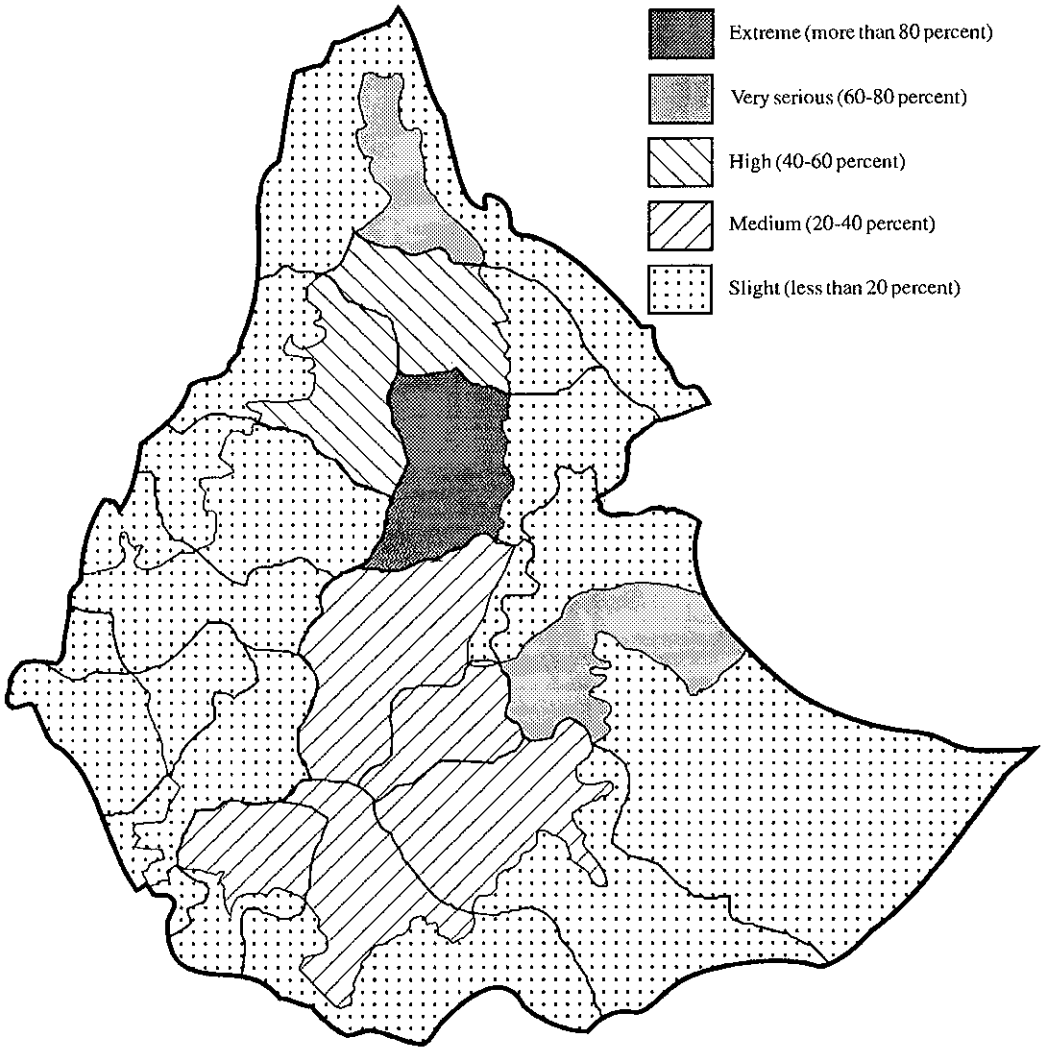
The relatively poor rainfall record of the drought-prone regions is shown in the time series in Table 2. These data show that for the nine provinces receiving precipitation below the national average, low levels of mean rainfall over time combine with high levels of interannual fluctuation. For example, the coefficients of variation in column 4 of the table are highest for the provinces of Eritrea (48), Tigray (28), and

Figure 2—Map of Ethiopia indicating regions most often affected by drought and famine

Source: Compiled from UNEPPG (United Nations Emergency Preparedness and Planning Group), *Briefing Notes on United Nations Emergency Relief and Preparedness Activities in Ethiopia* (Addis Ababa: 1990); Berhane Gizaw, "Drought and Famine in Ethiopia," in *The Ecology of Health and Disease in Ethiopia*, ed. Zein Ahmed Zein and Helmut Kloos (Addis Ababa: Ministry of Health, 1988), 75-81; and Mesfin Wolde-Mariam, *Rural Vulnerability to Famine in Ethiopia, 1958-1977* (Addis Ababa: Vikas Publishing House and Addis Ababa University Press, 1984).

Note: Provincial names used here follow those commonly used prior to the 1987 reorganization of administrative boundaries. The shaded areas are those regions most often affected by drought and famine.

Figure 3—Map of Ethiopia indicating regional severity of current soil erosion



Source: Hans Hurni, "Ecological Issues in the Creation of Famine in Ethiopia" (paper presented at the National Conference on a Disaster Prevention and Preparedness Strategy for Ethiopia, Addis Ababa, 5-8 December 1988).

Table 2—Average levels and variability of rainfall in Ethiopia, 1961-87

Province[a]	Mean	Percent of Ethiopia Average	Standard Deviation	Coefficient of Variation	Rainfall in Worst Year	
					Year	Percent of 1961-87 Average
Arssi	883	96	139	16	1980	69
Bale	774	84	199	26	1965	69
Eritrea[b]	395	43	187	48	1966	57
Gamo Gofa	761	83	155	20	1963	48
Gojjam	1,173	127	119	10	1983	18
Gondar	991	108	179	18	1970	63
Hararghe	511	55	139	27	1984	48
Illubabor	1,312	142	187	14	1965	66
Keffa	1,333	145	151	11	1980	80
Shewa	844	92	97	11	1965	76
Sidamo	851	92	198	23	1980	50
Tigray[b]	578	63	162	28	1984	44
Wollega	1,222	133	233	19	1970	47
Wollo	848	92	156	18	1984	46
Ethiopia[c]	921	100	71	8	1984	78

Source: Computed using data from the National Meteorological Services Agency, Ethiopia.

Note: Comprehensive rainfall data, long unavailable to the public, have recently been made more accessible. Although few regions have uninterrupted series, most have good coverage from 1961 to the present. The above table is based on pooled data deriving from a minimum of 31 stations (1961) to a maximum of 494 stations (1987).

[a]It should be stressed that figures presented on a province-wide basis frequently mask considerable local variability. Figures have all been rounded to the nearest figure.

[b]Figures are for the 1961-86 period only.

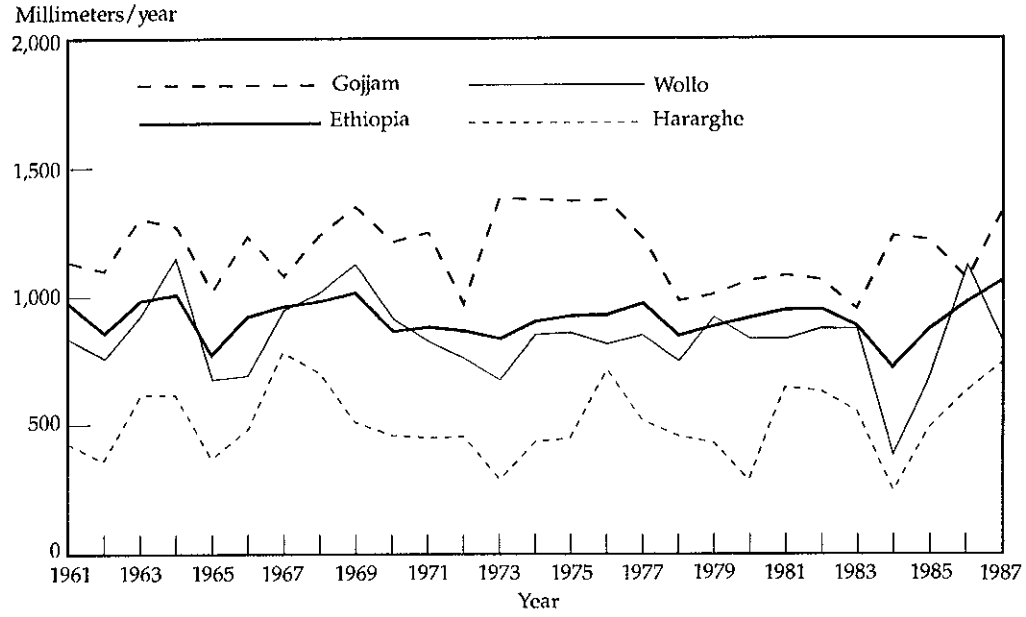
[c]The Ethiopia average is computed on the basis of regional cereal production weights of 1980-85 six-year-average cereal production by regions.

Hararghe (27). By contrast, regions with the highest levels of mean rainfall, such as Keffa and Gojjam, have coefficients of variation not exceeding 11.

This does not mean that high rainfall areas avoid localized crises. Droughts have occurred in Shewa, Gondar, and Gojjam during the past 20 years. However, these and other drought-prone provinces did not always experience their "worst" years simultaneously. For example, column 6 of Table 2 shows that five of the country's provinces had their severest drought during the 1960s, only two (Wollega and Gondar) were worst-affected during the 1970s, while four had their hardest year during the 1983-86 drought. Precipitation rates in all worst years ranged from 18 percent below the long-term average to as much as 57 percent below. For Ethiopia as a whole, the worst year since 1961 was 1984, with rainfall levels 22 percent below the long-term average.

Figure 4 shows that rainfall patterns by province are not perfectly correlated. Rainfall for Gojjam (a so-called "surplus province") is plotted against that of Hararghe and Wollo (two of the worst drought regions). Rainfall was exceptionally low in all three provinces around the catastrophic years of 1965, 1973, and 1984. The figure also shows that interannual fluctuations are much larger in the deficit regions than is normal for the country as a whole. The frequent occurrence of drought-inducing

Figure 4—Mean annual rainfall for Gojjam, Hararghe, Wollo, and Ethiopia, 1961-87



Source: Based on data obtained from the National Meteorological Services Agency, Addis Ababa.

fluctuations is, therefore, of central concern to food strategists and requires due policy attention.

A second element contributing to vulnerability in the drought-prone regions is their greater dependency on the short rains for their total annual production. The short rains fall between February and April, while the main rains fall from June to September. Many parts of the country benefit from short rains, which provide food (5 percent of national food production), raise fodder grasses (allowing livestock to recover weight after the dry season), and help weed control during the main rains by encouraging early growth, which can be plowed back into the ground.

However, the regional importance of the short rains varies considerably. The central and northern highlands receive between 20 and 30 percent of their total annual rainfall from the short rains, while in the eastern and southern lowlands this percentage rises to 40 or 50 percent. What is more, the correlation between levels of short and long rains in the same year is low—good short rains can be followed by drought in the main rainy season (IUCN 1989).

The Drought Sequence of the 1970s and 1980s

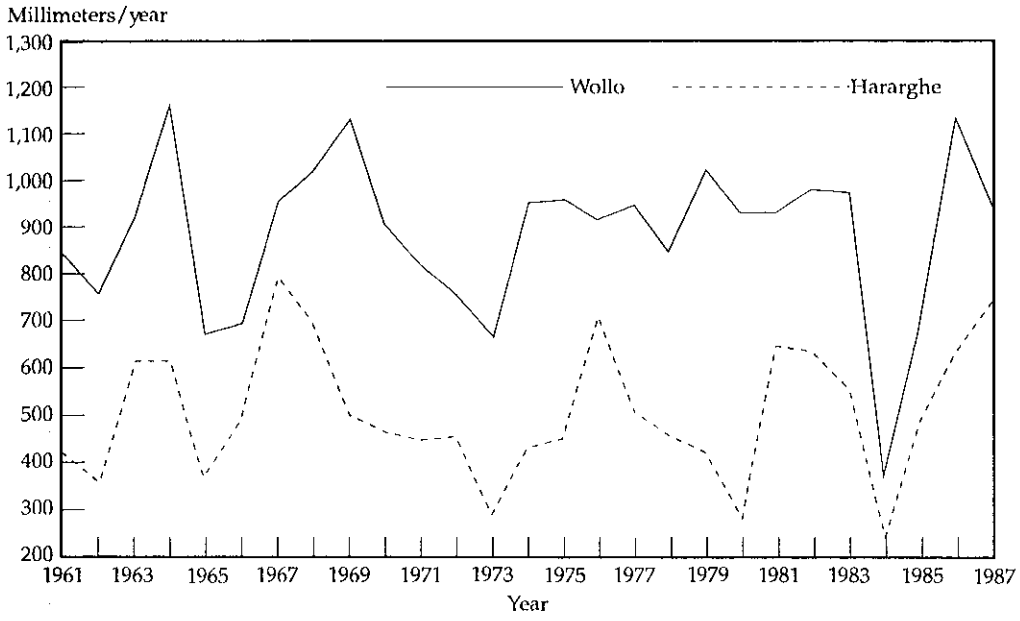
The lack of correlation between regional rainfall patterns illustrated in Table 2 supports the argument that there is no long-term pattern for Ethiopian drought

episodes, be it trend, periodicity, or cycle (Lamb 1977; Degefu 1988). What is more, there is no perfect correlation between drought years and subsequent food shortages. A single year of poor rainfall in Wollo or Tigray has not invariably resulted in famine, either in the same year or the following year. Thus, while the relationship between drought and hunger is a close one (the years of 1973 and 1984 are obvious examples), it is neither a constant nor a necessary one. The link between the two is more complex than simple associations allow.

Thus, a further feature of the rainfall story should be considered; namely the cumulative aspect of drought. The disasters of 1973/74 and 1984/85 did not happen suddenly. They were the culmination of a process spread over many years. An isolated drought is rarely a dangerous drought; it is only when a poor year follows others that drought crises take on unmanageable proportions (Hay 1986; Corbett 1988; de Waal 1988).

This argument is well supported by the data for the past few decades. The mean Ethiopia rainfall line presented in Figure 4 shows troughs for the years when the worst droughts were experienced. But the troughs are fairly shallow. This is because the figures for the drought regions are canceled out by those from high rainfall provinces. At a provincial level, however, a clear pattern of cumulative drought emerges. The time series for Wollo and Hararghe are reproduced in Figure 5. For these two provinces, the 1973/74 drought was merely the last and worst of a sequence of five to seven years of declining rainfall. Similar, although shorter, drought sequences preceded the crisis years of 1979/80 and 1984/85.

Figure 5—Mean annual rainfall for Wollo and Hararghe, 1961-87



Source: Based on data obtained from the National Meteorological Services Agency, Addis Ababa.

Thus the crucial characteristic of famine is its creeping, insidious nature. The 1973-75 famine can be seen as having its origins in the late 1960s. Indeed, many distress indicators were apparent long before the crisis was acknowledged: in 1971, Awsa District in Wollo petitioned the governor for food aid (Goyder and Goyder 1988); a crop assessment report in 1972 indicated suffering in many parts of Wollo and warned of impending calamity on a wider scale (Goyder and Goyder 1988); and by the end of 1972, nine regional governors and administrators were requesting 46,000 metric tons[3] of grain and 121,000 cartons of supplementary food from the government (RRC 1985a).

But by then the crisis had deepened. In December 1972, the Ethiopian Red Cross was helping roughly 1,000 refugees (mainly from Wollo) who had traveled south to the capital (Gill 1986). By the end of 1973, 60,000 refugees were crowded into camps in Wollo designed to cope with 20,000 (Holt, Seaman, and Rivers 1975). More migrants were flooding into provincial towns. It is claimed that at least 284,000 people sought help at regional centers (Rivers et al. 1976). A survey of seven districts in Wollo found that 85 percent of the population was "subsisting on less than 1,500 calories per day," with 10 percent critically malnourished (RRC 1974a).

However, it was not just Wollo that suffered. Although not center-stage during this crisis, western Shewa was reporting 23 percent of children in 55 sampled villages below 80 percent of standard weight-for-height (ENI 1974). Towns in Hararghe also reported between 17 and 25 percent of children below 80 percent of weight-for-height (RRC 1974b). In other words, this crisis spread from one region to the next and from a small number of affected people to a major national crisis. For example, in November 1973, 1.5 million people in 5 provinces were affected by the drought; by July 1975, there were 2.6 million people involved, spread across 11 provinces (RRC 1985a).

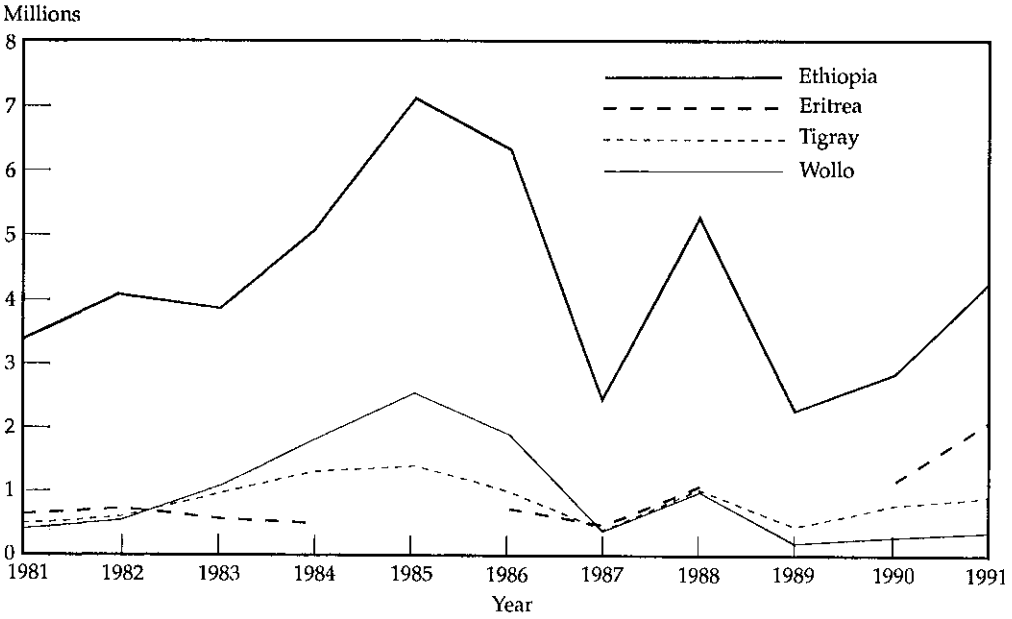
The 1973-75 famine is said to have claimed the lives of over 250,000 people (Shepherd 1975; Sen 1981; RRC 1985a; Fraser 1988). An assessment of the famine impact in seven districts of Wollo found that 20 percent of the population had died (RRC 1974a). According to Bondestam (1974), the hardest hit were the Afar pastoralists, who lost 25-30 percent of their population.

Unfortunately, more famines unfolded during the 1980s. As early as 1980, poor rains in Tigray along with widespread crop loss and livestock mortality were noted by NGOs (Wright 1983; OXFAM 1984). In December 1982, Save the Children Fund (UK) had opened a feeding camp at Korem in Wollo. By April 1983, it was feeding 35,000 people (Gill 1986). Meanwhile the town of Mekelle in Tigray was coping with 15,000 refugee families (Fraser 1988). Thus, when severe drought occurred in 1984, conditions were already ripe for a rapid transmission of production failure to consumption failure on a massive scale. When drought hit Ethiopia in 1984, the famine was indeed "already under way," as de Waal (1991) puts it. However, it was only in 1984 that the sequence of droughts from 1977 to 1980 began having its true effect.

Figure 6 gives an indication of how the crisis again intensified in the worst-hit regions, particularly Wollo, and then spread outward. In Wollo, poor nutritional status, coupled with disease, resulted in considerable human mortality. In the worst

[3]All references to tons in this report are in metric tons.

Figure 6—Estimated drought-affected population for selected provinces, 1981-91



Source: Compiled from numerous Relief and Rehabilitation Commission (RRC) publications and reports. It should be noted that discrepancies exist between data used in one RRC document and the next. For example, the highest "official" estimate of people at risk due to drought in 1985 reached 10.8 million; the lowest stood at only 6.5 million. The figures presented here are drawn from the most consistent sources.

Note: Breaks in a line indicate that no data are available for that period.

months of 1985, relief agencies recorded up to 72 percent of sampled children in feeding camps at less than 65 percent of standard weight-for-height (Jareg 1987). At an emergency feeding camp in Bati (northern Wollo), the peak period of mortality was at the end of 1984 (Rahmato 1987). It is estimated that of all the deaths that occurred in northern Wollo between October 22 and December 9 of 1984, over 70 percent were those of children under 15 years of age (Demissie 1986). Despite an isolated increase in mortality (as a proportion of total camp inmates) in July 1985, which coincided with the onset of the rains, the death toll at Bati did not again reach the heights of May 1984.

Wollo shared this experience with other parts of the country. For example, in Dinki (located in the Rift Valley between Shewa and Hararghe), two out of three households experienced mortality. Other areas experienced relatively less human mortality during 1985, but faced destitution after the loss of productive assets. In Wolayta, oxen normally worth 300 birr were sold for 10 birr in 1985.[4] And in the

[4]US$1.00 = 2.05 Ethiopian birr (official exchange rate).

pastoral regions of Sidamo, many herders ate the hides of fallen livestock to stay alive.

Almost 8 million Ethiopians were affected by food shortage during the famine crisis, and an excess death toll of 1 million is widely quoted (Jansson, Harris, and Penrose 1987; Rahmato 1988). The figure of 1 million (recently challenged as an exaggeration based on scant empirical evidence) cannot be verified (de Waal 1991). However, the magnitude of the suffering involved has been well documented, and in addition to hundreds of thousands of famine-related deaths, millions of people were made destitute. Such large-scale erosion of the asset base has left the poor ever more vulnerable to future crises.

And the effects of the 1984/85 crisis are still being felt. Although 34,000 tons of seeds were distributed to farmers who had consumed their planting seed, the early rains of 1987 were poor, locusts destroyed much of the crop, and there was a two-month dry spell in the middle of the main rainy season. These conditions signaled further hardship. Yet an appeal in 1988 for 1.05 million tons of food aid to relieve over 5 million people was immediately met by pledges, and by 1989 more than 1.1 million tons of food had been distributed, thereby reducing some of the suffering.

But the underlying conditions of vulnerability remain. At the end of 1990, the Ethiopian Relief and Rehabilitation Commission (RRC) estimated that over 4 million people would require food aid during 1991, and an appeal was launched for 839,000 tons (FEWS 1990; RRC 1990a). After relatively good harvests in 1991, estimates of food needs for 1992 still exceeded 1 million tons (FEWS 1992). The World Food Programme launched an emergency program (worth US$11 million) to reach 600,000 people in special need of assistance in Sidamo, Hararghe, and Gamo Gofa as well as Wollo.

The most recent stages of the ongoing crisis have been ascribed largely to the climax of the conflicts in the north and center of the country. However, up to 50 percent of the famine-vulnerable people are found outside the main zones of conflict in Eritrea and Tigray (Figure 6). Indeed, it can be hypothesized that the repeated crises have so seriously eroded the capacity of many households to withstand external shocks that even a single-year drought can lead to suffering and death (an issue explored further in the next chapter).

The question is, Which are these most vulnerable households? While most households in crisis-prone regions of rural Ethiopia are vulnerable to food crises, some people (the 8 million currently requiring food assistance) are apparently more insecure than others (those not currently classified as "in need"). The difference between the two groups is not merely geographical. Rather, it may be hypothesized, the roots lie in a differential spread of poverty. The next chapter therefore seeks to identify in more detail the types of household that are worst affected by famine and why, and what response mechanisms are available to such households in their attempts to mitigate the effects of famine. Private coping strategies are considered, as well as the production, income, and consumption effects of food crises on different households according to wealth status, ethnicity, and gender of household head.

4

HOUSEHOLD RESPONSES TO DROUGHT AND FAMINE

The literature on the impact of famine, and on the means adopted by households to minimize that impact, has become increasingly complementary and convergent. Reviews of existing research on household famine responses broadly conclude that, while conditions vary by locality, there are identifiable behavior patterns associated with the onset, progression, and climax of a crisis (Jodha 1975; Dirks 1980; Torry 1984; Corbett 1988; D'Souza 1988; Drèze and Sen 1989; Shipton 1990; Campbell 1990; Riely 1991; Bohle et al. 1991; Frankenberger 1992; Watts and Bohle 1992). These responses are largely determined by the nature of the crisis—its speed, intensity, and linearity—but also by the varying abilities of different households to cope. This variability in coping capacity is widely believed to hold the key to an effective design of famine early-warning systems and appropriate interventions (Torry 1988).

This chapter focuses on the questions of who are the worst affected by food crises in Ethiopia, why are they so affected, and how do their responses differ from less vulnerable households. Without such an understanding, few conclusions can be drawn about how alternative public interventions might build on the households' private strategies for dealing with stress.

Household Response to Famine: "Coping" or "Suffering"?

The literature on household coping with risk, uncertainty, and crisis is voluminous. During the 1960s and 1970s, theoretical frameworks for risk analysis were developed that guided many later empirical studies of risk aversion and coping strategies in insecure environments (Cancian 1980; Berry 1980). Such studies have generally focused on describing the social and economic dynamics of famine (Shipton 1990; Cekan 1990). On Ethiopia, the works of Wolde-Mariam (1984), Rahmato (1987, 1988), Dejene (1990), and McCann (1987a, 1987b) are well known.

The range of strategies adopted by households in response to the emergence of famine is generally referred to under a catchall heading called "household coping mechanisms."

The pattern of household responses to a food crisis generally involves a succession of stages along a continuum of "coping" that runs from long-term risk minimization through crisis damage containment to the extreme instance of household collapse. In the interests of simplification, these stages are grouped under three headings: risk minimization, risk absorption, and, if necessary, risk-taking to survive.

The first stage involves insuring against risk in a precrisis period in an environment of limited credit and insurance markets. It incorporates measures of savings,

investments, accumulation, and diversification. There are four key elements of this strategy. Resource-poor farmers make efforts to (1) protect minimum farm productivity through intercropping, spatial dispersal of fields, and use of multiple seed varieties; pastoralists make efforts to hold mixed-species herds and preserve last-resort grazing grounds; (2) accumulate assets through food storage, capital accumulation, and investments in valuable disposable goods such as jewelry, farm equipment, and housing goods; (3) add to credit through establishment of social-support networks based on gifts, food-sharing, and loan provision, and (4) diversify the income base to include nonfarm sources (and migration remittances). How successful households are in pursuing and attaining these goals plays a large role in determining the outcome of subsequent crises.

The second stage of coping involves disaccumulating earlier investments, calling in loans, and searching for new credit. As capital for investment dries up, consumption (both food and nonfood) is restricted, stores of food are drawn down, and the number and variety of potential income sources that are available become crucial to survival. The ability to protect past investments declines. Access to credit to stabilize consumption and to limit distress sales of assets is crucial at this stage for a quick recovery from food crises.

Wealthier households handle this stage of a food crisis better than do poorer households because they generally have more assets (equipment, durables, livestock) that they can part with, and moreover, they can better afford to wait for more favorable market conditions.

Capacity for coping is not solely a function of the asset base: it is also a function of human capital accumulation. For instance, in Sudan, rural children whose parents had some formal education, and especially those whose mothers had received some schooling, were significantly better off in terms of nutritional status than other children in the aftermath of the 1985 famine (Teklu, von Braun, and Zaki 1991).

The final stage in coping, which may become inescapable if famine conditions persist in the absence of external aid, involves the disengagement of all normal systems of survival. At this point, the diet of most households is dominated by unusual "famine foods" (roots, leaves, rodents), and they are obliged to sell their remaining assets, including homes, fields, and clothes. If they are still able to do so, many households leave their villages in search of assistance from distant relatives or at a relief camp. Much more mass migration to relief camps occurred in Ethiopia and Sudan than in Burkina Faso, where affected people engaged in seasonal migration to a greater extent than before to the humid zones of the coastal economies.

This sequence of events depicts a scale of increasing irreversibility of actions taken, and at the same time, increasing vulnerability to continuation of the crisis. It also assumes the worst; each response, at best, delays the onset of the next stage, unless conditions change or external help arrives. Not all of the coping actions undertaken by households at each stage of the crisis are beneficial, either to a household or to its environment. Reducing basic food intake to minimal levels or breaking up a family to enhance chances of survival of individual members does entail suffering. Similarly, desperate actions such as cultivation of marginal land or wholesale felling of trees to sell as firewood have serious consequences for future environmental development and income generation (Holcombe 1989; Cekan 1990).

The intent of the following analysis is not to establish an order or schedule of events for the sequence outlined above; this would be hazardous using recall data

alone, since many households were following different coping paths at different rates. Rather, an effort is made to analyze the multiple factors that characterize vulnerability and a household's ability to withstand a crisis.

Conceptual Approach

The close relationship between food production, food prices, wages, and employment is critical when one looks at household responses to famine. A framework for analyzing adjustments to fluctuations in food production, prices, and wages can start with the following simple definition: consumption equals net income minus savings. Adjustments can take place in all three (see C, Y, S, and their elements in Figure 7). On the income side, households can adjust by changing their cropping patterns, by intensifying their work in off-farm activities, by compounding their income through remittances or food aid, or by a combination of these responses. On the consumption side, households adjust their nutritional intakes as well as their consumption of nonfood items, which might create a conflict over calories versus other food and nonfood consumption.

Figure 7—A framework for analysis of famine response at the household level

$$(1) \quad C = (\pm Y) - (\pm S),$$

with

$$(1.1) \quad C = C_{staple}\,(Q \times P) + C_{nonstaple} + C_{nonfood},$$

$$(1.2) \quad Y = [(Q_{staple} \times P_{staple}) + (Q_{others} \times P_{others}) - cost] + Y_{off\text{-}farm} + Y_{remittances} + Y_{transfers}, \text{ and}$$

$$(1.3) \quad S = S_{money} + S_{kind} + S_{durables} + I_{productive\ assets},$$

where

C = Consumption
Y = Net income[a]
S = Savings (including I)
Q = Quantity of (crop) output[b]
P = Price[b]
I = Investment

[a] "Off-farm" income includes wages and self-employment.
[b] "Others" includes collected bush and "famine" foods, such as leaves, roots, and rodents.

This simple framework, although operating at an aggregate level, includes parameters that represent adjustments at a household level. It does not, however, make explicit allowance for adjustments in activity level that reduce energy expenditure. Furthermore, the issue of migration is only implicitly captured by the income earnings function. It should also be understood that while the overall structure of coping responses is addressed by the model, households adapt their coping strategies according to community-level responses (household interactions) as well as to the sequencing of responses of other households. What is more, individual coping responses on the production and income side largely depend on resource base. Similarly, productive assets may be depleted without a consumption decline (livestock mortality being a case in point).

This framework is used in the following sections to examine household data from seven field survey locations in six regions of Ethiopia. The linkages between production, income, and consumption provide the basis for a detailed analysis of household response to crisis.

The Survey Settings

Surveys were conducted at seven sites (Figure 8). The surveys were carried out in rural areas that suffered hardships between 1984 and 1989, but hardships that were not caused by military disruption of production.

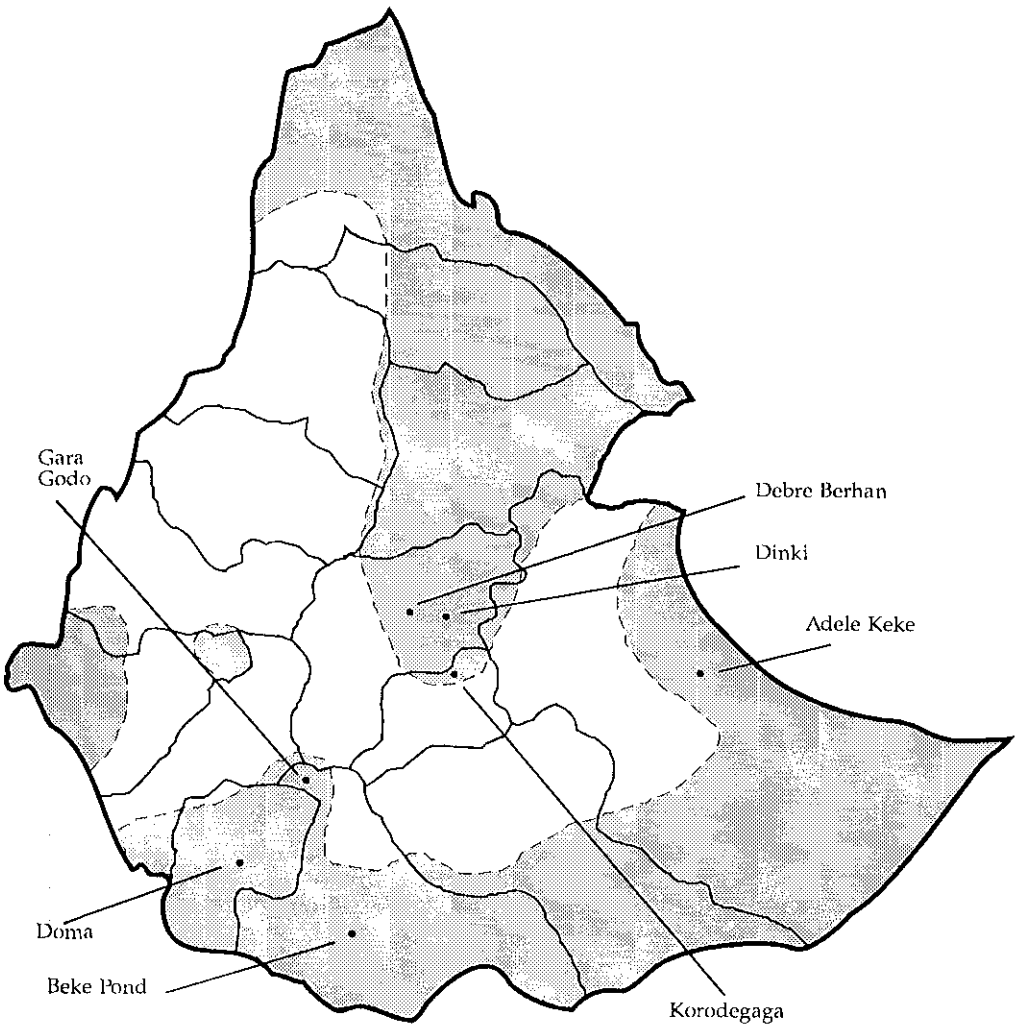
The following principles guided site selection:

- Diversity of agro-ecological settings and ethnic groups. The sample covers a range of climatic regimes with mean annual rainfall varying from 500 millimeters to 1,300 millimeters, in both unimodal and bimodal patterns. The sites are located at altitudes of less than 1,000 meters, rising to over 1,800 meters above sea level. Eight distinct ethnic groups are included in the sample.
- Clear indications of recent food crisis at a local level, as documented at a district level by RRC vulnerability reports and donor monitoring activities.
- A variety of public interventions for which documentation or baseline information was accessible. Prior to site selection, 10 months were spent in Ethiopia reviewing project documents and donor and government reports, interacting with local university researchers, and visiting field locations. At the end of this period, the number of potential survey sites was small due to the paucity of quality record-keeping and self-evaluation within donor, NGO, and government agencies involved with famines. Nevertheless, a number of organizations proved to be exceptions to this rule, and these generously collaborated with the research at all stages.

Although a number of potential survey sites were identified in Wollo and Tigray, the heartland of the 1984/85 famine, the military conflict in these areas precluded their selection. Since research clearance was needed from the Mengistu government, the survey locations chosen were obliged to lie in territory administered by that government and in areas unlikely to become militarily insecure during the survey operation.

While data aggregated across the survey sites cannot be statistically representative for the country as a whole, the seven sites capture some of the diversity of famine experiences felt in the survey regions. Three of the sites are located in the

Figure 8—Map of Ethiopia indicating survey locations



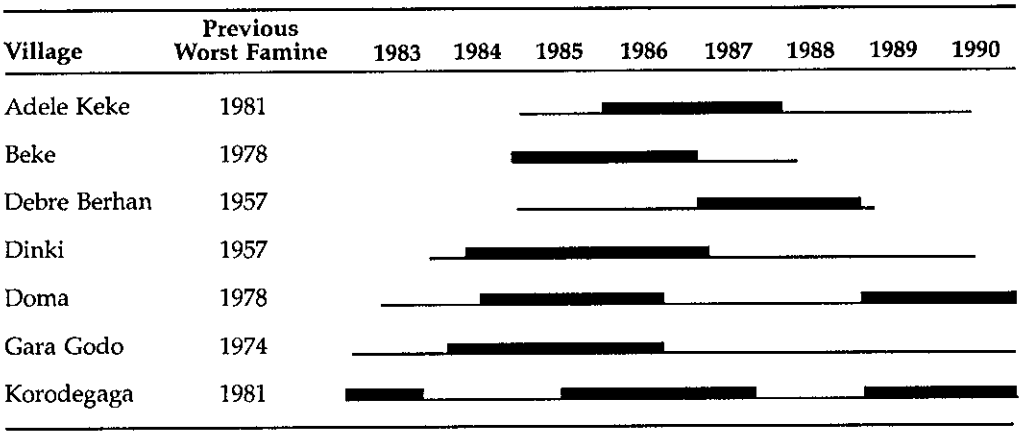
Note: Shaded areas represent the zones most affected by famine and drought during the 1980s. Debre Berhan, Adele Keke, and Gara Godo are highland sites. Doma, Korodegaga, Dinki, and Beke Pond are in the lowlands.

highlands (more than 1,500 meters above sea level), while four are located in the lowlands (Figure 8). One of the lowland sites represents a seminomadic, pastoral community (Beke Pond), while the other six are all settled farming communities. Both site-specific and cross-site aggregated data are presented in the sections that follow in order to provide more generalized, as well as localized, insights into the issues considered.

It should be pointed out that all sites did not feel the worst of the famine at the same time. The period of famine duration and the crisis peaks most often referred to by respondents are indicated in Figure 9. The figure shows that although all sites experienced a crisis of varying severity at some stage between 1983 and 1988, the peaks did not always coincide; some were worse off during 1985, others not until 1988. A brief description of the nature of these crisis peaks, and of each survey location, is presented in the Appendix.

Despite the wide range of experiences encountered at the seven locations, the underlying conditions of vulnerability and the response strategies open to vulnerable households were found to be similar across all sites: small farm size, low level of farm technology, limited fertilizer use, limited income diversification, relative isolation from major markets (excepting Debre Berhan and Adele Keke), few community services, and proneness to climate-related production fluctuations. Thus, while the details of food crises varied at the sites studied, the underlying processes resulting in famine were familiar to all. In the following sections these processes are examined at the microlevel, both within and across sites. Following the three broad conceptual stages of crisis response outlined above, the analysis focuses on risk minimization (ex ante) and risk absorption (ex post) response stages in relation to production, asset holdings, income, and food consumption. This is followed by a brief consideration of

Figure 9—Duration and peaks of hunger period as reported by sample households, by sample village



Source: IFPRI survey, 1989/90.
Note: Crisis peaks are indicated by heavy lines.

the final (catastrophic) stage of risk-taking, when households generally migrate or collapse.

Risk Minimization in a Growth-Constrained Environment

Crop and Livestock Management

Mean farm size, use of improved inputs, and farm productivity remain generally low in Ethiopia (Harbeson 1990; Belshaw 1990; Brüne 1990). The capacity of households to cope with crisis years therefore depends to a large extent on their ability to cope with such underlying constraints to production in so-called "normal" years.

Farm production among the 547 sample households is carried out mainly on private fields. Despite the land reform of 1975 (which sought to replace a quasi-feudal landholding system with a public-ownership system, theoretically giving better land access to the poor), 62 percent of sampled farmers were cultivating most of the fields that they held before 1975—often the same fields that their parents had used. Only 26 percent of households gained access to fields redistributed during the 1980s. Even members of Producer Cooperatives often continued to rent private fields.[5] In 1989, 72 of the sample households belonged to cooperatives; 36 percent of these households cultivated private plots in addition to working communal fields.

On the other hand, households retaining access to long-established "family land" may still have had the total area reduced as a result of plot redistribution to former landless or tenant farmers. The clearest indication of this is that former landlords (households that had received rents from tenant farmers before 1975) had no greater access to farmland in 1989 (a mean 1.1 hectares per household) than did former tenant or landless households (currently farming 1.2 hectares per household).

The average 1.2 hectares now cultivated by former tenant or landless farmers speaks of some success in the principle of land redistribution in the survey areas. However, public facilitation of equality in access to land does not guarantee raised, or more equally distributed, income from production. First, the total area cultivated by survey farmers remains very low—a mean of 0.15 hectare per capita. At a national level, area cultivated per capita in 1988/89 was only 0.12 hectare (Gutu, Lambert, and Maxwell 1990). As noted in Chapter 3, this is because most production is concentrated in the highlands, where population density and land-quality constraints are highest.

Second, tenure rights to land were not improved through redistribution, since control of land resources was assumed by the state (Cohen and Isaksson 1987a; Winer 1989). This is widely believed to have limited farmer investment in land-productivity enhancement, thereby restricting potential productivity gains (Stahl 1990; Lycett 1992).

Third, land is only one element of the production function. Access to labor (both animal and manual), capital, and improved inputs is limited in Ethiopia, with most benefits accruing to relatively wealthier households (Iliffe 1987). In the highlands,

[5]For more details of the 1975 land reform and the creation of Producer Cooperatives, see Chapter 5.

where thick vertisols (black volcanic soils) predominate, access to a team of plow oxen is one of the prerequisites to a successful harvest (Gryseels and Jutzi 1986). In 1988/89, an average of only 13 percent of the sample households owned a pair of oxen, while 79 percent did not own any at all. Of those that did not own any oxen, 91 percent were relatively poorer households by local standards.[6]

Similarly, very few sample households have access to formal credit sources or to improved inputs such as seed and fertilizer. Those that do are generally wealthier. For example, while no respondents admitted to keeping a formal bank account, 17 percent did report membership in a community-based savings society (called an *equb*). Membership ranged from 12 percent among the poorest households to 30 percent among the relatively wealthier households. Likewise, only 8 percent of survey households (all relatively wealthier households) have ever obtained a loan from local Service Cooperatives for the purchase of fertilizer (normally procured through a cooperative). As a result, only 1 percent of sample households used any chemical fertilizer during the 1988/89 season.

These general production constraints result in very low yields (Vosti 1992). In a year of above-average rainfall (such as 1988), survey households obtained average yields of only 740 kilograms per hectare at the highland sites and 340 kilograms per hectare at the lowland sites.[7] This translated into an average of only 111 kilograms of cereals produced per capita in a good year. It should, of course, be recognized that the relatively good 1988/89 season followed five crisis years, and households were therefore depleted of the productive resources necessary to capitalize on improved rainfall. However, such figures indicate the poverty of the productive base upon which households must depend in the face of drought.

Attempts to minimize production shortfalls have had varying success. Production failures at the survey sites during the 1980s were closely associated with climate. Over 75 percent of respondents blame adverse climatic conditions for the recent famines (mostly drought, but sometimes frost and hail). Another 10 percent (all in Sidamo) refer to the reduced carrying capacity of the land, while only 15 percent fault other factors, such as declining purchasing power and the more general "insecurity of life."

Yet the respondents know that drought is possible in any year, and they plan their cropping and other activities accordingly. In Debre Berhan, for example, farmers name years after the Apostles, and each name follows the next in cycles of four. Traditionally, the year of John is a bad harvest year due to drought, frost, or pest damage. Some farmers claim that in the year of John they plant early or store up more of the previous year's harvest as a precaution. Similarly, Gabbra and Borana pastoralists in Sidamo (see Appendix) perceive cycles in climatic patterns against which they organize their resource-management strategies—four-year cycles among the Gabbra and seven-year cycles among the Borana.

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[6]Income groups (relatively "richer," "middle," and "poor") were calculated ex post from collected data. These terciles are based on net annual income per household for 1989/90. Details of the income calculation are given later in this chapter.

[7]The highland sites are Debre Berhan, Adele Keke, and Gara Godo. The lowland sites are Doma, Korodegaga, Dinki, and Beke Pond.

However, climatic patterns are not perfectly predictable. Robinson (1989) reports some correlation between Gabbra perception of cycles in northern Kenya and actual rainfall patterns. And in Debre Berhan, the years named after John were, interestingly, 1984 and 1988—the two worst years of the 1980s. Nevertheless, the traditional cycles did not predict three or more years of successive drought during the early 1980s and a renewed sequence of droughts from 1989 to 1991. Nor could they help predict the severity of those droughts. On the other hand, the certainty that another drought will follow within a decade forces farmers and pastoralists to manage their production with risk-minimization principles in mind.

Many of the "risk-aversion" measures commonly found in Africa are practiced in the survey areas (Andrews 1990; Cekan 1990; Shipton 1990; OFDA 1991). Intercropping is widespread as a means of reducing the risk of total failure in any one crop: sorghum is planted between chat (*Catha edulis*, a perennial bush that produces narcotic leaves) in Adele Keke (Hararghe), while barley is mixed with lentils and wheat in Debre Berhan (north Shewa). Staggered planting is common, with crops of different maturation periods being planted successively rather than simultaneously, thereby reducing labor conflicts and protecting against total seed loss due to midseason droughts. In lower-lying foothills (such as Dinki and Beke Pond), a dispersal of field plots by altitude up and down slopes is favored so that variations in microclimate can be tapped, thereby avoiding complete crop failure in a set of contiguous fields. Some farmers selectively weed only the most favorable shoots and so minimize labor lost on unproductive plants. And, at all seven survey sites, farmers report an increased reliance on shorter-maturating cultivars in the search for protection against drought.

The increasing emphasis on shortness of maturation does not necessarily imply a shift to more drought-resistant crops, such as the widespread substitution of maize and sorghum for millet in the most drought-prone areas of the Sahel. Rather, there appears to be increasing reliance on maize at the expense of sorghum. The three most important cereals across the survey sites are maize, sorghum, and teff (*Eragrostis abyssinica*, an indigenous short-stalked grain) (Table 3). While maize and teff both increased their overall shares of planted area between 1984 and 1988, sorghum

Table 3—Area shares of major cereals planted by survey communities, 1984-88

Crop	1984	1985	1986	1987	1988
			(percent)		
Barley	3.6	4.0	2.0	2.9	1.9
Beans and lentils	8.3	7.5	7.0	5.5	6.6
Maize	35.7	34.1	38.7	37.9	43.4
Millet	1.4	1.2	2.1	2.4	9.8
Potatoes	2.3	3.2	2.6	4.2	7.0
Sorghum	31.0	29.6	30.9	25.7	9.1
Teff	16.0	17.7	15.0	19.3	21.6
Wheat	0.7	0.9	0.5	0.3	0.3
Other[a]	1.0	1.8	1.2	1.8	0.4
Total	100.0	100.0	100.0	100.0	100.0

Source: IFPRI survey data, 1989/90.
Notes: The data are derived from household recall and exclude Debre Berhan and Sidamo, for which time series are incomplete. Parts may not add to totals because of rounding.
[a]Noncereal crops such as coffee, sugarcane, enset, and chat.

showed a decline. What is more, the sample-level substitution between maize and sorghum is also observed at a national level. This does not appear to be because maize is more resistant to drought than sorghum; rainfall-production response estimates presented in Chapter 5 indicate that at a national level both maize and sorghum are highly susceptible to fluctuations in rainfall.

Several factors can be invoked in explanation. First, the national Institute of Agricultural Research developed a short-maturing strain of maize that was already being distributed in parts of Arssi and Shewa (two of the survey provinces) in the latter half of the 1980s. Second, the price ratio between maize and sorghum was consistently in favor of maize during the 1980s (maize being cheaper), thereby encouraging cash-poor farmers to replenish lost seed stocks with the cheaper cultivar. Third, maize has been expanding in areas like Wolayta and Hararghe that are traditionally dependent on root crops, such as enset (*Ensete ventricosum*, an indigenous tuber) and cassava, and cash crops, such as coffee, sugarcane, and chat.

Although the total area represented by root and cash crops is small in the sample, these crops have in the past been essential to the income base of most households. Income from the noncereal cash crops and food from the roots and tubers often made up for shortfalls in cereal production. During the 1980s, this was not the case at the sample sites. In Hararghe, for example, although chat is relatively drought-resistant, its price fell during 1984/85 because of widespread income collapse and resultant reduced demand. Some households did continue to consume it regularly because of its appetite-cutting properties. In Sidamo, a famine-year consumption survey of 48 households registered chat as the fourth most common item consumed for this very reason (D. L. Coppock, personal communication 1991). Yet most households sharply reduced the frequency of chat purchases in favor of grain purchases.

Income from cash crops was no more dependable in Wolayta, where coffee is the traditional cash crop. Coffee berry disease spread through the region in the early 1980s, causing substantial damage to tree stock. During 1985, 50 percent of sample households in Gara Godo reported that their coffee trees did not produce any beans because the leaves dried up or because insects ate the leaves (one of the few sources of green matter around). The remaining 50 percent who did harvest some beans reported that yields were very low. By 1990, the coffee crop had not improved. Almost 40 percent of sample respondents said that their trees were still being attacked by insects and berry disease, while hail had ruined the crop for another 13 percent. Only 31 percent felt that 1990 would give a good harvest.

The reduction in coffee income is particularly hard in Wolayta because the main staple food of the area, enset, was also badly damaged by disease. Indeed, without enset, conditions would have been worse still in this area. Enset is a starchy tuber containing little protein or fat, but it survives drought well and stores for long periods underground. Although bacterial wilt spread rapidly through the crop in 1984, only 23 percent of 65 households interviewed lost all their crop. During 1985 the majority of respondents relied heavily on enset (as well as another tuber, cassava) as a source of both food and income.[8] Nevertheless, losses of enset plants (which take several years to mature) were high during the drought. More than 60 percent of households

[8]Roughly 50 percent of the households interviewed claimed that cassava was essential to replace some of the lost enset, while the other 50 percent also lost most of their cassava.

felt that they could not depend on enset for their consumption needs during 1990/91. As a result, maize is rapidly supplanting enset as the main staple in parts of the region (Redd Barna 1989).

The other key element of Ethiopian farm production is livestock. Ethiopia has the highest ratio of livestock per capita in Africa; it accounts for 16 percent of all small ruminants, 19 percent of cattle, 8 percent of camels, and 57 percent of equines on the continent (ILCA 1991). While large numbers of animals are kept in the humid highlands, many inhabit zones that were badly affected by reduced water, decreased fodder and browse growth, and increased livestock disease during the drought years of the 1980s.

The most common methods of minimizing herd loss through drought are herd diversification and dispersal. Both were commonly adopted at the seven survey sites. Diversification involves the husbandry of a mixed animal stock; that is, both small and large ruminants as well as browsers. This permits both a better utilization of feed resources (because of more varied demand) and easier disposal of small stock before unproductive large stock during times of crisis. Dispersal involves spreading the risk of herd loss by splitting the herd into semiautonomous groups kept in the same region or arranging for stock to be husbanded by relatives or contracted labor in more distant locations. Some households in Debre Berhan owned more animals in the next administrative region than they did in their own village.

Diversifying the Nonfarm Income Base

Given the constant threat of drought-led shortfalls in crop or livestock production, Ethiopian farmers adapt by diversifying their income sources. The long-term survival of households faced with recurrent food shortages is largely made possible by income derived from nonfarm sources (Cutler 1984; Reardon, Delgado, and Matlon 1992). This diversification has been documented in many countries. The evidence reviewed by von Braun and Pandya-Lorch (1991) for Sub-Saharan Africa reveals that nonfarm sources provide an average of 38 percent of total income in rural households. In The Gambia, for example, rural households derive 23 percent of total income from nonfarm activities (von Braun, Puetz, and Webb 1989). In Kenya and Rwanda, by contrast, the share of total income obtained from nonfarm sources represents 40 and 60 percent, respectively (Kennedy and Cogill 1987; von Braun, de Haen, and Blanken 1991).

The overall net per capita income levels for each of the survey sites, disaggregated into site-specific income terciles, are given in Table 4. The table shows that although a few relatively much wealthier households were included in the sample at each survey site, income for all households is extremely low. At the sample mean, total net income stands at only US$41.50 per capita per year.[9] At the same time, it shows that while all households are extremely poor in absolute terms, there is considerable variability both within and across sites. Doma and Gara Godo, for example, have a narrower range of income and a much lower ceiling than do Beke Pond and Debre Berhan. On average, the poorest households in Debre Berhan are

[9]As a result of sample design, all households interviewed suffered considerably during the recent famine. Therefore, their low incomes partly reflect the long-term damages inflicted by the crisis on the local economy.

Table 4—Net annual income per capita for sample households at each survey site, by income tercile, 1989/90

Survey Site	Income Terciles[a]			Sample Mean
	Lower	Middle	Upper	
	(mean net income per capita, birr)[b]			
Adele Keke	29.6	129.6	290.1	152.0
Beke Pond	7.1	36.7	280.9	108.2
Debre Berhan	90.7	196.8	378.0	221.8
Dinki	48.7	98.1	230.3	125.1
Doma	6.0	23.4	78.8	36.1
Gara Godo	9.2	33.7	76.7	40.4
Korodegaga	−7.6	25.8	119.9	45.8

Source: IFPRI survey data, 1989/90.
Note: The data are derived from household recall.
[a]Income terciles were calculated after data had been collected, not before. The terciles are based on net annual income per household for 1989/90. Income is calculated as follows: (1) own agricultural production (crop production, sale of livestock and its products, and income from farm labor); (2) nonfarm labor income (received as wages for nonagricultural work and income from artisanal activity); (3) transfers (remittances, loans, gifts, dowry, inheritance, sale of food aid, in-kind income derived from food-for-work); and (4) sales (income derived from selling own cash crops [cotton, sugarcane, coffee], collected fuel products [wood, dung, incense], collected consumables [bush foods], and processed drinks, such as *tella*, *tej*, *arequi*).
[b]US$1.00 = 2.05 Ethiopian birr.

wealthier than the richest households in Doma and Gara Godo. And, in Korodegaga, households in the lower tercile exhibit a negative net income as a result of high production costs not recovered in 1988/89 because of poor or failed harvests.

Such differences in income by site are largely due to variation in agricultural potential and nonfarm income-earning opportunities by location. The two sites with the highest incomes (Debre Berhan and Adele Keke) are situated in the highlands, with concomitantly better crop yield potential and marketing infrastructure than the lowland sites. Households in the highlands (which are more densely inhabited than the lowlands) also appear to have more opportunities for nonfarm employment; for example, laborers, traders in fuel products, and craft workers.

Table 5 provides a breakdown of household income sources across all sample sites during 1989/90 by income tercile. This table (with terciles drawn across all sites) shows that although cropping remains the primary source of income (representing an average of 50 percent across the three terciles), other sources of income are important. Indeed, few households depend solely on crop production for survival. The marketing of animals and their products, wage labor, the sale of fuel products, the sale of craft work, and other activities unrelated to the home farm accounted for 58 percent of total net income for households in the upper tercile, and 45 percent of income in the lower-tercile households. In other words, households in the upper income tercile relied on a more diversified income portfolio than did the poor households. The latter, forced to rely more on cropping, are therefore always more vulnerable to droughts.

The relative importance of nonfarm income also varies by region and by season. For example, the pastoralists of Sidamo have little tradition of manual labor, but the sale of craft work (woven baskets) is of growing importance. In Debre Berhan and Korodegaga, sales of animal products (dung cakes and milk) and firewood constitute

Table 5—Income sources of sample households, by income tercile, 1989/90

Income Source	Income Terciles[a]			Average
	Lower	Middle	Upper	
	(percent of total net income per capita)			
Crop income	55.0	53.0	42.0	50.0
Livestock				
Animal sales	1.7	7.3	19.2	9.7
Animal products	4.4	4.0	5.1	4.5
Wage income				
Farm labor	1.3	0.5	1.4	1.0
Nonfarm labor	0.3	3.5	11.2	5.2
Transfers				
Public	0.7	0.5	0.2	0.4
Private (including gifts)	3.4	5.6	3.8	4.5
Fuel products[b]	27.7	19.9	15.1	20.6
Crafts	2.7	2.3	1.2	2.1
Rental income	0.9	2.7	0.6	1.4
Commerce	1.3	0.6	0.4	0.7
Total[c]	100.0	100.0	100.0	100.0

Source: IFPRI survey data, 1989/90.
Note: Based on household recall data.
[a]Terciles are drawn individually for each survey location.
[b]Firewood, charcoal, and dung cakes.
[c]Parts may not add to totals because of rounding.

important income sources. Much, therefore, depends on the availability of raw products and on the proximity of markets.

Some markets are seasonal. Wages for farm labor and rental income from renting land or draft animals can be secured only during the rainy season. Craft work and nonfarm labor assume greater significance in the dry season when farm activity is low. Income from certain service activities, such as milling grain by waterwheel (a service provided by two households in Dinki), is also relatively seasonal, since the busiest months are those following harvest. Alternatively, trading, remittances (private transfers from urban-based relatives), and the sale of processed fuel products (such as charcoal and dung cakes) are less seasonal in nature.

Some activities are dominated by women. During 1989, women were more active than men in trading and in selling fuel products and food and drinks (local beers and spirits, roasted barley, and maize). Men, on the other hand, were more active as manual laborers.

Strengthening Savings

Savings can take the form of food stores, real-value stores (household goods of value), and cash stores (Swift 1989). Cash stores are difficult to quantify. As mentioned earlier, no survey respondent admitted to holding a bank account, and fewer than 20 percent belong to local savings groups. However, 35 (of the richer) households in the Debre Berhan area did admit to keeping one or more silver Maria Teresa coins (Austrian dollars minted in the late 1700s) as an emergency reserve. The local market value of each coin in 1989 was roughly US$15, equivalent to 50 kilograms of maize.

Food stores are easier to verify. Most households attempt to store a portion of their harvest to tide them over until the following year (McCann 1990). Storage technology is similar across the country: stores take the form of sacks or pots kept in the house, freestanding thatch-covered clay or wicker frames, and lined pits in the ground that may be sealed (in Dinki, the latter were used for burying the dead in 1985, since few people had the strength to dig graves). The proportion of the 1988/89 harvest retained in storage (as both food and seed) was an average of 10 percent across all sites. This varied from a low of 1 percent in Adele Keke (because the harvest was still very low) to a high of 62 percent in Debre Berhan. In real terms, however, these figures translate into an average grain store of only 17.4 kilograms per capita. Almost 60 percent of households had nothing in store at all. During the famine years, the number of such households with empty stores rose dramatically.

As for valuable household assets, these remain few at the survey sites. The most valuable assets (after livestock) are generally housing materials (metal roofs and wooden posts), metal-framed beds, new clothes, and plows and plowing harnesses. Nevertheless, in 1989 the mean value of assets still held by households that had survived five or more years of crisis was only 136 birr (US$66) per capita. This ranged from 234 birr (US$114) per capita among relatively wealthier households to only 107 birr (US$52) in the poorest households.

Household Risk Absorption

Impact of Drought on Crop Production

Measures adopted by households to minimize, or even to try to avert, risk can do so only for limited periods. When drought persists, it inevitably affects production, with negative multiplier effects on income and consumption streams. The effect of drought on production at the seven survey locations is indicated in Table 6. This table, based on household recall data, shows trends in area, harvest, yields, and value of output across sites.[10] Data relate to private fields only, thus excluding communal holdings farmed by Producer Cooperatives.

The crop response to inclement weather at each site was marked. Cereal yields in 1985 were very low at 181 kilograms per hectare, compared with 508 kilograms per hectare in 1988. During the same period, area planted rose almost 50 percent, suggesting that farmers did not plant larger areas to deal with protracted drought, but rather concentrated scarce productive inputs on the most productive fields. A lack of seeds, fertilizer, labor, and quality land lead to a retrenchment of activities during crisis years, rather than an expansion of area. The result was a cereal harvest per capita in 1988 more than double that in 1985. The greatest yield increases in 1988 were recorded in Dinki and Korodegaga, both of which had their first reasonably undisturbed harvest since 1983.

[10]It should be emphasized that in the absence of comprehensive census information on agricultural activity in each subregion, the patterns and trends presented here are statistically significant only for the survey areas, not necessarily for the country as a whole.

Table 6—Production and marketing trends among survey households, 1984-88

Item	1984	1985	1986	1987	1988
Planted area (hectares/capita)					
Cereals	0.08	0.08	0.08	0.07	0.11
Noncereals	0.01	0.01	0.01	0.01	0.02
Output (kilograms/capita)					
Cereals	45.69	24.10	33.82	28.65	56.40[a]
Noncereals[b]	3.22	0.65	1.51	1.57	6.42
Yields (kilograms/hectare)					
Cereals	294.00	181.00	306.00	320.00	508.00
Noncereals	60.00	26.00	222.00	47.00	222.00
Value of output (local currency)[c]					
Cereals	51.29	30.34	27.19	16.69	29.03
Noncereals	1.79	0.37	0.61	1.07	5.88

Source: IFPRI survey data, 1989/90.
Note: The data are derived from household recall and exclude Debre Berhan and Sidamo, for which time series are incomplete.
[a]It should be pointed out that if data for Debre Berhan were included in this calculation, the total would almost double to 111 kilograms per capita. Debre Berhan is perhaps the survey site with the highest production potential.
[b]Yields of noncereals are converted to cereal-equivalents.
[c]Real values are calculated using the GDP deflator from the World Bank's *World Tables,* 1990 edition.

A similar story emerges for noncereals.[11] Between 1985 and 1988, area planted changed very little. During that period, however, yields increased more than eight-fold, while output increased almost tenfold. The areas most responsible for these increases were Gara Godo and Doma, where potatoes, enset, and beans all made considerable recoveries after four years of failed harvests.

The general pattern of production decline in years of low (or excessive) rainfall was only slightly mitigated by wealth at the survey sites. It has often been claimed that famine affects the poor more severely than the rich: "It is the poor who starve during food crises—not the rich" (Devereux 1988) (see also ICIHI 1985; Hopkins 1990; Kebede and Jacob 1988; Harrison 1988). While remembering that production failure alone cannot be equated with starvation, it is therefore appropriate to compare the production shortfalls of richer households with those of poorer households.

In fact, although the relatively richer households certainly did manage to maintain higher yields and output than the poorer households during the worst years, their productivity was still highly compromised (Table 7). The better performance of upper-tercile households may be due to their better access to productive inputs (Vosti 1992). The advantage of owning oxen, being able to hire labor, and to purchase seed resulted in higher cereal yields (roughly three times greater) and output (four times greater even in the worst year) than for the poorer households. The same holds true for noncereals.

[11]Noncereals refer to primary food crops, such as pulses, enset, and bananas, as well as to crops largely destined for sale, such as coffee, chat, sugarcane, and citrus fruits.

Table 7—Area, output, and yields of cereals, by upper and lower income terciles, 1984-88

Item	1984	1985	1986	1987	1988
Upper tercile					
Area (hectares/capita)	0.65	0.66	0.72	0.67	0.72
Output (kilograms/capita)	68.41	38.04	58.18	57.33	112.96
Yield (kilograms/hectare)	362.86	300.22	396.64	419.44	900.22
Lower tercile					
Area (hectares/capita)	0.30	0.29	0.32	0.34	0.59
Output (kilograms/capita)	29.72	9.54	11.69	12.35	10.12
Yield (kilograms/hectare)	209.91	111.00	146.43	127.05	175.15

Source: IFPRI survey data, 1989/90.
Note: The data are derived from household recall and exclude Arssi, Gamo Gofa, and Sidamo, for which data are incomplete.

However, while the relative differences between these income groups is great, the cereal output of the wealthier households between 1985 and 1987 was still extremely small in absolute terms. In 1985, only 38 kilograms of cereals were produced per capita, compared with an average of 113 kilogram per capita in 1988 (Table 7). In other words, although some farmers were much more successful than others in dealing with the adverse climatic conditions of the mid-1980s, almost all households faced major production shortfalls regardless of income, and most were forced to seek sources of food and income elsewhere.

Impact of Drought on Livestock

Extraordinary measures were taken by households attempting to keep their most valued animals alive during the extended drought of the mid-1980s. In Korodegaga, for example, three households (all headed by widows) shared whatever food was available to themselves with their animals, particularly the cows and calves. This was seen as a logical attempt to safeguard the households' long-term survival. In Dinki, 69 percent of sample households fed thatch off their own roofs to their oxen and milch cows. Cactus stems and fruit were used by 24 percent of households, and 5 percent collected creepers from the trees. In Sidamo, more than 50 percent of sample households gathered wild vines, roots, and grasses to supplement whatever browse the animals could find. In addition to this, 35 percent of respondents increased the watering frequency of their herd, and another 10 percent increased the frequency of their transhumant cycles by stopping for shorter periods at any one place.

The local perception of what constitutes a "most valued animal" varies by location. In Dinki, 27 percent of households attempted to keep their oxen alive. This is understandable in a region that depends on draft-power for production. In Sidamo, by contrast, the Borana and Gabbra are little concerned with oxen. Thus, 84 percent of sample households focused their attention instead on milk- and meat-producing cattle and camels.

However, despite such extreme preservation measures, loss of production and animal mortality during the famine years were high. In Sidamo, average milk offtake per cow (Boran species) is estimated at roughly 1 liter per day (Donaldson 1986;

Holden 1990). However, in March 1985, offtake had declined to 400 milliliters per cow per day (Donaldson 1986). Another study of Gabbra and Borana herds near Beke Pond recorded milk offtake during the worst part of the famine of only 150 milliliters per day (D. L. Coppock, personal communication, 1991). The latter study also recorded that milk offtake from camels during the famine was much higher than that of cattle, averaging almost 800 milliliters per day. This underlines the value of camel ownership during years of drought.

Even in highland Debre Berhan, milk output was affected by reduced forage and fodder availability. The best milk yield from local cows held by sample households during 1989 was 2.2 liters per day. However, according to survey recall data, average output fell to 930 milliliters per day during the worst of the food crisis, with large numbers of cows drying up altogether.

The ultimate production loss for livestock owners is death of the animal. Total livestock mortality for sample households (expressed in tropical livestock units [TLU]) during the worst drought year was, on average, double the mortality experienced in 1989/90: 0.36 TLU per capita compared with 0.17. In other words, crisis conditions had a severe impact on animal numbers, which engendered the extreme measures adopted by some people to try to keep at least some of their herd alive.

This differential postcrisis ownership according to wealth (also observed in Kenya by Downing, Gitu, and Kamau [1989]) has important policy implications for the rehabilitation of farming systems devastated by drought. If the poor are not successfully targeted by restocking projects, the goal of increasing food security and stabilizing incomes among the most vulnerable will not be easy to achieve.

The poorest households (with few animals) took some of the most extreme measures to keep animals alive, and were in large measure fairly successful. For example, households in the upper-income tercile actually lost more livestock units per capita than did poorer households—0.23 TLU versus 0.13 TLU, respectively. This is apparently linked to scale of operations and the targeting of scarce resources. On the other hand, even if relatively richer households lost more animals, they still survived the famine years with more stock in hand than the poorest-tercile households: in 1989, the poor owned an average of only 0.17 TLU per capita, while the richer households still held 0.42 TLU per capita.

Asset Sales and Income Response

With crop and livestock output compromised, food stores depleted or empty, and most capital reserves exhausted, patterns of normal-year activity begin to change. As the search for income assumes a new urgency, asset sales become more common, new types of nonfarm work are adopted, and economic debts and social obligations are called in. These adjustments are captured in function (1.3) of the conceptual framework presented in Figure 7.

As might be expected, households in the upper and middle income terciles had more assets to sell than poorer households, and those that were sold tended to be of greater value. An average of 42 percent of households in the lower tercile sold assets during the worst years of the crisis (mainly livestock, but also farm and household assets), compared with 77 percent of middle-tercile households and 64 percent of upper-tercile households. Table 8 compares the value of income gained from asset sales during the worst year of famine with the value of assets held in 1989 by all

Table 8—Value of assets sold during worst famine year and held in 1989, by income tercile

Item	Income Terciles[a]			Sample Mean
	Lower	Middle	Upper	
	(mean birr per capita)[b]			
Famine sales				
Farm assets	0.1	0.1	0.1	0.1
Household assets	0.0	0.2	0.2	0.1
Livestock assets	5.0	14.4	30.1	16.3
Assets in 1989				
Farm assets	2.5	2.7	5.4	3.5
Household assets	2.7	5.2	15.8	7.8
Livestock assets	107.03	79.3	234.4	135.9

Source: IFPRI survey data, 1989/90.
Notes: The data are derived from household recall. The worst year of famine varies according to individual household responses for the period 1983-88.
[a]Terciles are calculated across all survey sites.
[b]US$1.00 = 2.05 Ethiopian birr.

households. The table shows that income earned from asset sales by richer households was more than twice that earned by those in the lower income tercile.

There were, however, differences in the volume of assets sold, according to the intensity of the crisis by survey site. For example, in Debre Berhan, where the crisis was relatively less severe than at other sites, only 19 percent of respondents sold any household goods—items such as tables, pots, and blankets. In Doma, by contrast, where famine conditions were severe, many people sold their own clothing (coats, dresses, shoes) and essential cooking utensils (dishes, cups, jugs). A number of particularly distressing cases were found in Doma. A former carpenter, forced to sell tools during 1986, could only find work in 1989 as a manual laborer. One respondent recalled that in 1986, "the local market was empty. The only people there were trying to sell a shirt or their own trousers."

Sales of productive assets represent the later stages of hardship. Since private ownership of land was prevented by law, land did not often change hands during the crisis. However, 28 percent of sample households sold at least some farm equipment, and 56 percent sold livestock. There appears to have been some degree of substitution between livestock, household, and farm assets. Where fewer livestock were sold, more household or personal assets were often sold, and vice versa. At Beke Pond, for example, 90 percent of the pastoral households sold livestock and only 8 percent sold household goods (Table 9). Given that pastoralists own few household goods and many cattle, this is not surprising. What is more, the sale of an animal is an event of high significance to both Gabbra and Borana. Where at all possible, if a household was forced to sell livestock, the clan tried to find a buyer within the clan so that animals rarely left the "greater fold." By contrast, in densely populated Gara Godo, 91 percent of respondents sold household goods, but only 55 percent sold livestock, which fewer people own because of land pressure.

Disposable farm equipment took the form of plows, sickles, harvest sacks, and rope. Table 9 shows that in Debre Berhan no households sold any of their productive farm assets. But in Doma 48 percent of the sample households sold farm-related

Table 9—Drawing on physical and social assets by sample households during worst year of famine

Site/Tercile	Sold			Borrowed		Family Support[a]
	Farm Assets	House Assets	Livestock	Cash	Food	
	(percent of households)					
Survey site						
Adele Keke	32	43	59	19	36	31
Beke Pond	25	8	90	41	2	81
Debre Berhan	0	19	69	41	13	16
Dinki	35	42	84	45	44	13
Doma	48	82	15	32	24	25
Gara Godo	52	91	55	45	12	40
Korodegaga	4	21	23	17	9	44
Income tercile						
Upper	5	5	54	37	25	43
Middle	13	10	54	34	19	30
Lower	18	3	31	32	16	29

Source: IFPRI survey data, 1989/90.
Note: The worst year of famine varies according to individual household responses for the period 1983-88.
[a]Family support is defined as families helping each other by sharing food and income more than during "normal" times.

assets. Of the latter households, three-quarters fall into the middle and lower income terciles. These examples signal that rural capital markets do not function efficiently for the poor; that is, the poor had no means of protecting their assets and their productive efficiency. This underlines the relatively greater problem facing poorer households in attempting to reestablish postdrought production.

Where livestock are concerned, the majority of animals sold were male cattle, calves, and small ruminants. Nevertheless, draft oxen, cows, and donkeys (the principal mode of transport and haulage) were also sold as conditions worsened. This progression is shown in Table 10. In 1984, few animals of any type represented "distress sales" (sales specifically for the purpose of obtaining cash to purchase food). However, in 1985 and again in 1987 and 1988 (the crisis peaks at most survey sites), distress sales of all three most-valued animals rose steeply. The long-term implications of such asset-stripping are considerable. Fewer oxen (and plows) are available for the next farm season, income from animal products disappears, and sales of fuel products suffer because of transport constraints.

Table 10—Percentage of sample households selling at least one cow, ox, or donkey to purchase food, 1984-88

Type of Livestock	1984	1985	1986	1987	1988
	(percent of households)				
Oxen	0.5	13.0	4.7	5.2	3.0
Milch cows	0.2	8.7	3.2	2.3	5.4
Donkeys	. . .	3.3	1.2	1.4	1.6

Source: IFPRI survey data, 1989/90.

It takes an estimated 3 years for a herd to recover from a 20 percent decline in total stock numbers; it takes 30 years to rebuild a herd that has been reduced by 60 percent (Toulmin 1985). While it is hard to calculate total herd losses during the famine, Donaldson estimated a net reduction in herd size in five Borana encampments of 30 percent from November 1983 to March 1985 (Donaldson 1986). The present study has already shown that famine-year losses among the poorest households represented almost 90 percent of total holdings.

Although it has been argued (Moris 1974) that the distress sale of assets is merely a rational response or "normal adjustment mechanism" of households facing a crisis, there is little doubt that famine-related asset losses strongly impair postcrisis economic recovery. The loss of productive assets, such as pack animals and carpentry tools, has a long-term negative effect on the household's ability to pursue nonfarm income-earning activities. The loss of a donkey made it much harder for women to collect firewood or manure bricks and transport them to market. Similarly, the sale of craft products, such as spun cotton and woven cloth, was compromised by transport constraints.[12]

However, even where transport was not a problem, the collapse of demand for nonessential foods and fuel products (cash being conserved for staple food) sharply reduced the earning options for most households. In a good year (1989/90), women were earning a primary income from the sale of fuel products in 21 percent of the survey households, and from the sale of processed food and drink in another 8 percent.[13] During the worst year of famine, less than 1 percent of all households were engaged in such activities. Instead, women were frequently forced to sell their last remaining asset of value, labor, alongside the men. In 1989, wage labor was a major source of income for men in 17 percent of the survey households and for women in only 3 percent of the households. However, during the worst famine year the percentage of households in which both women and men were working as laborers rose to 25 percent. This was true despite a 50-60 percent fall in wages in the survey areas during the famine.

The only major difference between male and female laborers was that women worked close to home, while men migrated longer distances to find jobs with higher wages. When women in the sample households were asked whether they had suffered more during the famine than men, only 52 percent affirmed that their suffering was greater. The remainder answered that, while women had perhaps suffered for a longer period, the hardship faced by men was equal because they had traveled longer distances to find employment.

In many instances, such migratory searches for employment and income needed to be preceded or supported by drawing on social investment systems, such as family

[12]In Dinki, 25 percent of the households are inhabited by Argoba-speakers. These were the original occupants of the village who speak their own archaic Semitic language. The other 75 percent are Amhara migrants who have joined the village during the past 50 years. The Argoba are traditionally weavers who trade their wares at regional markets, only sporadically engaging in agriculture. During the past 20 years, this practice has declined as the Argoba learned new farming skills from the immigrants. However, the famine forced most Argoba families to resurrect their skills, and many survived on the sale of spun cotton or woven cloth.

[13]This excludes Beke Pond, Debre Berhan, and Gara Godo, for which complete data were unavailable. The data also exclude income earned through project-based, labor-intensive public works.

and community exchange and reciprocal obligation (Fleuret 1986; Shipton 1990). There is a large anthropological literature underpinning the old, but still unresolved, debate over the nature and extent of sharing within communities during times of stress (Turnbull 1972; Dirks 1980). Part of the debate centers on whether communities, or even relatives, share or do not share what they have during famines. Evidence has been supplied to support both sides of the argument (Pankhurst 1985; Cekan 1990).

The present findings are also mixed. Table 9 (last column) shows the percentage of households reporting that they exchanged more than usual support with relatives during the famine. Roughly one-third of the respondents at four survey sites claim to have supported their relatives at the worst time. The remaining respondents reported that things were so bad that they could not help anyone but their own household. In Wolayta, some relatives went out of their way to avoid seeing each other rather than confront the embarrassing issue of blood ties. In Dinki, where conditions were the worst of all the sites, a common response was that people felt a moral obligation to bury a neighbor if found dead, but that other forms of help were limited. One respondent replied, "There was no way of helping each other. It was a time of hating—even your own mother."

The one exception is Beke Pond in Sidamo. Pastoral communities are often more mutually supportive than their agrarian counterparts (Laughlin 1974; Dahl and Hjort 1979; White 1984; Robinson 1989). Although access to water and grazing became very restricted during the drought, 90 percent of the pastoral respondents reported that there was no friction or conflict over such resources. The few who did report clashes over grazing noted that this did not occur among the Borana or Gabbra, but with other ethnic groups such as the Gujji, who attempted to move into the Beke Pond area during the drought. Those reporting friction over water said that this occurred mostly among the Borana because of strict rationing imposed by the elders on access to ponds and traditional wells. Most disputes were over the allocation of water rights by clan.[14]

Within clans, however, mutual support was strong. Over 80 percent of households supported not just other relatives, but anyone in the clan who needed assistance. The same close-knit behavior was recorded by Robinson in Kenya: "The Gabbra remember that during the 1890s, they had assisted the Borana, who had lost most of their cattle to rinderpest, with gifts of camels. Reports filtering south from Ethiopia indicate that the Borana once again made official pleas in 1984 to the Gabbra for camels and that a number of Gabbra herd owners responded affirmatively to these requests" (Robinson 1989).

Aside from pastoral reciprocity (which shows considerable stability), the diversity of responses at the other survey sites suggests that social relationships change as do the conditions around them. Cultural norms and the changing severity of local conditions both play a part. As Shipton (1990) points out, "Hunger seems to separate the more from the less valued ties . . . as sharing becomes more discriminant."

But what of ability to share? It has been argued that families in Ethiopia survive long periods of hardship because community support mechanisms enable the almost-

[14]For details of the complex political structures that govern water allocation from shared wells that are 600 years old, see Legesse 1973, Wilding 1985, and Cossins and Upton 1987.

destitute to borrow from and share food with wealthier households (Rahmato 1987). While the present data are too aggregated to identify the direction of food and income flows between different household types, the lower half of Table 9 does show that roughly one-third of the sample households claim to have shared more food and income with relatives during the crisis than during normal times. On the other hand, increased sharing shows up somewhat more among households in the upper income tercile (43 percent) than it does among poorer households (29 percent). What is more, few respondents report having shared freely with nonrelatives. In other words, while sharing (and, indeed, increased sharing) of resources did take place, relatively more of the wealthier households were in a position to do so, and then shared with blood relatives rather than with destitute households outside of the family.

Where it was difficult to find access to shared resources, many households resorted to credit. A Wolof proverb from Senegal that has variants in Ethiopia runs, "A man without debts is a man without friends." Debts represent personal ties, and personal ties represent security during crisis. Thus, if relatives could not (or would not) give food or cash in the form of a gift, often they would give a loan. Some 48 percent of loans were received from relatives, another 41 percent from friends, with only 11 percent coming from professional moneylenders or merchants. Slightly more households in the upper tercile borrowed food and cash than did poorer households (Table 9). They also made larger loans. This indicates that the poor (but, in fact, all households) lack access to the credit that is crucial to preserving resources during times of stress. Interest rates on loans ranged from 50 to 300 percent, payable in cash or kind, and where they were obtained from relatives rather than merchants they usually carried no time limit for repayment.

Household Consumption Adjustments

The conceptual framework for analyzing household responses to famine was outlined in Figure 7 (function 1.1). That the consumption response is addressed at this point in the sequence of discussion does not imply that these responses take place only after all other degrees of freedom in terms of asset response have been exhausted. On the contrary, reduction of consumption and adaption of diet overlap considerably and, in certain cases, precede the adjustments outlined above.

Even during nonfamine years, calorie consumption in Ethiopia is extremely low. Average per capita figures commonly cited lie in the range of 1,500-1,750 kilocalories per day (Idusogie 1987; UNEPPG 1990; Harbeson 1990). It should be stressed that these are rough estimates based only on fragmentary surveys, food balance sheets (which often exclude roots and tubers from the calculation), and nutritional monitoring data (Mulhoff 1988; Kelly 1987).

A consumption survey was carried out in 400 of the sample households during 1989/90.[15] The head woman of the household was interviewed about the previous

[15]A figure of 400 households is used, since data for the remaining 147 households were incomplete. At two of the sites, the consumption surveys were carried out shortly after harvest: the Debre Berhan survey was conducted in May/June (after the harvest from the short rains), while the survey in Gara Godo took place in January 1990, several months after the main harvest. Thus the calorie figures for these two sites are higher than they would have been if surveyed during the lean farming season, as was the case for the other five locations.

week's consumption of all food items (cereals, noncereals, snacks, condiments, and foraged foods), using local units of measure. If it was not possible to interview the head woman, a more junior woman, or the male household head, was turned to. All items that were home-produced, purchased, or received as gifts were included in the analysis. Although it is recognized that there is a high probability of underreporting where the snacks, condiments, and foraged foods are concerned, the figures for major calorie sources are deemed acceptably accurate. It should be understood that since this was a single-shot consumption survey, the length of time spent by households at such low intake levels cannot be reported.

There was great variability both within and across sites (Table 11). As might be expected, the highest average consumption levels are found in Debre Berhan, the more prosperous of the survey sites. At the same time, consumption levels of the poorest income tercile at four of the sites were below 1,600 kilocalories per capita per day, indicating a high level of food deprivation even in the good year of 1989/90.

At the sample mean, households in the upper income tercile consumed 30 percent more calories than those in the lower tercile. The gap between rich and poor is greatest in Dinki, while the gap between the terciles is narrowest in Gara Godo. Yet, by any nutritional standard, all of these figures are low. Even the wealthier households in Doma, Korodegaga, and Gara Godo consumed less than 2,000 kilocalories per capita per day. As a result, at the sample mean, 68 percent of households consumed less than 80 percent of the recommended daily allowance of 2,300 kilocalories. This compares unfavorably with recent surveys in The Gambia and Rwanda, which found only 18 percent and 41 percent of households as calorie-deficient, respectively (von Braun and Pandya-Lorch 1991). The range shown in Table 11 runs from lows of 42 and 43 percent in Debre Berhan and Beke Pond to highs of 83 and 84 percent in Korodegaga and Gara Godo, respectively. In other words, in 1989/90 (a good year), no less than 68 percent of the households in these communities could be classified as malnourished.

Table 11—Daily per capita calorie consumption, by survey site and income tercile, 1989/90

Survey Site	Income Terciles			Households Below 80 Percent of RDA[a]
	Lower	Middle	Upper	
	(kilocalories/capita/day)			(percent)
Adele Keke	1,997	1,905	2,165	68
Beke Pond	2,371	2,147	2,792	43
Debre Berhan	2,065	2,733	3,207	42
Dinki	1,279	1,621	2,617	75
Doma	1,554	2,384	1,995	67
Gara Godo	1,366	1,382	1,621	84
Korodegaga	1,564	1,505	1,845	83
Weighted mean[b]	1,693	1,685	2,183	68

Source: IFPRI survey data, 1989/90.

[a]For this calculation, the minimum recommended daily allowance (RDA) is set at 2,300 kilocalories per capita per day.

[b]The weighted means are calculated using income pooled across all sites, not based on the means of each site combined. Anova analysis of variance indicates significant difference between the tercile means for three of the sites: Doma (at 5 percent) and Dinki and Debre Berhan (both at 1 percent).

Taking the analysis a step further, although households headed by women (widows, divorcées, or wives of soldiers) tend to earn less than male-headed households, their calorie consumption was roughly equal at the same mean (Table 12). On the other hand, there is little difference between the food budget shares of the upper and lower terciles: 65 and 64 percent, respectively. These shares compare with a 59 percent expenditure on food by the poorest income groups in The Gambia in 1985/86 (von Braun, Puetz, and Webb 1989), 63 percent among landless laborers in Kenya in 1984/85 (Kennedy and Cogill 1987), and 37.5 percent for the poorest groups in Rwanda in July-September 1986 (von Braun, de Haen, and Blanken 1991). In other words, even the wealthiest households in this sample spent more on food in 1989/90 than did the poorest income groups in recent studies in other parts of Africa.

The most common sources of calories consumed by the sample households are identified in Table 13. This table shows that maize and wheat are the most common cereals, while pulses and roots and tubers top the list of noncereal foods. It is interesting that wheat is so important at the survey sites, since it is not a crop of major importance in production terms for the survey households (Table 3). Furthermore, the proportion of sample households consuming wheat rose from a mean of 20 percent during the worst famine years to almost 29 percent in 1989.

This outcome matches the picture at a national level. From 1979/80 to 1988/89 the share of wheat in national cereal consumption rose from 10 percent to 29 percent, while its share in total production rose from only 8 percent to 16 percent (Watts and Bohle 1992; Gutu, Lambert, and Maxwell 1990). Thus, in one decade, national wheat consumption tripled, while its production only doubled. The difference has been made up mostly by food-aid imports (FAO 1982; Maxwell 1986).

Table 12—Per capita income and expenditure (1988/89), and food consumption (1989/90), by income tercile and gender

Group	Total Net Income per Capita	Total Expenditure per Capita	Food as Share of Expenditure[a]	Total Calories Consumed per Capita
	(birr/year)[b,c]	(birr/month)[b,c]	(percent)	(kilocalories/ capita/day)
Income tercile				
Upper	270.9	50.6	65.0	2,444
Middle	90.6	30.8	68.2	1,744
Lower	20.5	22.3	64.1	1,658
Average	124.7	34.3	65.8	1,940
Gender of head of household				
Male	128.5	33.8	66.0	1,927
Female	108.7	36.9	67.0	2,110

Source: IFPRI survey, 1989/90.

Note: The data are derived from household recall and exclude Doma and Korodegaga (two of the poorest survey sites), for which complete information is not available. As a result, the figures in this table are higher than those presented in Table 4, which is based on the full data set.

[a] When per capita expenditure rather than income is used to calculate household terciles, the typical pattern of a decreasing share of income spent on food with rising household income shows up much more clearly.

[b] US$1.00 = 2.05 Ethiopian birr.

[c] Year = 1988/89. The expenditure surveys took place successively as follows: Debre Berhan in March/April 1989; Dinki in May/June 1989; Sidamo in July/August 1989; Korodegaga and Doma in September/October 1989; Adele Keke in November/December 1989; and Gara Godo in December 1989.

Table 13—Sources of calories consumed by sample households, by income tercile, 1989/90

Source	Income Terciles			Total Average
	Lower	Middle	Upper	
	(percent of total calories consumed)			
Cereals				
Barley	1.5	2.5	11.0	4.9
Maize	62.6	50.2	38.7	50.7
Millet	0.7	2.9	5.2	2.9
Sorghum	7.8	8.9	8.3	8.4
Teff	5.0	3.9	4.0	4.3
Wheat	7.7	10.5	12.2	10.1
Noncereals				
Meat	0.2	0.2	0.1	0.1
Milk/cheese	1.5	1.2	1.6	1.4
Oil/butter	0.4	1.3	1.1	0.9
Pulses	5.8	7.5	10.6	8.0
Roots/tubers	5.5	7.8	1.7	5.1
Sugar	0.7	0.5	1.0	0.8
Vegetables	0.2	0.6	0.6	0.4
Other	0.5	2.2	4.2	2.3
Total	100.0	100.0	100.0	100.0

Source: IFPRI survey data, 1989/90.
Note: Parts may not add to totals because of rounding.

However, consumption of the major staples is not identical across income groups. In general, the upper-tercile households have a more varied diet than do the poorer households. Households in the upper tercile receive more calories from wheat, barley, and millet than households in the lowest tercile. Conversely, the poorest households depend predominantly on maize, which is the most abundant and cheapest cereal. Similarly, households in the upper income tercile consume more pulses, vegetables, and oil and butter than households in the lower tercile.

Yet, were the wealthier households able to rely on the same foods during the crisis? There are three main consumption responses to absolute food shortage: the diet can be diversified to incorporate food items not normally consumed, the quantity of food consumed per meal can be reduced, and the number of meals per day can be reduced. All three measures were adopted by the sample households.

The principal foods consumed during 1989 are compared in Table 14 with those consumed during the worst famine year (as experienced by each survey site). Wealthier households changed their diet relatively less than the poorer households. The most striking difference between the famine year and 1989/90 is the marked lowering of consumption among wealthy households of both the most expensive grain (teff) and the two least expensive grains (maize and millet).

Nevertheless, substitution between grains was not the only consumption effect among the wealthier households; many were also forced to eat "famine foods." While certain forage foods are collected as a matter of course even during normal years, the range of items and frequency of consumption rose considerably during the crisis. In Dinki and Gara Godo more than 95 percent of households supplemented their diets with famine foods such as roots and leaves and, in the case of Dinki, even

Table 14—Major foods consumed by sample households during worst year of famine and in 1989/90

Type of Food	Lower Income Tercile		Middle Income Tercile		Upper Income Tercile		Total Average	
	Famine Year	1989/90	Famine Year	1989/90	Famine Year	1989/90	Famine Year	1989/90
	(percent of households)							
Cereals								
Barley	1.0	3.9	5.2	9.3	19.1	22.3	7.9	11.3
Maize	30.4	93.4	49.1	83.8	44.2	70.4	40.9	83.1
Millet	. . .	1.4	. . .	9.4	. . .	10.1	. . .	6.8
Sorghum	7.9	17.8	31.6	28.4	41.5	34.1	26.2	26.4
Teff	0.1	9.2	0.0	11.6	0.1	11.6	0.5	10.8
Wheat	8.2	22.6	21.3	26.9	33.3	37.7	20.3	28.7
Noncereals								
Meat	n.a.	1.6	n.a.	5.2	n.a.	3.2	n.a.	3.3
Milk/cheese	n.a.	24.5	n.a.	24.4	n.a.	29.4	n.a.	26.0
Oil/butter	n.a.	4.3	n.a.	11.1	n.a.	20.4	n.a.	11.5
Pulses	1.4	30.9	3.0	44.5	11.7	61.6	5.1	44.9
Roots/tubers	16.1	24.9	18.9	35.0	11.9	13.3	15.8	24.8
Sugar	n.a.	8.0	n.a.	11.1	n.a.	20.7	n.a.	12.9
Vegetables	n.a.	9.3	n.a.	30.4	n.a.	48.1	n.a.	28.3
Other	2.5	29.5	0.1	53.4	1.7	77.8	1.7	52.4

Source: IFPRI survey data, 1989/90.
Notes: The worst year of famine varies according to individual household responses for the period 1983-88. n.a. means not available.

grass and rats (Table 15). At other sites the average total number of households consuming famine foods was close to 35 percent. Both men and women joined in the search for products to supplement an increasingly restricted diet.

The lower half of Table 15 shows that 58 percent of households in the upper income tercile increased their consumption of famine foods, compared with only 41 percent of those in the lower tercile. This is because the poorer households supplement a cereal- or tuber-based diet with berries and fruits, even in "normal" years (Irvine 1952; Wilding 1985). Frequently consumed bush food should therefore be distinguished from famine foods. If such a distinction could be made, the gathering of bush foods could be identified as a coping mechanism, while the gathering of famine foods would more accurately represent desperation.

But some households eschew certain types of famine food as long as possible because of cultural norms. The Afar and Arssi peoples of the Awash basin reportedly refused to eat fish during the 1973/74 famine (Kloos 1982). Similarly, in Sidamo the Gabbra (as Moslems) are forbidden to eat the meat of animals that have died of hunger or disease. None of them admitted to eating such meat during the famine. On the other hand, 92 percent of the Borana, who are animists, did use this source of food in 1985/86. Also, although the Gabbra formerly drank blood as a regular part of their diet (as the Borana still do), a Gabbra council proclaimed 20 years ago that drinking blood was sacrilegious. As a result, only 25 percent of Gabbra households increased their consumption of blood during the famine, compared with 42 percent of Borana households.

Table 15—Household consumption responses during worst famine year, by survey site and income tercile

Site/Tercile	Meals Eaten per Day			Reduced Quantities Eaten[a]	More Famine Foods Eaten[b]	More Food Shared[c]	Early Weaning[d]
	One or Fewer	Two	Three				
				(percent of households)			
Survey site							
Adele Keke	22	56	22	84	35	29	23
Beke Pond	69	29	2	47	47	81	27
Debre Berhan	9	27	64	30	33	27	n.a
Dinki	78	20	2	89	96	13	45
Doma	. . .	92	8	31	30	25	38
Gara Godo	20	78	2	84	99	19	84
Korodegaga	12	82	6	69	16	25	29
Income tercile							
Upper	47	41	12	75	58	41	57
Middle	56	33	11	60	52	26	36
Lower	63	35	2	55	41	23	29

Source: IFPRI survey data, 1989/90.
Notes: n.a. means not available. The worst year of famine varies according to individual household responses for the period 1983-88.
[a]Data are for peak of crisis.
[b]"Famine foods" are unusual foraged foods, such as grass, roots, and rodents.
[c]More food than usual was shared with relatives outside of the household.
[d]Mothers had difficulty lactating and weaned infants earlier than planned.

It is interesting that these Gabbra taboos did not break down during the crisis. This was not the case with followers of the Ethiopian Orthodox Church, who constitute a majority of the sample households in Debre Berhan, Dinki, and Gara Godo. Orthodox fasting rules, which dictate that meat and dairy products be avoided on 150 days of the year, were suspended by all sample households during the crisis (Dirks 1980; Selinus 1971). They have since been readopted.

Taking Risks to Survive

Consumption Decline

The other two methods of dealing with food shortage (reduced consumption per meal and reduced number of meals) represent severe hardship and a lack of alternatives, rather than coping. Between 30 and 89 percent of households across all sites reduced the amounts of food consumed per meal during the worst famine year (Table 15). Again, more of the households doing so fall into the upper rather than the lower income tercile. This is largely because fewer poor households could reduce the amount eaten, since those amounts were so small to begin with.

Most households also cut back on the number of meals per day. Table 16 gives an indication of the extent of such reductions for four of the sites. The most extreme case was recorded in Dinki. In 1989/90, 67 percent of households consumed at least three meals per day. However, during the famine, 78 percent of respondents cut back to one

Table 16—Number of daily meals eaten by households in selected survey sites during worst famine year and in 1989/90

Survey Site	Number of Meals per Day		
	One or Fewer	Two	Three
	(percent of households)		
Debre Berhan			
During famine	9	27	64
1989/90	2	12	87
Dinki			
During famine	78	20	2
1989/90	4	30	67
Doma			
During famine	. . .	92	8
1989/90	1	65	34
Korodegaga			
During famine	12	82	6
1989/90	2	33	65

Source: IFPRI survey, 1989/90.
Note: The worst year of famine varies according to individual household responses for the period 1983-88.

meal per day, or even fewer. The "or fewer" is included because a dozen households reported going for up to four days without any food at all.

Often the reduction in meals was forced because of a lack of purchasing power. Some women in Korodegaga noted that they relied on the daily sale of firewood in a market 20 kilometers away. If they could find no buyer, they went hungry. Table 15 shows the proportion of households in which mothers were forced to wean their babies earlier than expected because their breasts had dried up. The highest proportion of such cases (84 percent) was found in Gara Godo. While the fact that breast milk dries up at all during famine has been challenged in the literature (Rivers 1988; Huffman 1990), women in this sample confirmed that lactation can be severely compromised by prolonged reduction in calorie intake. That this issue was raised most by women in the upper tercile may indicate that they had intended to breast-feed their infants longer than women in the poorest households. Confirmation of this hypothesis would require specific fieldwork on breast-feeding and weaning habits across the country.

On the other hand, there were times when food could not be found. In the early stages of the crisis most households (87 percent) took loans of food from nearby villages, which they repaid with interest. But as the crisis deepened, other villages held on to their food, and people in Dinki reportedly fought over handfuls of roots.

Demographic Effects of Famine

Prolonged food scarcity coupled with increased incidence of disease cannot be withstood for long without adverse effects on physical welfare (Payne and Lipton 1990). Some people were able to flee the problem, although the number of emigrants from the survey sites (less than 10 persons from the whole sample) was surprisingly small compared with evidence from other parts of Ethiopia (Clark 1986; Kidane 1989; de Waal 1991). The explanations for this small number might be that personal

mobility was still highly restricted by law, and that, although devastated by famine, each of the survey sites was reached by a relief organization, usually after mortality had started to rise but before large numbers of people attempted to migrate. The two cases where relief came late were the most remote sites of Dinki and Doma. However, disease spread through the population of these two sites at an early stage, thereby reducing the ability of people to migrate.

For many of those who remained in their villages, death was the last stage of the famine. Mortality statistics alone cannot do justice to the magnitude of the suffering involved. In Doma, 37 percent of sample households experienced at least one famine death. In Korodegaga, it was 45 percent, and in Dinki, almost 53 percent. Dinki's experience was the worst. Out of 120 households in Dinki, 18 whole families were lost. In 1990 their homes stood empty and untouched. In the 57 sample households at Dinki there were 21 deaths, representing 7.5 percent of the sample population at that time.

The most immediate cause of death in Dinki was cholera. Inhabitants of villages located, like Dinki, at the foot of the Rift Valley escarpment were told by villagers on the plateau above not to climb up the slope for fear of confinement or forced repatriation. Similarly, people in the highlands who wished to visit family in Dinki were told not to come back. In effect, a whole locality was quarantined by frightened villagers living in the relative safety afforded by physical remoteness from catastrophe.

Most of the victims were preschoolers and the elderly. Of the 80 or so deaths in sample households ascribed directly to the famine (in Dinki, Gara Godo, Doma, and Adele Keke), 46 percent were aged less than five years, while the majority of adult victims were over forty.

In most cases, death came slowly, not suddenly. In Gara Godo, a common saying is: "*Sabasbati chilen Gabati, duti Karati.*" This can be translated as, "During the famine, people could eat a piece of pancake in the market but still die on the way home [because they were so depleted of energy]." In Korodegaga, a 15-year-old boy was found dead lying under a tree where he had sat down to rest three days previously. In Doma, there were several cases of women giving birth on the way to market, months before normal term.

It is thanks to numerous development organizations that the death toll at these sites was not greater still. As a consequence of site-selection criteria, each of the seven communities surveyed was reached by at least one relief agency that endeavored to stabilize consumption and to rehabilitate the villages in which they were operating. Although data on relief coverage during and after the famine is lacking, it is clear that not all communities in the country were so fortunate.

This chapter has examined the microlevel experience of famine and shown that depth of poverty at the household level is important in defining the precise nature and severity of such experience. The following chapter sets the household experience into the wider context of the macrolevel experience of famine, with a focus on the role played by drought in famine development.

5

AGRICULTURAL CONSTRAINTS: CONFLICT, POLICY, AND DROUGHT

Developments in Ethiopia's agriculture are intimately tied to most other factors involved in famine by virtue of agriculture's key role in overall economic growth, employment generation, foreign-exchange earning, food supply, and household food security. The agricultural sector employs 85 percent of the active population and accounts for almost 50 percent of GDP (World Bank 1990). Agricultural products constitute 85 percent of total exports, deriving 90 percent of total export earnings (Belete, Dillon, and Anderson 1991). Coffee, the country's largest single export, accounts for roughly 60 percent of foreign-exchange earnings and nearly 10 percent of government revenue (through export taxes).

Yet, despite the importance of this sector, Ethiopian agriculture has for more than a decade shown disturbing signs of decline (Webb, Zegeye, and Pandya-Lorch 1992). Some of the constraints facing smallholders in the study regions at a grass-roots level were described in Chapter 4. In the present chapter some of the factors underlying these constraints are examined as they relate primarily to the policy and physical environments. First, the decline in production and food availability in the country is documented. This is followed by an examination of the principal agricultural strategies of Ethiopia since the 1970s and the role played by drought in the agricultural decline. Brief mention is also made of the effects of armed conflict in the study areas.

Production Trends and Food Availability

Food availability in Ethiopia is to a large extent determined by the country's domestic production of cereals: the correlation between annual per capita availability and production is 0.76. As pointed out in the last chapter, Ethiopia's diverse ecology and climate provide for a complex set of agro-ecological environments.[16] This has led to variations in the relative importance of different cereals and root crops by region and to a strong geographical concentration of cereal production.

The main teff-growing regions are Shewa and Gojjam. These two provinces provide almost two-thirds of the country's supply of one of the preferred ingredients of the national diet. Maize, on the other hand, is produced in large quantities in Keffa, Sidamo, and Wollega as well as in Shewa and Gojjam. Where total cereal output is

[16]Discussion continues as to how best to define and demarcate these zones. Some authors rely on three simple categories: the conventional *dega* (high altitude), *woina-dega* (middle altitude), and *kolla* (lowland) (McCann 1987a, Appleton 1988). Others use more detailed and, consequently, complicated definitions: the 3 zones are stretched to 11 by Hurni (1986), to 25 or 30 by Mitchelhill (1986), and even to 51 by Wicks (1987).

concerned, however, the concentration of production is unequivocal. Shewa, Gojjam, and Arssi were together responsible for the bulk of cereal production in 1988/89, both in terms of share of national production (54.3 percent), and in production per capita by province. The provinces producing the least amounts of grain were Gamo Gofa (which depends largely on root crops), Bale (which is sparsely populated), and Illubabor (a major coffee-producing province). Coffee remains the lifeblood of the economy, with exports exceeding 94,000 tons in 1988/89, equivalent to more than US$300 million (National Bank of Ethiopia 1989). However, stagnant yields (among the lowest in the world) and the collapse of the International Coffee Agreement in 1989 have affected exports, thereby placing even greater stress on foreign currency reserves (IFAD 1989).[17]

Although most cereal production is located in the higher-potential regions, both national-level cereal production and resultant food availability have followed a downward trend since the 1960s. Per capita cereal production has been declining by an average of 4 kilograms per year (Figure 10).[18] The decline has not been smooth and uninterrupted for the entire period. Certain years such as 1975 and 1979 saw large increases in cereal production that may have been associated partly with better than average rainfall and partly with policy changes.[19]

The decline has also not been smooth across all regions. Poor or good production in one province is not directly correlated with the production levels of any other province (see Table 17 for correlation of cereal production from 1979 to 1987 in six provinces). There is, therefore, variety within the country in terms of production variability and covariability. Nevertheless, the overall production trend has been markedly negative.

The same is true of trend lines for per capita cereal availability and food availability (Figure 10). Cereal availability per capita has been declining at an average of 3.3 kilograms per year, while per capita availability of all foods (cereals plus pulses and roots) has been declining by 2.7 kilograms per year.

Interannual fluctuation on the food availability line is much less than on the cereal availability line. This points to the buffering role of food imports, food aid, and stock depletion. It is noteworthy that while the relationship between cereal production and cereal availability remains strong throughout the time series, the difference between the two increasingly widened during the 1980s.

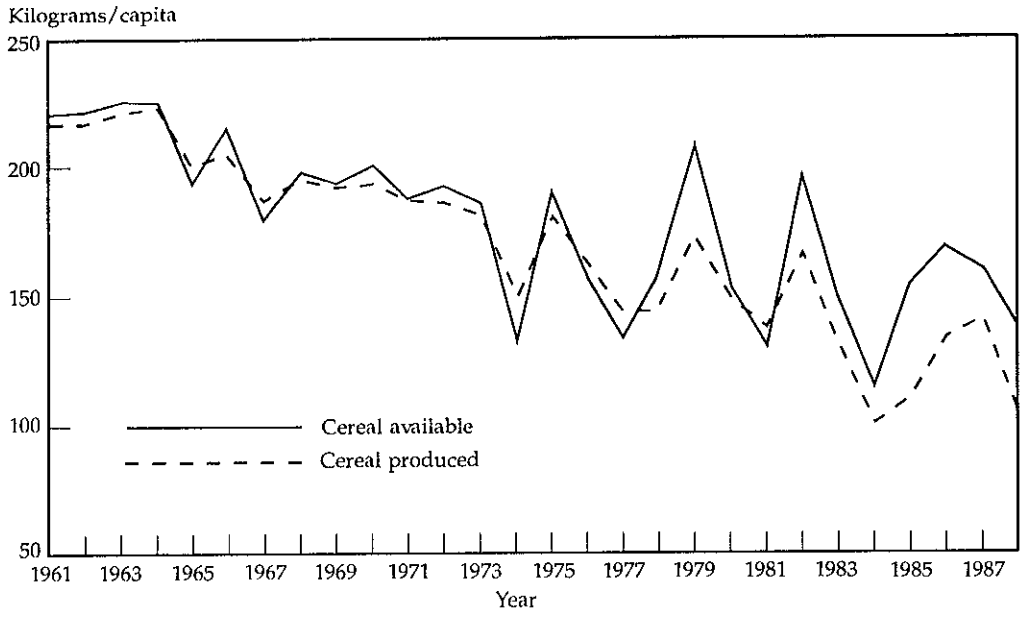
Imports, both commercial and food aid, have taken up much of this slack, but not all. Commercial imports contributed less than 20 kilograms per capita until 1985, when the imports of wheat and rice rose in response to the food crisis. However, they have remained at a low level. In 1985, roughly 322,000 tons were imported; by 1987,

[17]In 1989 the ratio of debt-service payments to exports rose to 44 percent, one of the highest levels in the world (Lancaster 1990; Belshaw 1990). In 1989, the ratio of debt-service payments to exports rose to 44 percent, one of the highest levels in the world (Lancaster 1990; Belshaw 1990).

[18]Due to the differences in survey methodologies adopted by the Central Statistics Authority since 1979, the production data of 1961-78 and 1979-86 were not directly comparable. Production data from 1961-78 have been adjusted here by a factor of 1.27 in order to make both data sets comparable. The following population growth rates were used: 1961-74, 2.63 percent; 1974-79, 2.74 percent; 1980-84, 2.8 percent; 1985-89, 2.5 percent.

[19]Of course, one should also be aware of possible errors in the data related to changes in sampling procedures over time.

Figure 10—Cereal production and availability per capita, 1961-88



Sources: Per capita cereals computed by the authors based on data set compiled from Food and Agriculture Organization of the United Nations, "Food Supply and Utilization Data Tape," FAO, Rome, 1988; Ethiopia, Ministry of Agriculture, *Area, Production, and Yield of Major Crops for the Whole Country and by Region in 1974/75-1978/79* (Addis Ababa: MOA, 1979); Ethiopia, Central Statistics Authority, *Time-Series Data on Area, Production, and Yield of Major Crops, 1979/80-1985/86 (1979 E.C.)* (Addis Ababa: CSA, 1987); Central Statistics Authority, *Agricultural Sample Survey, 1986/87 (1979 E.C.): Results of Area and Production by Sector* (Addis Ababa: CSA, 1987); Central Statistics Authority, *Agricultural Sample Survey, 1987/88 (1980 E.C.): Results on Area, Production, and Yield of Major Crops by Sector and Season* (Addis Ababa: CSA, 1989); Central Statistics Authority, *Report on 1988/89 Crops, Weather, and Food Situation* (Food Information Systems Project, Addis Ababa, 1988, mimeographed).

this had dropped to 140,000 tons. Food aid, on the other hand, has increased since 1984 and remains at a high level. The important contribution made by food aid in the critical period from 1983 to 1985, and again in 1988, is illustrated in Figure 11. In overall terms, however, food aid contributed at most 20 kilograms per capita in these years. In 1988, emergency food aid exceeded 1985 levels because of severe droughts in many regions. New donations from the U.S.S.R. and the European Community largely provided for this increase. The 1989 total declined to half a million tons, but it rose again in 1991 to roughly 1 million tons and has remained just below that level in 1992 (WFP 1991a; FAO 1992).

The proximate causes of the per capita production decline are many. The population growth rate of almost 3 percent per year plays a role, as do the erosion-induced losses of soil fertility and output potential mentioned in Chapter 3. But the three most commonly invoked explanations center around military conflict, drought, and eco-

Table 17—Correlation of per capita cereal production in six main provinces, 1979-87

Province	Correlation Coefficients						Average per Capita Production
	Arssi	Shewa	Hararghe	Gondar	Sidamo	Wollo	
							(kilograms)
Arssi	...	.17	.13	-.02	.76*	.21	290
Shewa	...	...	.91**	.66	.34	.73	153
Hararghe	...	...	...	.65	.31	.60	95
Gondar	...	...	...	...	-.18	.57	152
Sidamo	...	...	...	...	...	.07	53
Wollo	...	...	...	...	...	...	151

Note: 1-tailed significance:
* -.01
** -.001

nomic policy. The last two play the most significant role in the study areas, so the analysis that follows deals only briefly with the subject of war before moving on to consider drought and policy in more detail.

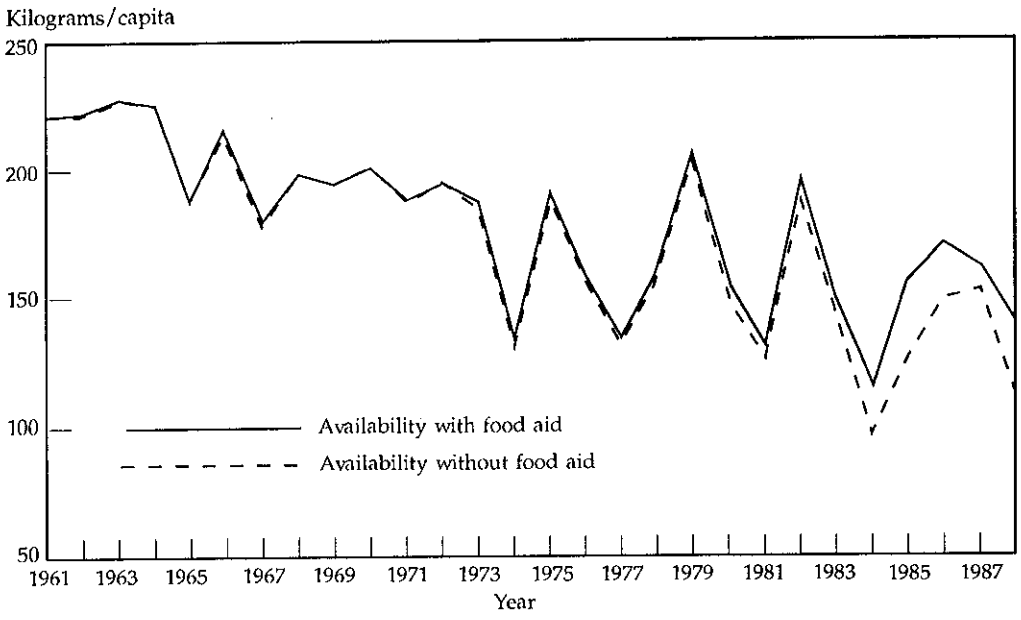
Military Conflict

While very difficult to calculate, and always open to dispute, estimates of war damage in Ethiopia tend to be very high. For example, it has been estimated that the conflict within Eritrea alone cost between 65,000 and 95,000 tons of lost food production per year (Bondestam, Cliffe, and White 1988). Cliffe (1989) calculates (again just for Eritrea) that between 1986 and 1989, 23,000 hectares of land were rendered uncultivable, 2,500 homes were destroyed, and roughly 44,000 animals were lost to their owners. Outside of Eritrea, Gondar, and Tigray (and parts of Gojjam and Wollo), the structural impact of conflict has been considerably less. For instance, no bombing, entrenchment, or battles took place at or near the study sites. Nevertheless, the wars have always affected the whole of the country. The drain on national economic resources has been enormous, reported in 1988 as over US$700 million per year, representing 50-70 percent of total government revenue (Buchanan 1990; Horn of Africa Report 1990; Lancaster 1990).

As for the drain on human resources, nationwide conscription drives (dating from 1976) brought government forces up to a level of almost a half million men by the end of the 1980s. Between 1976 and 1982 such drives were carried out on an irregular basis, but the decision in 1981 to formalize national military service for the "entire working people" resulted in annual and biannual conscription campaigns across the country (de Waal 1991).

The numbers of conscripts, nongovernment forces, and civilians killed during the conflict cannot be known, although estimates abound. For example, Wolde-Giorgis (1989) attributes a figure of 250,000 deaths to the war in Eritrea from 1967 to 1988. Cliffe (1989) is more circumspect in proposing a total of 5,000 dead and imprisoned (on both sides) between 1986 and 1989. Among the 547 households interviewed for

Figure 11—Cereal availability per capita with and without food aid, Ethiopia, 1961-88



Sources: Per capita cereals computed by the authors based on data set compiled from Food and Agriculture Organization of the United Nations, "Food Supply and Utilization Data Tape," FAO, Rome, 1988; Ethiopia, Ministry of Agriculture, *Area, Production, and Yield of Major Crops for the Whole Country and by Region in 1974/75-1978/79* (Addis Ababa: MOA, 1979); Ethiopia, Central Statistics Authority, *Time-Series Data on Area, Production, and Yield of Major Crops, 1979/80-1985/86 (1979 E.C.)* (Addis Ababa: CSA, 1987); Central Statistics Authority, *Agricultural Sample Survey, 1986/87 (1979 E.C.): Results of Area and Production by Sector* (Addis Ababa: CSA, 1987); Central Statistics Authority, *Agricultural Sample Survey, 1987/88 (1980 E.C.): Results on Area, Production, and Yield of Major Crops by Sector and Season* (Addis Ababa: CSA, 1989); Central Statistics Authority, *Report on 1988/89 Crops, Weather, and Food Situation* (Food Information Systems Project, Addis Ababa, 1988, mimeographed).

the present study, a total of six men were reported as "absent from the household" as a result of conscription into military service. Only one man in these households had ever been killed in action.

A lesser, but still important, effect of the war on nonconflict regions has been the levying of special taxes on smallholders to support the war effort. In addition to an annual agricultural tax of 20 birr, a membership fee of 5-10 birr for belonging to a Peasant Association, and other association and social service support fees (often exceeding a total of 15 birr), a "voluntary" contribution was requested, starting in 1988, to support the "territorial integrity of the Motherland." At the survey locations, this was reported to amount to another 15 birr. Thus, in 1988/89, the sample households were expected to pay an average of around 50 birr (US$24) per year in contributions to the state.

Table 19—Regression analyses of rainfall-cereal production and yield relationships in Ethiopia, 1961/62-1988/89

Dependent Variable	Explanatory Variables				R^2	F-Value
	$RAIN_t$	$RAINSQ_t$	$DUMMY_t$	CONSTANT		
$CEPROD_t$	25,075.4	-12.259	-1,448,382.9	-6,978,123.5	0.77	26.4
	(1.98)	(-1.83)	(-8.18)	(-1.178)		
$CEYILD_t$	6.587	-0.0033	-340.2	-2,079.8	0.76	24.7
	(2.19)	(-2.07)	(-8.08)	(-1.476)		

Note: t-values are in parentheses; number of cases = 28.

Variables:

$CEPROD_t$ = total cereal production in metric tons in year t,

$CEYILD_t$ = cereal yield in kilograms per hectare,

$RAIN_t$ = annual rainfall (country-weighted averages of regional rainfall using production shares as weights),

$RAINSQ_t$ = RAIN squared, and

$DUMMY_t$ = dummy variable for separation of production series before and after new statistics system (1978).

decline in rainfall below the long-term national average results in an average drop in all cereal yields of 4.2 percent. As some substitution with area may occur, a drop of 4.4 percent in total cereal production is found for a 10 percent decline in rainfall. The latter occurs as a result of disproportionately large declines in the yields of sorghum and maize (Table 21). The latter two crops are grown in the drier provinces of Hararghe, Wollo, and Bale. Since these provinces are also prone to greater-than-average rainfall fluctuations, the crops seem also to be more responsive to such fluctuations.

The rainfall-production link is not perfect. Soil type, depth, location of plots, and soil temperature can all have a large effect on yields and total production, even within

Table 20—Crop-specific analysis on rainfall-yield relationships, 1979-87

Crop	RAIN	RAINSQ	CONSTANT	R^2	F-Value
Barley	0.998	-0.00040	697.94	0.272	2.59
	(1.972)	(-1.681)	(2.460)		
Maize	2.393	-0.00076	99.01	0.440	5.37
	(3.383)	(-2.249)	(0.248)		
Sorghum	1.734	-0.00060	388.86	0.440	5.42
	(2.528)	(-1.829)	(1.006)		
Teff	0.725	-0.00022	438.14	0.402	4.65
	(1.795)	(-1.151)	(1.925)		
Wheat	1.408	-0.00051	280.31	0.331	3.43
	(2.322)	(-1.768)	(0.820)		

Notes: t-values are in parentheses; number of cases = 104 (1979-87). The regional dummy variables are not listed.

Table 21—Effect of a 10 percent drop in rainfall below long-term average on crop yields, by type of crop at country level

Crop	Change in Yield
	(percent of average yield)
Barley[a]	-1.9
Maize[a]	-5.9
Sorghum[a]	-4.9
Teff[a]	-3.5
Wheat[a]	-3.9
All cereals yield[b]	-4.2
Total cereal production[b]	-4.4

Note: National average rainfall is weighted according to province-level production shares, 1979-87.
[a]Calculated from parameters in Table 20.
[b]Calculated from parameters in Table 19.

a limited area (Henricksen and Durkin 1985; Wolde-Mariam, personal communication, 1992). However, drought is found to be a very important factor contributing to food shortages in Ethiopia. The effects on yields and production show up quite strongly. But these effects vary considerably by crop and by region. Yield stability and yield levels are clearly important considerations in agricultural policy for food security, and the trade-offs between the two need to be better understood.

Although further analysis along the lines of these models is clearly required, it can already be concluded that

- Production-food availability relationships are strong in Ethiopia, at both national and provincial levels, since food aid, trade, and the drawdown of stocks had little effect on reducing the gap between production shortfalls and demand.
- Drought-production linkages are strong, albeit differentiated by crop. Because the importance of the above production-availability linkage to food security was enhanced by the restrictive domestic trade policies of the past two decades, all three relationships had an important bearing on the functioning of markets.

The next section therefore examines the broad outlines of agricultural strategy during the 1970s and 1980s, before moving on to consider the question of markets and price behavior in Chapter 6.

Agricultural Strategies of the 1970s and 1980s

Improved national food security through raised agricultural output has been a major government concern since the 1970s. The principal articulation of this concern has been the implementation of three major policy initiatives aimed at state-led growth in agriculture.[23] Despite low overall investment in the agricultural sector

[23]For more detailed consideration of the agricultural policies of the Mengistu government, refer to Göricke 1979, 1989; Ghose 1985; Griffin and Hay 1985; Rahmato 1987; IFAD 1989; Pausewang et al. 1990; de Waal 1991; and Belete, Dillon, and Anderson 1991.

(averaging only 9 percent of total government expenditure from 1974 to 1984), these initiatives brought about fundamental changes to the rural economy (IFAD 1989; Diakosavvas 1989; Pausewang et al. 1990). The changes comprise land reform policies, the aggregation of production units (cooperativization and association), and a narrow sectoral and geographical concentration of investment. While these past initiatives have been largely discarded as part of the policy reorientations of the 1990s, a brief outline of their former roles is essential to an understanding of trends in agriculture during the drought-prone 1980s.

Land Reform

In an attempt to redistribute income and stimulate agricultural output, private ownership of land was abolished in 1975, a move that changed the face of farming. While tenure arrangements, cropping patterns, and farm technology varied across the country, agriculture before 1975 was generally dominated by the needs of a landed gentry, the church establishment, and an overseeing aristocracy.[24] The reform measures transformed this structure and laid the foundations of a three-tier system.

The largest component of this system was (and remains) the smallholder sector. Individual households, which are responsible for about 90 percent of national production, were granted access rights to a maximum of 10 hectares for private production (Brüne 1990). In practice, average holdings are between 1 and 2 hectares per household. Over 5 million households were organized into some 20,000 Peasant Associations. These associations control the allocation and use of land, each being responsible for up to 800 hectares.[25] Almost 40 percent of the Peasant Associations had been "villagized" by the end of the 1990s (IFAD 1989).[26]

Land reform went some way toward equalizing access to land and providing security for the landless (as shown in Chapter 4). Such measures were welcomed most (and therefore implemented more smoothly) in the central and southern regions formerly characterized by extensive absentee ownership of land, tribute farming, and large-scale commercial agriculture (Cohen and Weintraub 1975; Göricke 1979; Abate and Teklu 1979; Blackhurst 1980). For example, some pre-1974 landlords at the Korodegaga survey site had owned over 1,000 hectares, which they farmed through tenants who paid up to two-thirds of their cereal harvest in rent. Yet land reform was just the first step in the new political agenda. Other elements were needed to support the evolution of the proposed collectivist agriculture.

Aggregation of Production

To create the second tier of the new rural system, Peasant Associations were encouraged to work toward the formation of cooperatives. The first step in this direction was the organization of Service Cooperatives. These interim organizations

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[24]For details of prerevolutionary agriculture, see Pankhurst 1966; Hoben 1973; Cohen and Weintraub 1975; Cohen, Goldsmith, and Mellor 1976b; Göricke 1979; and McCann 1987a.

[25]The organization of Peasant Associations in pastoral regions progressed more slowly than in settled areas. The Mengistu government was studying ways by which pastoralists might be brought more actively into the process of association, but little was achieved in that direction (Hodgson 1990).

[26]For details of the controversial villagization program, see Cohen and Isaksson 1987a, Luling 1987, Lirenso 1989, 1990, Walters 1989, and de Waal 1991.

were designed to sell farm inputs, provide storage and processing facilities, offer low-interest loans, and facilitate the sale of local produce (Cohen and Isaksson 1987a). A total of 3,600 cooperatives were serving 4.4 million households by the end of 1988 (IFAD 1989).

The next stage in cooperativization was the formation of Producer Cooperatives. These cooperatives pooled land, labor, and other resources in an attempt to capture economies of scale. One day of labor provided by members to communal fields was registered as one "point." The communal harvest was then divided according to the number of points held per household. In order to attract members, the cooperatives offered lower taxes, interest-free loans, and priority access to inputs and consumer goods. By 1988, almost 4,000 Producer Cooperatives had been founded, comprising 302,600 households (Walters 1989).

Although a number of analysts highlighted the potential for these organizations to serve as a basis for rapid gains in rural productivity, Producer Cooperatives were responsible for only 5.5 percent of national cereal production in 1988/89 (Cohen, Goldsmith, and Mellor 1976a; Griffin and Hay 1985; Gutu, Lambert, and Maxwell 1990). Empirical documentation of the effects on the poor of such associations is still lacking (Teka 1984; Pankhurst 1985; Desta 1990). It can be noted that at the survey locations, members of Producer Cooperatives did appear to benefit from these organizations: mean per capita income for members in 1988 (72 sample households) was roughly 30 percent higher than for nonmembers. However, it is not clear whether households that joined were somewhat wealthier than the average before joining or became so afterwards. This is a research issue, since descriptions of the procedures of cooperativization cannot in themselves shed light on the practical aspects of intracommunity redistribution of resources and income. Unfortunately, since many cooperatives are in the process of dissolution in 1992, the opportunity to undertake such studies in order to compare the Ethiopian experience with that of Tanzania and Zambia has been rapidly disappearing.

The third, and smallest, component of the farming system comprises state farms. Of an estimated 750,000 hectares of commercial farms functioning before 1974, 67,000 were converted into state farms that were operated (from 1979) by a new Ministry of State Farms (Cohen and Isaksson 1987b). The remaining portion was dismantled and used either for settling the landless or for assimilation into adjoining peasant associations. By 1989, state farms had grown to occupy a total area of 220,000 hectares (Walters 1989; Brüne 1990). However, despite large investments and running costs, these farms were responsible for only 4.2 percent of main season cereal production in 1988/89. This relative inefficiency has been widely criticized (Wörz 1989; Winer 1989; Rahmato 1990b).

Concentration of Investments

The third trend of the 1980s has been a concentration of investment in the provision of "green revolution"-type inputs to selected farmers in high-growth-potential regions and to state farms. The Mengistu government rejected pre-1974 strategies focusing resources on capital-intensive mechanized farming (Aredo 1990; Girgre 1991). For example, from 1968 to 1972 more than 76 percent of capital expenditure in agriculture (9 percent of total government spending) went to the commercial/export sector, compared with less than 13 percent for the smallholder sector (IFAD 1989). As a result, the Ten-Year Perspective Plan (1984-94) not only

raised agricultural expenditure to a (proposed) level of 30 percent but allocated 37 percent of this to the smallholder sector (IFAD 1989).

However, while this was an improvement for the smallholder sector, state farms were still receiving the major share of agricultural spending until 1990. Furthermore, not all small farmers benefit from the increased smallholder allocation. Although much pre-1985 investment attempted to improve basic infrastructure for input delivery nationwide (for example, the Minimum Package Projects—MPP I and II), the post-1985 period has been dominated by a plan to concentrate foreign exchange and skilled managerial inputs totaling US$85 million on a small proportion of farmers in high potential regions (the Peasant Agricultural Development Project [PADEP]). For example, the 1986-89 Public Investment Program selectively concentrates its expenditure (much of it related to PADEP) on only 181 "surplus-producing" districts throughout the country. Similarly, between 1987 and 1989, donors provided almost US$237 million for agriculture projects; one-third of the total was accounted for by PADEP, and very little of the remainder funded projects in drought-prone regions (IFAD 1989).

There has been some questioning of this approach, including criticism of the justifications used for PADEP: for example, reference to yield increases achieved by Ministry of Agriculture station trials rather than farm trials, and only a superficial analysis of the experience of the 1960s Chilalo Agricultural Development Unit (Kifle 1972; Koehn 1979; Gamaledinn 1987; IFAD 1989). Nevertheless, most donors support this initiative, and the principle of expanding output where potential is highest currently guides most project activities.

Impact of Pre-1990s Policy

Public commitment to improving the welfare of rural households by revitalizing Ethiopian agriculture served as the justification for major policy experiments during the 1970s and 1980s. Most of these were aimed at fundamentally changing the structure of productive relationships between land, labor, capital, and output. However, the effects of such policy changes on agricultural productivity in general, and on levels of food self-sufficiency in particular, have been limited.

While land reform and cooperativization brought smallholders into a new relationship with the state (and with each other), thereby supplanting the role of landowner and church, these measures did little to remove long-standing constraints to improved productivity (Brüne 1990). Thus, a significantly positive effect on output has not been observed. For example, the impact of land reform has been small because (1) quality of land and degree of land fragmentation were rarely considered, (2) area cultivated per capita has remained small, (3) redistribution was not supported by increased security of tenure, and (4) access to land is only one variable in the production function—access to oxen and inputs was largely unaffected by the reform.

The process of social and economic aggregation was intended to improve the economic basis of land use resulting from reform and redistribution. However, Peasant Associations, Service Cooperatives, and Producer Cooperatives rarely met their potential for stimulating rural growth. First, they were perceived as tools for enhanced state control of the rural environment. In the study areas, Service and Producer Cooperatives were widely perceived as giving preferential treatment to

party members. Second, these cooperatives suffered from a lack of resources (improved inputs and credit) to meet demand (Rahmato 1990b; Lycett 1992). Third, the price incentives necessary to raised productivity were lacking, thereby limiting any potential gains made possible by either land reform or cooperativization.

Thus there is a broad consensus that, while the structures of rural society and production that existed before 1974 required fundamental change, the policies pursued between 1975 and 1990 did not succeed in raising either national or household food security on a large scale (Goyder and Goyder 1988; Göricke 1989; 1990; Belete, Dillon, and Anderson 1991; Magrath 1991). The smallholder sector did not respond to the altered policy environment, largely because it could not—the root causes of poverty had not been removed, and with the mere stabilization of consumption levels, an important priority for a large proportion of households, few could raise a large marketable surplus. At the same time, the state farm sector, consuming the bulk of agricultural investment but returning less than 5 percent of total production, was far from reaching its goal of helping to alleviate the country's food problems (Wörz 1989; Rahmato 1990b).

Policy Reorientation of the 1990s

By 1990, the shortcomings of many previous policies were openly acknowledged. Following the arguments of a Soviet report released in 1985 (the so-called Sokolov report), a number of new strategy plans were elaborated in the late 1980s that sought to clarify the role of government in famine relief and long-term prevention, and the scope for a new focus on smallholder agriculture (GOSPLAN 1985). For example, in 1986, a national meeting was convened to discuss the causes and effects of the famine, and to establish an effective food strategy for the future. Recommendations from the workshop formed the basis for a 1987 draft National Food and Nutrition Strategy, which has since been reworked to reflect the changed policy circumstances of the 1990s. Actions associated with the development of this strategy include the creation of a Food and Nutrition Unit within the Ministry of Central Planning (which currently oversees a National Nutrition Surveillance system), increases in food producer prices (indexed to fertilizer prices), and preliminary moves toward liberalization of the grain marketing system (Belshaw 1990).

A parallel process of strategy formulation during 1989/90 provided a National Conservation Strategy and, most important, a National Disaster Prevention and Preparedness Strategy (DPPS). Aspects of both documents have been absorbed into mainstream planning, including the now-suspended Five-Year Plan for 1990-95, and annual target plans. However, the principal components of the DPPS, in particular, deserve to be highlighted here. They comprise commitments toward (1) emergency legislation designed to delegate responsibilities and speed up responses to crises; (2) institution-building, that is, a strengthening of the planning and response capacities of relevant government organizations; (3) investment in enhanced information systems (which will guide the appropriate crisis response); and (4) preparation of interventions to enhance institutional readiness for action. The fifth component is a commitment to a streamlined integration of the first four initiatives with longer-term development programming (ONCCP 1989).

The increasing convergence of opinion expressed in such documents on the causes of low agricultural productivity and related food security needs was highlighted by the major policy reorientation announced in March 1990. Termed a "new economic policy," a package of reforms was proposed that brought together many of the elements suggested in the various strategy papers. Key policy changes proposed included (1) a move toward private tenure (in perpetuity) of land and trees for smallholders, (2) legalization of labor hiring for private production (and, hence, of a free rural labor market), (3) removal of the control stations that formerly regulated the movement of grain across provincial borders, (4) abolition of quotas requiring the sale of grain to the Agricultural Marketing Corporation at fixed prices, (5) creation of an effective cereal buffer stock (with a transfer of responsibility for such a stock from the Relief and Rehabilitation Commission to the Agricultural Marketing Corporation), (6) permission for Producer Cooperatives to dissolve themselves, (7) removal of constraints to private trade in manufactured goods, (8) removal of restrictions on private investment (venture capital is now encouraged in all sectors of the economy), and (9) denationalization of uncompetitive enterprises (Belshaw 1990; Baker 1990; IGADD 1990; Pausewang et al. 1990).

These reform proposals signaled a concern with the structural problems of low land and labor productivity, and associated poverty and famine vulnerability. But they came too late to forestall a major change of government in May 1991. This change initiated a far-reaching debate about the policy requirements of subsequent democratically elected authorities. Several opposed views have emerged, generally polarized around one camp arguing for a fully privatized, market-driven economy versus another camp that proposes a modified, but continued, role for the public sector (particularly in the realm of control over land and the provision of social services) within an economically liberalized (though somewhat regulated) economy (Pausewang 1990; Richburg 1992). On the other hand, there appears to be general agreement in three areas: namely, the need for (1) more secure, individual, tenure rights; (2) a refocusing of investment on the smallholder sector, and (3) a fully implemented political, as well as economic, liberalization of the rural environment (Manyazewal 1992). These are the same three issues that dominated debate in the 1970s on how to overcome structural causes of low agricultural productivity inherited from the imperial era (Bondestam 1974; Koehn 1979; Cohen, Goldsmith, and Mellor 1976b; Brüne 1990).

The debate continues—in itself a positive development over conditions before 1991 (Webb, Zegeye, and Pandya-Lorch 1992). However, the debate takes place in the context of renewed famine. While the change of government and the cessation of civil war have removed many problems (such as the fear of conscription, and military disruption) and increased the potential for rural investment, the poor remain in a state of high vulnerability to famine, still affected by chronically deficient market infrastructure and fluctuating food prices. It is the relationship between these two factors and food availability that forms the basis of the next chapter.

6

PRICES AND MARKETS DURING FAMINE

Closely associated with the agricultural policies focused on raising farm output outlined in the last chapter were policies specifically focused on capitalizing on the marketed surplus expected to result from increased household productivity. These policies centered around tight control of marketing and distribution systems, and on price control.

It is crucial for policymakers to have a comprehensive understanding of market and price behavior during food crises. Knowledge of production-consumption relationships provides a key input into policies on interregional food distribution, stockholding/drawdown, and imports. It also provides insights into the question of the relative merit of "free" versus "state-guided" market operation during famine. The latter remains a crucial and still much-debated policy issue in many famine-prone countries. It was a common debate during the nineteenth-century famines in Ireland and India as well as in the context of this century's famines in Asia (Sen 1981; Ravallion 1987a; Drèze and Sen 1990). Yet the literature on market behavior during famines in Africa remains limited compared with related work in Asia.

In an environment of well-integrated markets (for food, labor, and capital), a local food production failure results in interregional adjustments in produce and factor flows. Food prices increase and real wages decline everywhere, not only in the affected region—a distribution of scarcity via price effects. Also, the real price of capital (for example, tradable assets) declines, but the extent of the decline depends on local insurance mechanisms, including private stockholding and expectations regarding public response. The affected region might face a (temporary) labor and capital outflow, but changes in food prices would be substantial only in regions having to switch from being net exporters to net importers. This occurs mostly in areas poorly connected to other markets, thus facing high transactions costs.

While long-term adjustments in food and factor markets aimed at mitigating food shortages do occur, time is a key factor if food shortages are to be prevented from triggering a famine. As discussed earlier, a sudden collapse of purchasing power—in the context of production failure and a parallel decline in employment opportunities—may not force sharp price rises in an affected region, because of a fall in effective demand. In the case of a region or country suffering from consecutive famines—such as Ethiopia—the potential for "relying on the market" to mitigate famine becomes increasingly limited because the asset base of most households is eroded. In such circumstances, actual need is little reflected in price changes because effective demand is lacking. Thus, food prices alone can neither send appropriate signals to private traders nor be the guiding yardstick for public intervention. In such circumstances, price data lose some of their "predictive" value to famine early warning.

With this cautioning remark, a review of Ethiopia's market integration and food price developments is begun with the hypothesis that interregional market exchange

during famine years was impaired not only by basic infrastructure deficiencies but also by government trade restrictions. In this context, the coexistence of famine in one region of the country and a reasonable supply-demand balance in another may be expected.

The following assessment covers the 1970s, 1980s, and early 1990s, with their respective famines, and focuses on connection and integration of markets at two levels of the food-distribution system: a central market versus regional markets, and regional markets versus local markets. After an overview of major government interventions in the marketplace since 1974 and a discussion of the problem of underdeveloped transport infrastructure, short-term seasonal adjustments and long-term deseasonalized intermarket relationships will be examined.

Policy Restrictions on the Market

Before 1975, government intervention in food markets was minimal. The Ethiopian Grain Corporation had been established in 1960 as a public corporation with a view to maximizing the export of high-quality grains, but by 1975 it commanded only 5 percent of the market share of the grain trade (Lirenso 1983; Holmberg 1977). The end of share tenancy in 1975, however, had an immediate effect on the cereal market. Relieved of the long-established obligation of paying rents and tributes to landlords, smallholders apparently consumed more of their production, causing the share of marketed surplus to fall. It is estimated that by 1977/78 it had dropped to around 11 percent of production (Ghose 1985). This decline in the quantity of grain made available to the market caused urban consumer prices to rise. Between 1974 and 1979, the price index for teff (taking 1967 as the base year) rose from 105 to 237. The rise for wheat was even more marked, rising from 117 in 1974 to 360 in 1979.

The government's first response to rising urban prices was to establish the Agricultural Marketing Corporation in 1976. This agency absorbed the functions of the Ethiopian Grain Corporation and began operations with a special focus on grain procurement for public distribution and on cereal price stabilization. Grain supplies for the towns and the army were secured via a quota system. In the late 1970s, Peasant Associations were obliged to deliver a minimum of 10,000 kilograms of their annual produce to the Agricultural Marketing Corporation at fixed prices. In 1981, this quota was raised to 15,000 kilograms, without a concomitant increase in producer prices.

Wholesale grain prices were centrally fixed for many of the provincial markets by the end of 1976, establishing an official producer pricing structure that remained essentially unchanged until the late 1980s (except for a 2.2 percent increase in the price of teff and sorghum in 1982/83 and further increases of 7-10 percent in 1988). Table 22 compares the price levels for 1985/86 and 1988, by crop. This table shows that although Agricultural Marketing Corporation farmgate prices were generally fixed for the country as a whole, they were (1) substantially lower than market prices in both Wollo (a deficit region) and Gojjam (a surplus region), and (2) the price differences varied by region (the gap generally being narrower in surplus regions). Both points imply that households in deficit (drought-prone) regions felt the effects of procurement relatively more than did those in surplus regions. As a result, several authors lay a large blame on the quota system for famine causation (Luling 1987; Winer 1989).

Table 22—Comparison of Agricultural Marketing Corporation (AMC) prices to mean nominal retail prices, Gojjam and Wollo, July 1985-June 1986 and January 1988

Crop	AMC Farmgate Price		Mean Retail Price			
			Gojjam		Wollo	
	July 1985-June 1986	January 1988	July 1985-June 1986	January 1988	July 1985-June 1986	January 1988
	(birr/100 kilograms)[a]					
Barley	28	30	61	56	106	68
Sorghum	23	25	55	44	118	85
Teff	45	48	77	72	157	129
Wheat	34	36	79	69	118	88

Source: Ethiopia, Ministry of Agriculture, Cost Data Base: Preliminary Output (Project Formulation Department, Addis Ababa, 1988, mimeographed); Ethiopia, Central Statistics Authority, Statistical Bulletin No. 57 (Addis Ababa, 1988); and Simon Maxwell, *Food Aid in Ethiopia: Disincentive Effects and Commercial Displacement*, IDS Discussion Paper 226 (Brighton, U.K.: Institute of Development Studies, 1986), 48.

[a]US$1.00 = 2.05 Ethiopian birr. The average wage rate for manual labor during these years ranged from 1.5 birr to 3.0 birr per day.

The greater burden on households in drought-prone regions may have been true in relative terms, but certain exceptions to the generalization deserve to be made. For example, while it is often argued that "all farmers, regardless of the size of their harvest, had to meet their quota" (de Waal 1991), this was not found to be the case at the survey locations. In 1988/89, only 18 percent of the sample households sold any of their harvest to the Agricultural Marketing Corporation, and the average quota delivered was only 2.7 kilograms per capita. This represented just 3 percent of harvest, or less than one day's work on a food-for-work scheme (see Chapter 7). Indeed, roughly 51 percent of the sample households had never paid any quota at all since the procurement program began. Of those that did pay, there was a clear wealth bias in quota allocation. For example, in 1988/89, households in the poorest income tercile paid an average of 0.1 kilogram per capita to the marketing corporation versus an average of 7.1 kilograms per capita paid by households in the richest tercile. This evidence of careful quota allocation at a household level does not discount the likelihood that some farmers have been forced to sell their stores or even purchase grain on the market in order to meet their obligations (Chole 1990; de Waal 1991). However, it does highlight the fact that quota-setting, as well as actual procurement, varied considerably in time and place.

It should also be pointed out that state farms played a role in supplying grain to the Agricultural Marketing Corporation. Since 1978, when quotas began, they have provided over 50 percent of total quota requirements for wheat and maize.[27] What is more, shares of total grain procurement between smallholders and the marketing corporation shifted during the crisis year of 1984/85. While total procurement was down by almost 50 percent from the preceding year, the share derived from small-

[27]State farms also supply 86 percent of cotton lint requirements and all of the country's cottonseed requirements (Wörz 1989).

holders dropped by 19 percent, made up in part by a parallel increase in grain procured from state farms (and partly by imports). This procurement response to shortfalls in the peasant sector was rational. Given the logistical and infrastructural difficulties of moving grain out of rural areas to feed urban populations, only to have huge quantities of grain moved back to rural areas suffering a food deficit, the short-term replacement of quotas with imports to feed the urban hungry appears cost-effective. This instrument could have been pursued further as an active institutional response to food crises. Of course, this would necessarily have made food aid more "urban biased." But its indirect role of relieving rural populations of their quota burdens during times of hardship could have been beneficial.

Acting in tandem with the quota system (which permitted farmers to sell grain on the open market after procurement obligations had been met) was a policy that required licensed private grain traders to make at least 50 percent of their purchases available to the Agricultural Marketing Corporation, also at fixed prices. In the high-production regions, this requirement covered 100 percent of all privately purchased grain. The most important regions in this respect in 1986/87 were Shewa (which provided 31 percent of all cereal procurements at a national level), Gojjam (28 percent), and Arssi (20 percent) (Ethiopia, Central Statistics Authority 1987b). Private traders were paid 5 birr per 100 kilograms above the official farmgate purchase price. However, traders failing to fulfil their quota to the marketing corporation lost their license.

In order to tightly control the operation of private traders, interregional trade of cereals (and even the movement of labor) was strictly regulated. In 1973, an estimated 90 percent of marketed grain was handled by some 20,000-30,000 private merchants (Holmberg 1977). However, between 1976 and 1980, the spreading influence of the Agricultural Marketing Corporation was paralleled by the declining influence of traders, constrained by legal prohibitions on many small-scale commercial activities. Aside from the requirement of certified licenses (of which only 5,000 were issued in 1986), roadblocks were erected at the entrances to all towns and large villages, aimed at controlling (and taxing) grain and population movements (de Waal 1991). Individual farmers were normally permitted to move 100 kilograms of grain through roadblocks as long as this did not involve crossing major administrative (provincial) boundaries.

However, even transport restrictions within provinces were not applied everywhere with equal vigor. An example of the impact of policy restrictions during 1985/86 relates to UNICEF's cash-for-food program.[28] Based on the distribution of cash rather than food to famine victims, this program assumed that in certain areas it was a lack of purchasing power, rather than a lack of food per se, that was causing hardship. It was therefore expected that recipients of cash would tap distant regional markets where food could still be obtained at a reasonable price. At one site where this was tried, farmers traveled up to 100 kilometers to purchase grain, only to have it confiscated on the way home and to be accused of illegal trading. Even traveling at night and off the roads, it was difficult to escape the militia enforcing this trade policy. As a result, most recipients were forced to stay home and to contend with local inflationary effects of the cash transfer scheme. A survey subsequently found out that

[28]For more details, see Chapter 7.

due to these difficulties, 77 percent of the cash recipients would have preferred to be given food aid rather than cash (Webb 1989b). This provides a clear example of an instance when policy change relating to market function was at least as essential as policy change relating to grain prices alone.

At another more remote site where fewer militia were operating, 83 percent of cash recipients interviewed were glad to have received cash rather than food, since transportation of food to their distant location would certainly have entailed delays and more hardship. Thus, if market integration is poor, the effects of a crisis on local prices, or indeed on a relief intervention, may be quite different from one place to the next, making the task of price monitoring at more aggregate levels very difficult.

Infrastructure Constraints

Policy restrictions were not the only constraint to efficient market operations. A lack of adequate infrastructure also hindered market integration and a more equal sharing of scarcity or surpluses between localities. The dearth of rural infrastructure in Ethiopia has been widely commented upon (Iliffe 1987; Goyder and Goyder 1988; James 1989; WFP 1990). For example, Ethiopia has only 90 centimeters of road (all categories) per capita, compared with 930 centimeters per capita in Zimbabwe and 1,230 centimeters in Botswana (von Braun, Teklu, and Webb 1991). And within Ethiopia there remain wide disparities in coverage. The highest density of road coverage is found in the central and western grain-producing regions. Shewa has 3.14 kilometers of road per square kilometer, while Bale has only 0.11 kilometer per square kilometer (IFAD 1989). Thus, almost 90 percent of the country's population still lives more than 48 hours' walk from a primary road (WFP 1989). In Wollo, it is estimated that only 2 percent of the region's villages can be reached by all-weather road, making the movement of food to remote markets extremely difficult (OXFAM 1984).

It should also be pointed out that the national road system traces a radial pattern with Addis Ababa as the hub and spokes leading to individual regions. The network connecting different regions, independently of Addis, is very underdeveloped. The role of such infrastructure deficiencies for market segmentation is addressed implicitly through more refined analysis below.

Price Developments and Their Relationship to Food Crises

An evaluation of cereal price developments during the 1980s shows a dramatic increase in both the nominal and real price (deflated price) of cereals in response to the production failure years of 1984/85 and 1987/88.[29] The national price index for

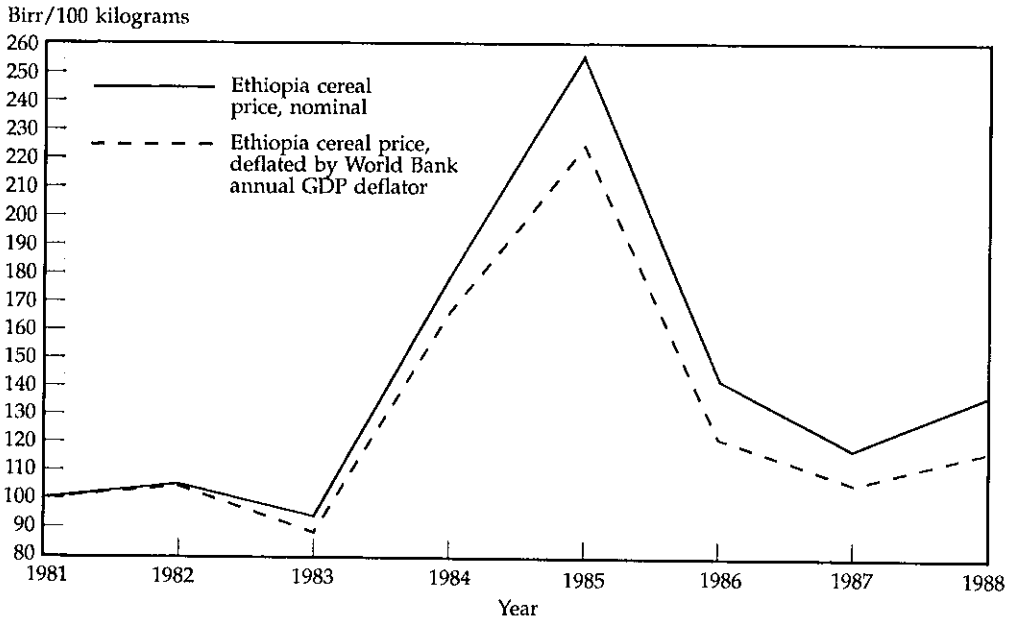
[29]There are limited (consistent) data available on the functioning of regional and local markets before, during, and after severe food crises. This section is therefore a preliminary evaluation of price developments in Ethiopia based on information that is currently available and is mainly focused on the 1980s and, in some cases, the early 1990s. Collaboration of the Relief and Rehabilitation Commission, the Central Statistics Authority, and the Tulane/Pragma Group's Famine Early Warning System is gratefully acknowledged.

cereals, computed as the weighted average across all provinces, increased from 100 in 1981 to over 220 in 1985 (Figure 12; Table 23). It rose again, though not nearly so sharply, during 1988.

While the price formation process is very complex and in principle requires a simultaneous consideration of supply and demand sides of the equation (as well as all the elements that determine conditions on both sides), it is worthwhile, given present data limitations, to pursue a simpler approach to explaining price flexibility against the effects of supply fluctuations under the prevailing trade, aid, and stockholding regime. The simple model used disregards demand changes and hypothesizes that the real price index of cereals is a function of supply changes (that is, of domestic cereal production in the same year, and of the previous year's ending food stocks).

The results of this simple regression computation suggest that a 10 percent decline in production resulted in a 14 percent increase in price (Figure 13). A comparable price response of 15 percent was computed for Sudan (Teklu, von Braun, and Zaki 1991). At a national level, therefore, a similar link between production and prices can be established, given past and current trade and stocking policies of these two countries. Policy changes regarding trade, aid, and agricultural inputs can change the relationship.

Figure 12—Cereal price index for Ethiopia, 1981-88



Source: IFPRI computations based on data from Relief and Rehabilitation Commission.
Notes: The overall Ethiopia cereals price index is a weighted sum of prices for all 14 administrative regions. The regional prices are themselves weighted according to the relative production shares of individual cereals in each region. US$1.00 = 2.05 Ethiopian birr.

Table 23—Regional cereals price index, 1981-88

Year	Arssi	Gojjam	Hararghe	Shewa	Sidamo	Wollo	Ethiopia, Total Cereal Price[a]
				(birr/kilogram)[b]			
1981	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1982	87.31	121.23	83.32	102.93	104.85	107.38	103.31
1983	79.98	105.33	57.63	86.53	84.14	102.62	88.89
1984	171.89	154.08	151.37	157.10	147.27	223.02	167.16
1985	197.64	223.75	161.41	230.34	167.82	291.30	224.10
1986	104.72	158.35	98.40	123.19	95.76	105.39	121.21
1987	87.17	149.94	70.35	104.91	77.33	97.05	105.56
1988	111.92	138.47	97.04	112.40	109.03	122.95	117.35

Sources: Computed by the authors based on a data set compiled from Ethiopia, Central Statistics Authority, *Statistical Abstracts of Ethiopia* (Addis Ababa: CSA, various dates); Central Statistics Authority, *Average Producer Price of Agricultural Commodities in Rural Areas by Region*, Statistical Bulletin 65, 1988; and Relief and Rehabilitation Commission data tapes printout.

Note: Prices were deflated using World Bank annual GDP deflator; 1981 = 100.

[a]Weighted average price.

[b]US$1.00 = 2.05 Ethiopian birr.

Figure 13—Regression model estimating effect of cereal production and stock level on cereal price index

$$\text{Price index} = 1.111.70125 - \underset{(-4.236)}{11.15640}\ \text{PCPDX} + \underset{(3.668)}{0.0306}\ (\text{PCPDX})^2 - \underset{(-1.166)}{0.78023}\ \text{Stock}_t$$

R^2 = 0.74
F = 18.19
N = 23
Price index = Cereal price index for Ethiopia
PCPDX = Per capita cereals production (kilograms per year)
Stock_{t-1} = Per capita change in stocks (food aid plus commercial imports) at year t−1 (kilograms per year)

Means
PCPDX = 164.014
Price index = 130.244
Stock_{t-1} = 0.042

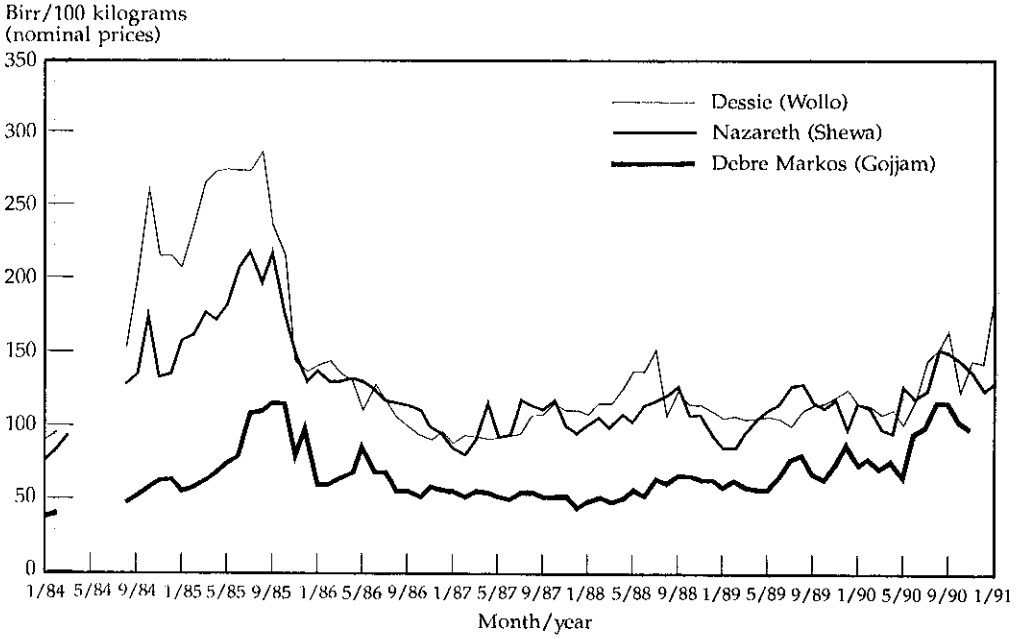
Elasticities with respect to
10 percent drop in per capita production = 14.09
30 percent drop in per capita production = 42.27

However, the price increases observed for Ethiopia as a whole were not felt uniformly across the country. Figure 14 shows that in Dessie (the capital of food-deficit Wollo), the nominal price of teff between 1984 and 1989 was generally more than 100 percent higher than in Debre Markos (the capital market of Gojjam), a surplus-producing region enjoying stable production. During the 1984/85 famine, the Dessie price reached three times that of the Debre Markos price.

While the picture is more mixed for wheat and sorghum, similar differences in absolute prices are observed between the regions (Figures 15 and 16). On the one hand, crop prices are consistently higher in Dessie than in Debre Markos, with the price gap increasing during the major crises of 1984/85 and 1988. On the other hand, the Dessie price is lower than that of Nazareth (used here as the major market center of Shewa), except during times of crisis, when the Dessie price leaps temporarily above that of Nazareth.

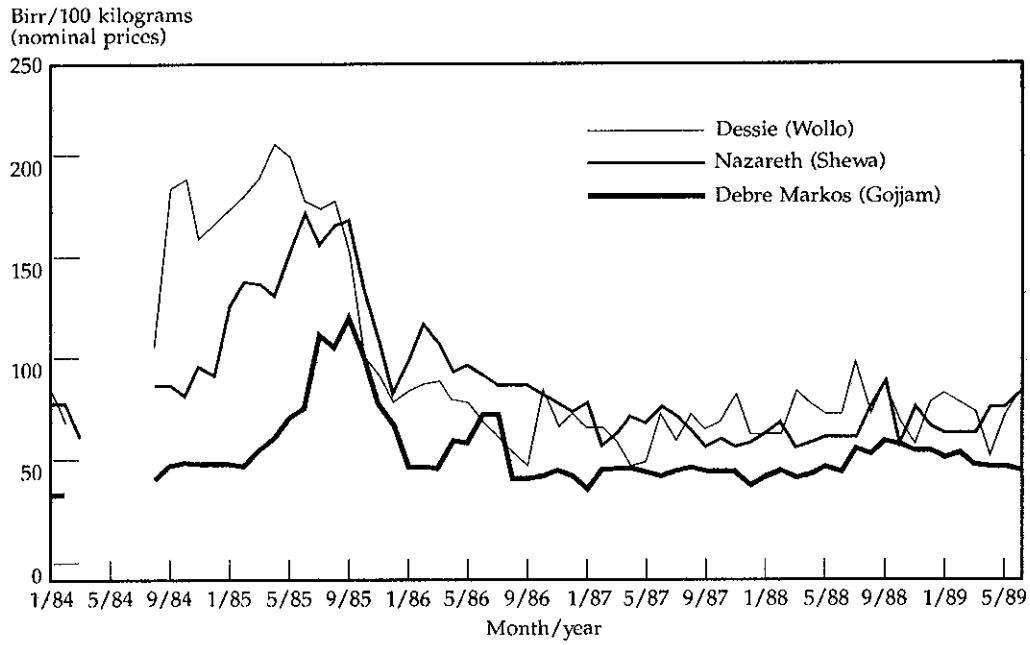
There were consistent differences in absolute price levels for the major cereals within regions. Figure 17 shows that in Wollo the cheaper, more inferior cereal (sorghum) mirrors price movements of the more expensive cereal (teff), but at a much lower level. Sorghum came near the teff price only in early 1985, as demand for cheaper grain rose with declining income. In Debre Markos (Figure 18), demand for sorghum (usually relatively low in teff-surplus Gojjam) was so great that the sorghum

Figure 14—Market price of teff in the regional capitals of Gojjam, Shewa, and Wollo, 1984-91



Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

Figure 15—Market price of wheat in the regional capitals of Gojjam, Shewa, and Wollo, 1984-89



Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

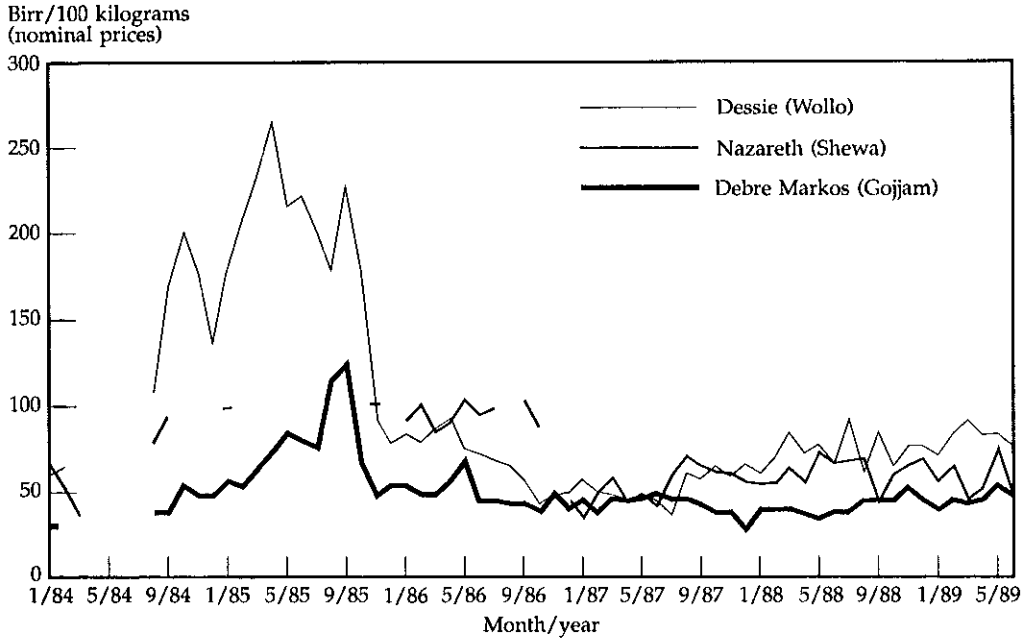
price exceeded that of teff during August and September of 1985. Similar patterns are observed for all major cereal-producing regions of the country.

Nevertheless, while absolute price levels were usually different between regions, the general pattern of price movements during the crises of 1984/85 and 1988 was similar in all regions. Some marked differences appear, however, in the 1984/85 crisis. Sorghum prices reached their peak in Dessie five months before they peaked in Debre Markos (Figure 16). The same lag applied for wheat (Figure 15). This time difference indicates that the transmission of price signals is not fully efficient, even between neighboring regions—a gap that is probably explained by the policy and infrastructure restrictions outlined above.

Measures of Market Integration

Market relationships are frequently tested by simple correlations. As a first step, a complete correlation matrix of regional aggregate cereal prices is presented (Table 24). The result shows that the great majority of markets correlate very closely with each other, even if quite distant from each other. In only 27 out of the total of 91 correlations is the coefficient less than 0.65 and in only 3 cases are the coefficients not highly significant.

Figure 16—Market price of sorghum in the regional capitals of Gojjam, Shewa, and Wollo, 1984-89



Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

Thus, are markets highly integrated? This cannot be concluded from the simple correlations. If drought hit everywhere at once, one would observe a high correlation of prices even if markets were not integrated. Other factors may very well be at play, which may lead to market correlation without market integration. Still, it is noteworthy that prices did move largely up and down together in the various regions of Ethiopia despite (or because of?) heavy government interference in cereal markets and despite poor infrastructure.

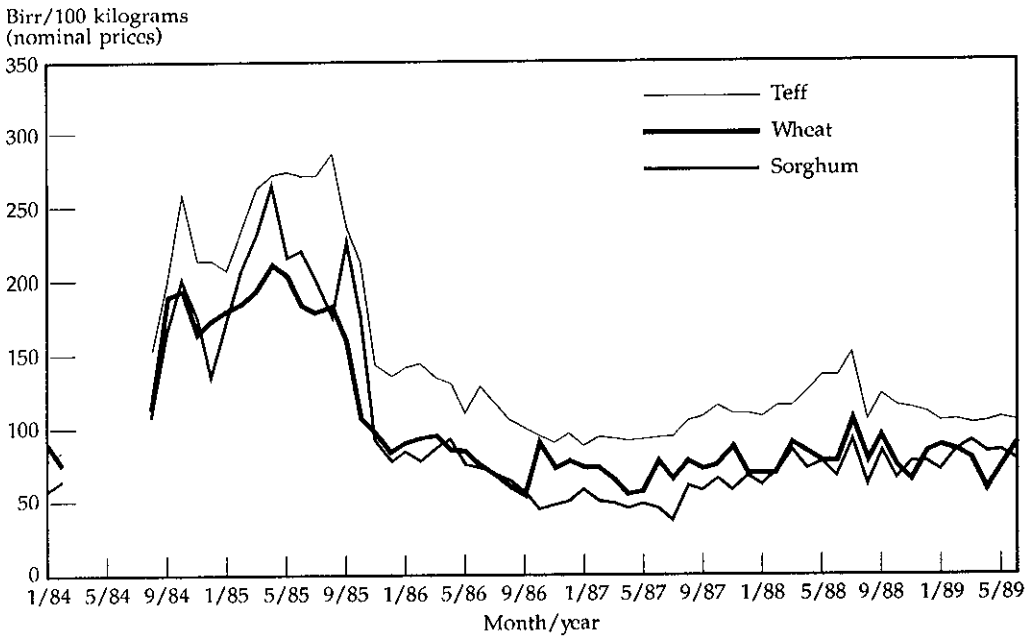
One may derive a measure of the degree of integration (or lack thereof) between markets by using a statistical model. Following Ravallion (1986), an econometric model of spatial price differentials will depend in part on assumptions about spatial market structure. A central market price (P_1) is influenced by various local market prices (P_i) (and their levels), while local prices are a function of central market prices, and both are influenced by a set of other influences (X_i), thus

$$P_1 = f_1 (P_2, P_3, \ldots, P_N, X_1), \text{ and} \quad (1)$$

$$P_i = f_i (P_1, X_i) \; (i = 2, \ldots, N). \quad (2)$$

This model seems suitable for a "radial" configuration of markets in which local markets are directly linked with the central market. However, the radial model may

Figure 17—Main market price of three grains in Dessie (Wollo), 1984-89



Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

still be valid if some of the local markets are linked only indirectly to the central market (in sequential fashion). Such is the more complex reality of system connections in a large and poorly integrated market like that of Ethiopia.[30] The main purpose of the following analysis is to test the applicability of this model of central-local market integration (or the lack thereof) in the Ethiopian context.

The (dynamic) econometric analysis derived from the above (static) concept in equation (3) postulates that changes in local market prices are driven by changes in the spatial margin between local and central markets, by changes in the temporal margin in the central market, by price levels in the central market, and by local seasonality (X).

$$P_{it} - P_{it-1} = (\alpha_i - 1)(P_{it-1} - P_{1t-1}) + \beta_{io}(P_{1t} - P_{1t-1}) + (\alpha_i + \beta_{io} + \beta_{i1} - 1)\, P_{1t-1} + \gamma_i X_i + \mu_{it}, \quad (3)$$

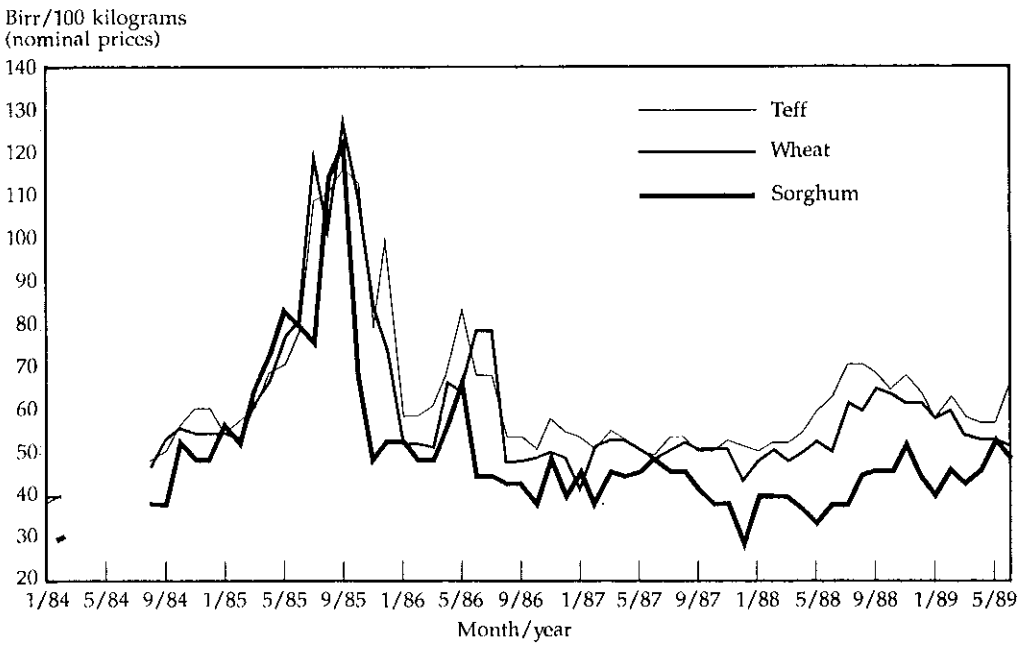
where

P_{it} = local market price at time t,

P_{1t} = central market price at time t,

[30]See Loveridge 1988 for an alternative approach applied to Rwanda.

Figure 18—Main market price of three grains in Debre Markos (Gojjam), 1984-89



Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

α_i = measures the effect of lagged local market price on current local price,

β_{io} = measures the proportional change in local price caused by a change in temporal margin of a reference market,

β_{i1} = measures the influence of reference market price level on local price level,

γ_i = measures the proportional contribution of factors specific to local price changes, and

μ_{it} = error term.

By deseasonalizing a series of local monthly prices (August 1984 - October 1989)—thereby eliminating X_i—and transforming the above equation (3), one ends up with the following model:[31]

$$P_{it} = \alpha_i P_{it-1} + \beta_{io}(P_{1t} - P_{1t-1}) + \beta_{i1} P_{1t-1} + \mu_{it}. \quad (4)$$

[31]For a comparable approach applied to Sudan, see Teklu, von Braun, and Zaki 1991.

Table 24— Correlation matrix of deseasonalized cereal price indices of major regional markets in Ethiopia, 1984-89

Province/ Market	Nazareth	Assela	Goba	Debre Markos	Gondar	Arba Minch	Harer	Dire Dawa	Gore	Jimma	Awassa	Yir-galem	Ne-kempte	Dessie
Shewa (Nazareth)	...	.9219	.8456	.8377	.7682	.7237	.9234	.8897	.4983[a]	.3511[a]	.9044	.8890	.8083	.8801
Arssi (Assela)	...	...	.7923	.9021	.7897	.6968	.8605	.8790	.4562[a]	.5260[a]	.9133	.9269	.7609	.8840
Bale (Goba)	...	...	...	.7272	.6640	.7915	.8365	.7543	.6112[a]	.2636[a]	.8099	.8335	.8844	.8821
Gojjam (Debre Markos)	...	...	...	...	.7364	.6343[a]	.7991	.7354	.4630[a]	.5452[a]	.8332	.8540	.7597	.7478
Gondar (Gondar)	...	...	...	...	...	.5267[a]	.6149[a]	.7972	.0655[a,b]	.1190[a,b]	.7610	.7377	.5951[a]	.8038
Gamo Gofa (Arba Minch)	...	...	...	...	...	...	.7691	.7240	.6780	.4002[a]	.8137	.8247	.7554	.7104
Hararghe (Harer)	...	...	...	...	...	...	...	.8646	.6229[a]	.4447[a]	.9064	.9051	.8014	.8200
Hararghe (Dire Dawa)	...	...	...	...	...	...	...	...	.3668[a]	.3497[a]	.9261	.9105	.6942	.8702
Illubabor (Gore)	...	...	...	...	...	...	...	...	...	.5283[a]	.5323[a]	.5832[a]	.6628	.3887[a]
Keffa (Jimma)	...	...	...	...	...	...	...	...	...	...	.4660[a]	.5435[a]	.3312[a]	.1937[a,b]
Sidamo (Awassa)	...	...	...	...	...	...	...	...	...	...	...	.9705	.8080	.8643
Sidamo (Yirgalem)	...	...	...	...	...	...	...	...	...	...	...	...	.8309	.8580
Wollega (Nekempte)	...	...	...	...	...	...	...	...	...	...	...	...	...	.7974
Wollo (Dessie)	...	...	...	...	...	...	...	...	...	...	...	...	...	...

Note: The time series covers monthly prices for 1984-89 (70 observations for each market). The series was deseasonalized in order to eliminate short-term fluctuations or seasonal factors from the longer-term trend. This was achieved using a multiplicative technique option of Micro-TSP for running 12-month moving averages.

[a]Correlation below .65.

[b]Not significant at the 1 percent level.

The analysis was conducted for 12 of the most important provincial markets compared against a central reference market, that of Nazareth in Shewa. While Nazareth may not be the single most dominant central market for Ethiopia as a whole, its proximity to Addis Ababa and its location on the main Addis-Assab road allow its use here as an approximation of a central market situation. Indeed, given the extent of public intervention into the Addis Ababa food market and the dual price structures prevailing during the time of observation, price formation at Nazareth may actually be a more accurate reflection of a central market situation.

The analysis is performed for three commodities separately: teff, maize, and an aggregate of cereals, where the latter is represented by an unweighted compounded price index for major cereals by region (where applicable, maize, teff, wheat, sorghum, and barley).

The model analysis of market integration sheds light on past relationships between markets (Table 25):

- β_{io} in equation (4) may reflect market segmentation when it is insignificant, thus price changes observed in the past month at the central market—controlling for central market price level (P_{1t-1})—are not reflected in current regional prices. This is found for 6 of the 13 markets in the analysis for the aggregate of cereals price index (Table 25). These 6 markets most segmented in relation to the central point (low t-statistics of parameter β_{io}) are Arba Minch, Gore, Jimma, Yirgalem, Nekempte, and Gondar. The apparently significantly well integrated markets (significant parameter estimates of β_{io} *and* parameter levels above 0.27) are Assela, Goba, Debre Markos, Dire Dawa, and Awassa. The road distance of the first group of markets—the segmented ones—from the central market ranges from 264 to 700 kilometers (average of 461 kilometers), whereas it is between 76 and 357 kilometers for the second group (average of 253 kilometers). Of course, distance does not alone influence communication flow between markets. Nevertheless, a substantial number of regional markets appear to respond according to price changes in the central market.
- The ratio between the regional market parameter (α_i) and the central market parameter (β_{i1}) can be interpreted as a more general index of market connection (IMC) (Timmer 1974). An IMC greater than 1 indicates poor connection across markets, with past local price developments dominating the current price situation. When the IMC is less than 1, central market price developments seem to dominate. Following these criteria, a strong market connection is found only between Nazareth and Assela (for teff and maize), and between Nazareth and Awassa for teff (Table 25).

Taking the analysis to the regional level, market integration was tested for five rural markets in Wollo in relation to price movements of sorghum and teff in the provincial capital of Dessie. Table 26 shows that there are low beta coefficients for all markets (except between Dessie and its close neighbor Bati), suggesting that the rural markets have a weak long-term integration with the principal regional market of Dessie. However, markets also appear segmented in the short-term. This is suggested by the IMC ratios greater than 1 in all cases except between Dessie and Bati for teff, and between Dessie and Woreilu for sorghum. In other words, information and goods do get from Dessie to rural markets, but not freely.

These examples of market disfunction (infrastructure- and policy-related) suggest that the monitoring of prices in one major market alone may not adequately

Table 25—Results of market integration model analysis

Province/ Market	Distance to Nazareth Reference Market	All Cereals Price Index			Teff Price Index			Maize Price Index		
		α_i [a]	β_{io} [b]	IMC[c]	α_i [a]	β_{io} [b]	IMC[c]	α_i [a]	β_{io} [b]	IMC[c]
	(kilometers)									
Arssi	76	0.422	0.626		0.352	0.481		0.263	0.112	
(Assela)		(3.423)	(4.057)	0.778	(2.899)	(4.789)	0.723	(2.080)	(1.084)	0.76
Bale	272	0.822	0.282		0.874	0.124		0.636	0.176	
(Goba)		(8.879)	(2.506)	>1	(8.99)	(0.764)	>1	(5.438)	(1.352)	>1
Gojjam	337	0.624	0.482		0.589	-0.0003		0.586	0.276	
(Debre Markos)		(6.612)	(2.897)	>1	(6.574)	(-0.003)	>1	(5.657)	(3.936)	>1
Gondar	700	0.689	0.385		0.768	0.342		0.687	0.0835	
(Gondar)		(7.461)	(1.906)	>1	(9.657)	(3.643)	>1	(6.414)	(0.904)	>1
Gamo Gofa	431	0.7009	0.0938		0.706	0.338		0.671	0.007	
(Arba Minch)		(7.463)	(1.278)	>1	(8.025)	(3.245)	>1	(6.271)	(.077)	>1
Hararghe	405	0.667	0.228		0.544	0.234		0.601	0.312	
(Harer)		(7.604)	(3.754)	>1	(7.017)	(1.841)	>1	(5.279)	(2.945)	>1
Hararghe	357	0.6181	0.278		0.620	-0.0838		0.585	0.211	
(Dire Dawa)		(5.405)	(2.501)	>1	(7.070)	(-0.596)	>1	(4.849)	(1.351)	>1
Illubabor	634	0.877	-0.0002		0.843	0.248		0.696	0.057	
(Gore)		(13.034)	(-0.002)	>1	(10.749)	(1.608)	>1	(6.564)	(0.677)	>1
Keffa	357	0.759	0.196		0.663	0.0354		0.772	0.065	
(Jimma)		(8.861)	(1.228)	>1	(6.645)	(0.143)	>1	(9.288)	(0.581)	>1
Sidamo	222	0.573	0.348		0.429	0.388		0.667	0.134	
(Awassa)		(5.194)	(2.463)	>1	(3.960)	(3.476)	0.82	(6.021)	(1.398)	>1
Sidamo	264	0.718	0.189		0.683	0.219		0.619	0.063	
(Yirgalem)		(6.975)	(1.514)	>1	(6.890)	(2.479)	>1	(5.121)	(0.631)	>1
Wollega	394	0.642	0.269		0.580	0.221		0.773	0.110	
(Nekempte)		(5.338)	(1.736)	>1	(5.520)	(1.429)	>1	(6.630)	(0.826)	>1
Wollo	500	0.981	0.275		0.641	0.799		0.988	0.170	
(Dessie)		(13.388)	(2.345)	[d]	(5.520)	(3.310)	>1	(17.50)	(1.410)	[d]

Note: t-statistics are presented in parentheses.

[a] α_i measures the effect of lagged local market price on the current local price.

[b] β_{io} measures the change in local price caused by a change in the temporal margin of a reference market.

[c] IMC = index of market connection.

[d] Negative, insignificant.

reflect price movements in other parts of the region that have little access to that central market. It may therefore be important for famine early warning systems to consider not only prices in principal regional markets, such as Dessie or Harer, but also prices in secondary market centers. For example, in his analysis of the 1973/74 famine in Wollo, Sen (1981) examined price data from Dessie (the provincial capital). Discovering little evidence of price increases, he concluded that there was no shortage of food at that time, only a shortage of purchasing power:

> "The Ethiopian famine took place with no abnormal reduction in food output. . . . A remarkable feature of the Wollo famine is that food prices in general rose very little, and people were dying of starvation even when food was selling at prices not very different from pre-drought levels" (Sen 1981).

Table 26—Index of market integration within Wollo

Commodity	Regional Market	Reference Market	β_{io} [a]	IMC [b]
Teff	Bati	Dessie	0.733	0.568
Teff	Woreilu	Dessie	0.565	1.622
Teff	Woldia	Dessie	0.535	1.438
Teff	Mekaneselam	Dessie	0.386	1.139
Teff	Korem	Dessie	0.259	5.062
Sorghum	Bati	Dessie	0.306	2.720
Sorghum	Woreilu	Dessie	0.263	0.983
Sorghum	Woldia	Dessie	0.246	1.318
Sorghum	Mekaneselam	Dessie	0.351	1.988
Sorghum	Korem	Dessie	0.272	2.255

[a] β_{io} measures the change in local price caused by a change in the temporal margin of a reference market.
[b] IMC = index of market connection.

Others have argued that conditions in Dessie may not have been representative of conditions in other parts of the same region (Shaw 1976; Cutler 1984; McCann 1987b; Iliffe 1987; Baulch 1987; Devereux 1988; de Waal 1988).

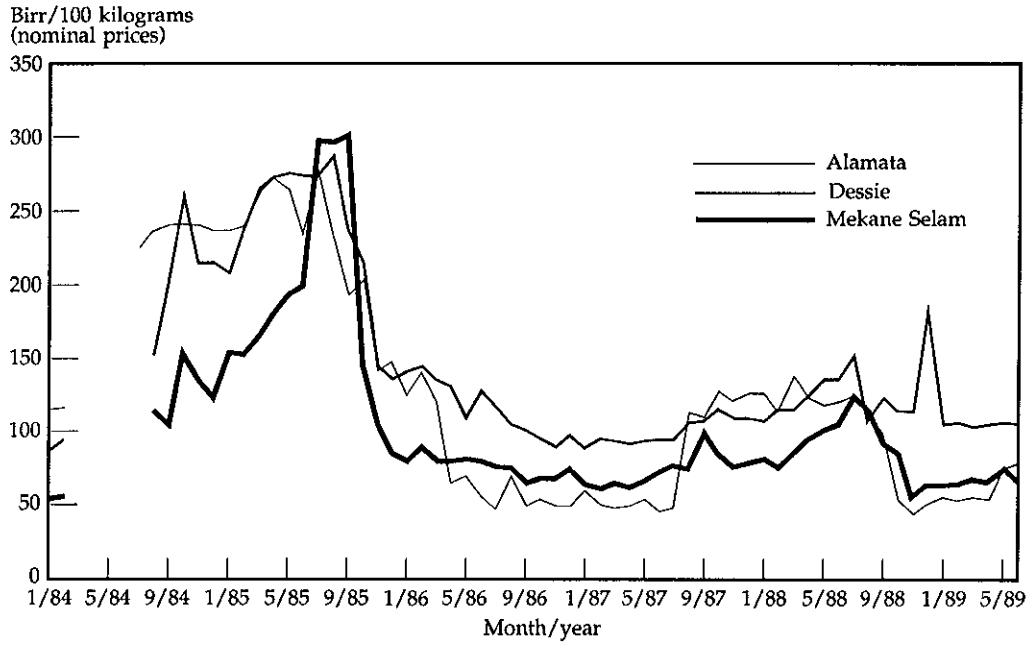
Time-series data on rural markets in Wollo during the 1970s are not available to settle this debate. On the other hand, the 1984/85 famine in Wollo took place with a reduction in food output and very large price increases (Figure 19). Figure 19 also illustrates that despite similar price movements for teff across markets in Wollo during 1984-89, a monitoring of Dessie prices alone would not have signaled the sharp rise (more than 100 percent) that occurred in mid-1984 in Alamata, at the worst time. The same applies to the lesser crisis that started in August 1987.

Subregional markets are more closely integrated in surplus regions, such as Gojjam and Shewa. Figures 20 and 21 show that the pattern and level of prices for markets in these two regions were very close during the 1980s. Nevertheless, it is interesting to note that the steep rise in teff prices in Motta from April to June 1985 would not have been spotted by monitoring prices only in the regional capital, Debre Markos.

There is, however, no doubt about one feature of the Ethiopian famine events in the 1980s: they did occur with drastic price increases. The same is now true of the 1990s. Figure 22 shows that the nominal price of white teff in 1991 in Addis Ababa had risen to crisis-year levels, largely as a result of political uncertainty as well as price deregulation. Prices continued to rise from that level during 1992.

The frequency of such price crises is eroding the purchasing power of the poor and does not permit rebuilding of the local economy. This development, if unchecked, may lead to famine situations with fewer and fewer obvious price signals. Thus, what has been found as firm relationships in the past may not hold for the future. This remains an important area for further research. The longer-term impact of price policy changes, including the abolition of quota procurements, fixed prices, and regional trade restrictions on production and prices, are as yet unknown. Indeed, the direct effects of the previous procurement policy on smallholder expectations and marketing behavior was poorly understood (Lirenso 1987; Franzel, Colburn, and

Figure 19—Teff price in three main markets of Wollo, 1984-89



Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

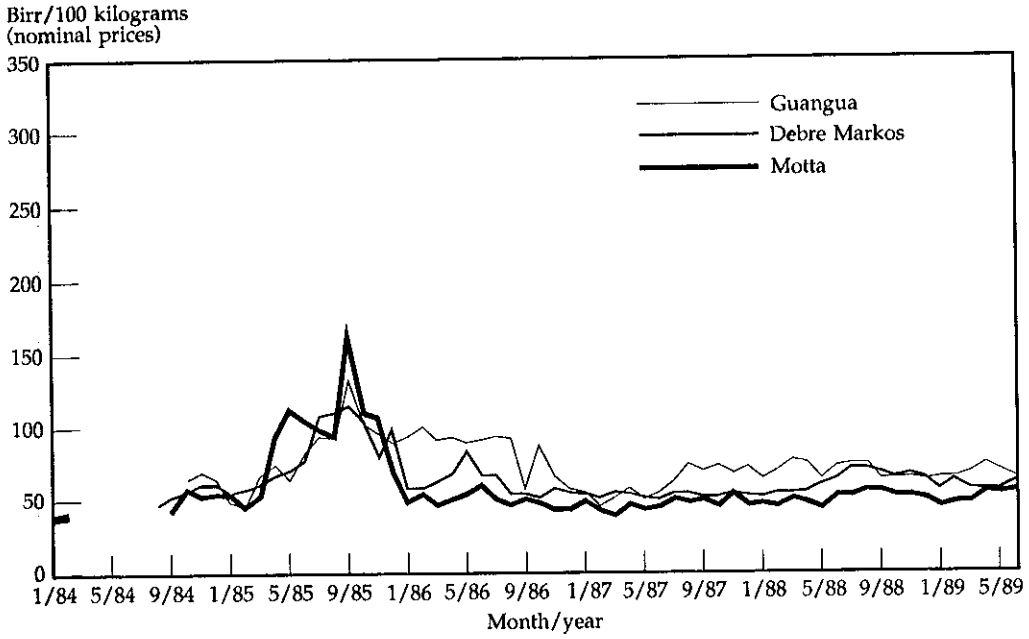
Degu 1989). Furthermore, although prices play a critical role in determining food consumption levels, especially of the poor, and although the influencing of prices is a major sphere in which governments can intervene in the local market, information on actual price developments is still sketchy (Dadi, Nagassa, and Franzel 1992).

The collection of market prices continues to be a mainstay of African early warning systems, but questions remain. It is clear that prices are not an "early" predictor of famine; even in Wollo, the steep increases became apparent only in late 1984, long after the impending catastrophe had been signaled from agents in the field. Thus, precisely what prices should be collected? How often? And can cutoff points, or thresholds, be established to act as triggers to confirm (rather than predict) that a crisis is under way? Such questions remain open.

The summarized conclusions of this analysis are, therefore:

- Short-term market disruptions and price explosions were commonplace and these did not always move synchronically, even in neighboring regions.
- Substitution of consumption between cereal crops (teff, sorghum, wheat, maize, and barley) is high, as indicated by parallel price movements.
- Price movements were highly correlated between most regional markets, but these are to a great extent spurious correlations that result from simultaneous

Figure 20—Teff price in three main markets of Gojjam, 1984-89



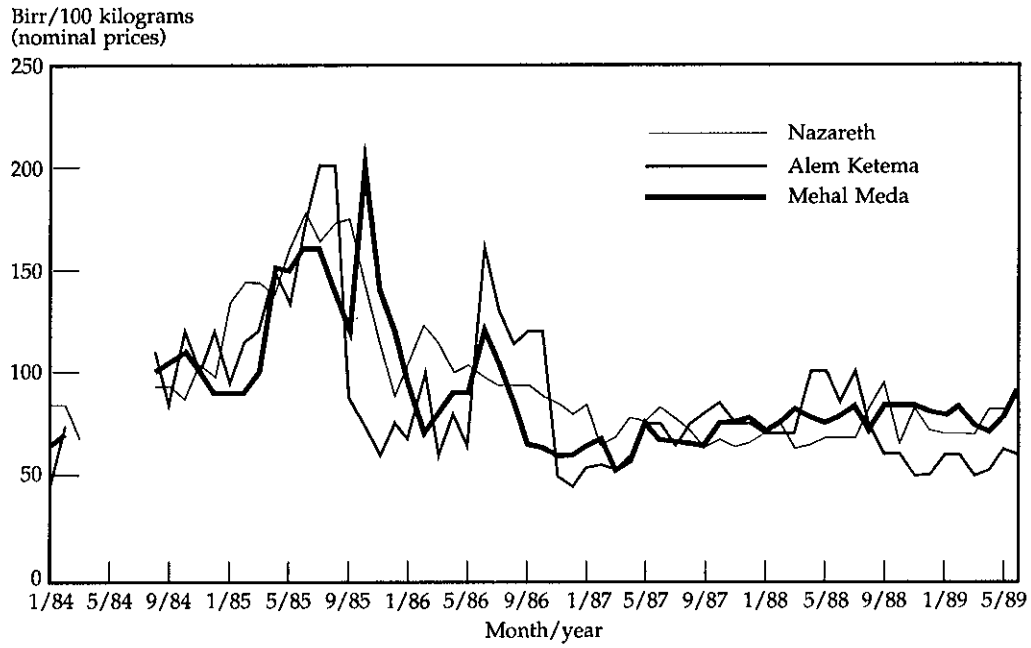
Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

effects of drought rather than integrated markets, as more refined analysis shows.

- Markets are considerably segmented by region, so integration with central markets is poor. Interregional trade barriers, though not fully effective, and poorly developed infrastructure were the forces behind this.
- Connection between regional markets and the central market is weak; price developments in such markets are therefore largely driven by developments in the subregion.
- Local market integration between regional capitals and off-the-road markets was fairly strong, although lagged.

While domestic food-market liberalization and integration in the international markets are keys to stimulated economic activity, regional specialization, and incentives for farmers, they need to be considered with caution under conditions of acute famine. Some time will be required to establish the institutions necessary for effective utilization of the free market: namely, active financial markets catering to traders and consumers; improved market information systems; and a strong supply response at farm level, facilitated by effective public and private input supply, including research, extension for improved crop technology dissemination, and the distribution of variable inputs.

Figure 21—Wheat price in three main markets of Shewa, 1984-89



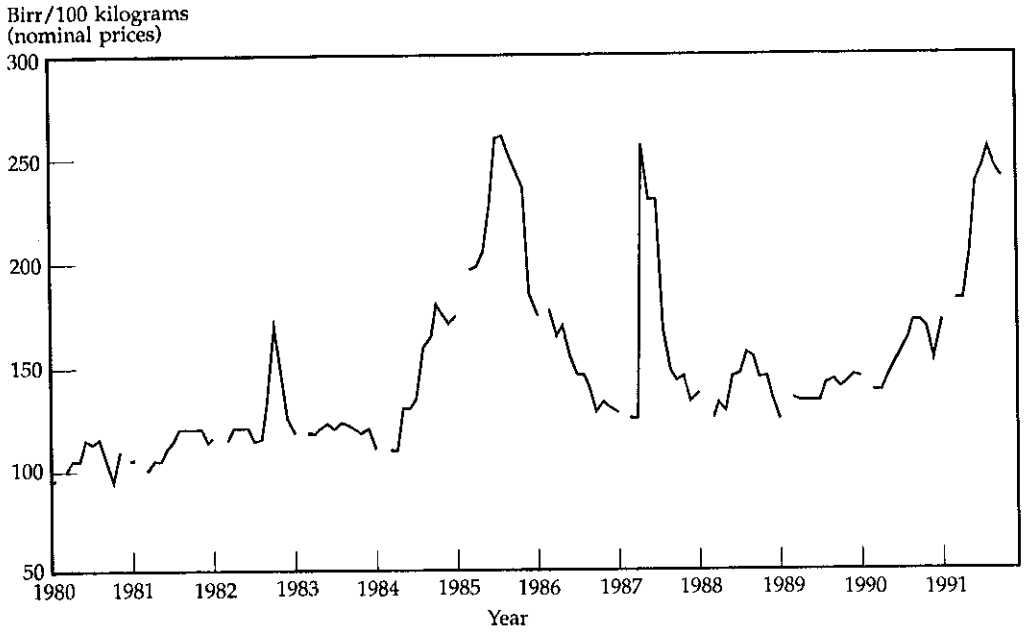
Source: Constructed by the authors from price data series provided by the Relief and Rehabilitation Commission, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. Breaks in a line indicate that no data are available for that period.

Livestock Markets

While an assessment of cereal price developments is central to an understanding of famine evolution, this is only one part of the story. The other important element is the changing terms of trade between cereals and noncereal commodities. The purchasing power of households (their ability to acquire food) is largely determined by the terms of trade between food and other marketed products such as livestock, cash crops (coffee, chat), and nonfarm items such as firewood, charcoal, and labor. During crises these terms generally shift in favor of households able to sell, rather than purchase, cereals. For example, the value of nonexport cash crops declines during drought because demand falls along with income. Similarly, the value of wage labor falls because total area cultivated appears to contract during drought (as shown in Chapter 4) and demand for labor is reduced. But perhaps the most striking example of shifting purchasing power is the erosion of livestock prices against grain prices, an erosion that affects pastoral households most severely.

Because of seasonal fluctuations in animal milk supply, pastoralists, such as the Afar in Wollo or the Borana in Sidamo, supplement their milk/meat diets with purchased grain. Income for such purchases derives almost entirely from sales of livestock and animal products (butter and cheese) (Pratt and Gwynne 1977; Holden,

Figure 22—White teff price in Addis Ababa, 1980-91



Source: Famine Early Warning System Project data disk obtained from Central Statistics Authority, Addis Ababa.
Notes: US$1.00 = 2.05 Ethiopian birr. A break in the line indicates that no data are available for that period.

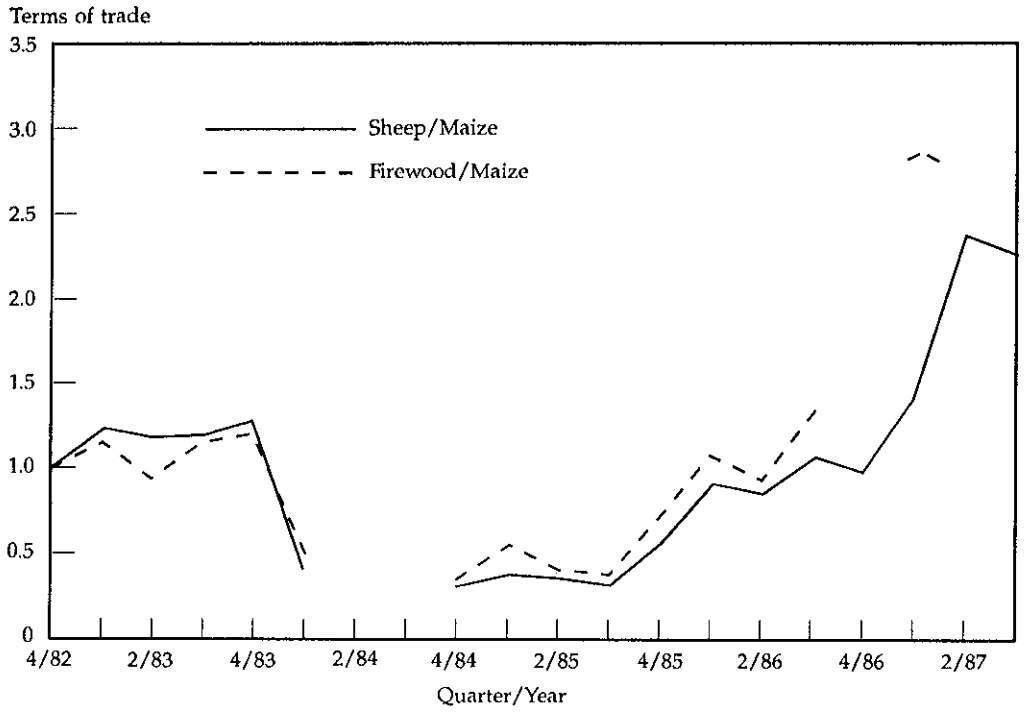
Coppock, and Assefa 1992). Such trade permits the conversion of high-value meat energy into cheaper grain energy at a beneficial exchange rate for the animal owner (Donaldson 1986; Cossins and Upton 1987).[32]

However, protracted drought changes this balance. As supplies of grazing, fodder, and water diminish, households reduce herd size by selling small ruminants (which have a capacity for fast herd regeneration) and nonessential cattle such as older males and young animals unlikely to survive stress. Many of these animals are destined for live export. The volume of sheep exported from Ethiopia, for example, rose sharply during the drought of the mid-1980s from less than 1,000 tons in 1982/83 to more than 4,000 tons during the famine year of 1984/85; the total declined again to 1,900 tons in 1987 (National Bank of Ethiopia 1988).

Yet mass sales of this nature often saturate the market, leading to a decline in the value of livestock at a time when cereal prices have begun to rise in response to increased demand. The eroded livestock-cereal terms of trade therefore puts herders at a disadvantage in the market when their dependence on purchased cereals is increasing. Figure 23 shows an example of this process from Wollo. The value of live

[32]One megajoule (MJ) value of energy derived from meat is normally equivalent to 6 MJ of energy from grain (Cossins and Upton 1987).

Figure 23—Terms of trade between sheep and maize and firewood and maize in Dessie (Wollo), 1982-87



Source: Ethiopia, Central Statistical Office. *Report on Retail Prices of Goods and Services in Rural Areas* (Addis Ababa: CSO, various years).
Note: Breaks in a line indicate that no data are available for that period.

sheep in Dessie against the market price for maize fell by almost 75 percent from December 1982 to December 1984. However, it then returned to prefamine levels by the end of 1986, only to climb to more than twice its 1982 value during 1987—the time when demand for livestock rose as part of the rebuilding of the postdrought economy. The terms of trade between firewood and maize almost mirror that of sheep and maize (Figure 23). Demand for firewood dropped during the crisis (because income was saved for food items), causing the price of wood to fall when the price of maize was rising. Firewood recaptured its position in 1986 and continued to grow in value in 1987 (possibly because many trees did not survive the prolonged drought of the mid-1980s).

Of course, if livestock owners do not sell in time, even at low prices, they may face losing everything if the animals die. Livestock mortality was considerable in some parts of the country. Rahmato (1988) shows that in Ambassel District of Wollo (one of the least affected by drought) almost 65,000 head of livestock (all categories) died during 1984/85. In Eritrea, it is claimed that up to 70 percent of grazing herds were lost during the drought (Cliffe 1989).

Although documentary evidence to back claims of such large-scale animal losses is highly fragmentary, data on livestock exports do provide some support. For

example, the number of live cattle exported in 1984/85 was only 25 percent of the 1982/83 level, possibly because of increased cattle mortality. Similarly, the export of hides and skins almost doubled from 7,700 tons in 1982/83 to more than 13,000 tons in 1985/86 (National Bank of Ethiopia 1988).

On the other hand, it appears that heavy losses were confined to the worst famine regions, and that they may not have had a significant impact at a national level. For example, Table 27 shows that cattle numbers in Wollo fell from 2.7 million in 1980/81 to only 1.3 million in 1985/86, while camels declined from 20,000 to only 2,000 during the same period. Similarly, in Sidamo the number of camels fell from 9,000 in 1981/82 to only 1,000 in 1987/88. However, the same table shows that cattle numbers increased in Shewa between 1980/81 and 1984/85, as did the national total.

While such aggregate data should be treated with great caution because of the difficulties inherent in estimating national herds, they do raise the possibility that herds migrated from Wollo to parts of Shewa less affected by the drought. Likewise, it is possible that herds from Sidamo dispersed into neighboring Bale, Gamo Gofa, and even Kenya. However, while overall stock at a national level may not have been severely compromised by drought-induced animal mortality, the impact at a local level was certainly devastating, as documented in Chapter 4. Many households in the worst regions lost all of their animals, thereby hampering the process of postfamine reconstruction. Without draft oxen, highland agriculture is constrained; without milch cows and camels, pastoral economies cannot survive.

The next chapter considers some of the means adopted by public relief agencies in their attempts to minimize the negative effects of the droughts and to contribute toward rebuilding those household economies most severely damaged by the famine.

Table 27—Numbers of cattle, camels, and sheep recorded in selected provinces, 1980/81-1986/87

Province	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88
				(thousands)				
Wollo								
Cattle	2,707	2,181	2,067	1,888	1,666	1,267	1,296	1,359
Camels	20	17	6	4	. . .	2	4	3
Sheep	2,697	1,863	1,764	2,001	1,720	1,701	1,897	2,752
Sidamo								
Cattle	1,626	1,863	2,112	2,124	2,365	2,237	2,854	3,115
Camels	6	9	7	5	6	8	2	1
Sheep	256	428	519	564	681	573	722	889
Shewa								
Cattle	5,714	6,419	6,649	6,655	6,452	6,405	6,527	6,592
Camels	1	2	4	n.a.	n.a.	2	n.a.	1
Sheep	1,766	2,408	2,709	3,169	2,784	2,964	2,089	2,115
Ethiopia total[a]								
Cattle	20,444	21,900	22,606	21,909	22,851	23,044	23,575	22,834
Camels	58	42	28	33	40	39	57	18
Sheep	7,998	8,602	9,339	10,087	10,488	9,457	8,728	9,468

Source: Ethiopia, Central Statistics Authority, *Time-Series Data on Livestock and Poultry Population 1980/81-1985/86*, Statistical Bulletin 67 (Addis Ababa: 1988); and *Agricultural Sample Survey 1986/87: Report on Livestock and Poultry* (Addis Ababa: 1989).

[a]The totals are for the country's 12 regions, not only the 3 shown in the table.

7

PUBLIC INTERVENTION DURING FAMINE

As varied as the private coping mechanisms, public responses to famine fall into three broad categories: local, national, and international. This chapter briefly outlines the major characteristics of these three groups and examines the effects of a variety of public interventions at the household level.

Local Interventions

The assumption that the Ethiopian famine gave rise to generosity only in the industrialized West is misplaced.[33] It was noted in the last chapter that communities supported their members with food gifts, loans, and other assistance. In addition to this, however, extra-community organizations attempted in 1985 to mobilize help for distressed villages in their area. These grass-roots initiatives were directed partly by church organizations and partly by regional Drought Committees.

The churches (Orthodox, Lutheran, Baptist, Catholic, and others) are largely coordinated in their relief activities by the Christian Relief and Development Organization, a body comprising over 50 organizations. Their (apolitical) role in food distribution behind lines of conflict was central to successful relief efforts during the 1980s (Minear 1988). During 1985, they served as grass-roots outlets for donations from overseas as well as from philanthropic organizations in Addis Ababa. Regional Relief Committees, on the other hand, were set up under the aegis of local party officials to organize care for destitute migrants as well as to collect voluntary contributions and a Famine Tax (levied on all Peasant Associations) for relief activities.

For example, both such organizations were active in the area around Debre Berhan (one of the survey sites), which is situated in an area of north Shewa that juxtaposes highland massif (exceeding 3,000 meters above sea level) with lowlands in the Rift Valley (at 1,000 meters above sea level). While some parts of the region suffered drought in 1985, others had plentiful harvests. Charity distributed between church parishes was not uncommon. In villages surrounding Debre Berhan, this took the form of caring for destitute families from other localities. One surveyed household looked after two women and four children from Wollo for six months until they were able to continue their migration south to Addis Ababa. The reemerging influence of all church groups in post-Mengistu Ethiopia might serve as an effective conduit for certain types of future investment where targeted, grass-roots interventions are necessary.

[33]The long tradition in Ethiopia of increased dependence of vulnerable households on local charity during famine is well documented by Iliffe (1987).

In addition to churches, a Committee for the Coordination of Drought Relief Operations was set up in Debre Berhan during 1984 as stories of hardship in Wollo filtered south. The stories were followed by refugees, and in November 1984 a feeding camp was set up by the relief committee and City Council. Food was provided by the Relief and Rehabilitation Commission (RRC) and by charities, while volunteer labor was provided by local women's, youth, and workers' associations. A medical team and supplies were secured by the International Livestock Centre for Africa. The camp became a transit stop where up to 3,000 malnourished people were treated overnight before being moved to resettlement sites in the south.

Government Interventions

A second level of public response relates to state operations. When famines occur, governments are often blamed for a lack of prior commitment to building up a capacity for crisis prediction and timely intervention (Gill 1986). Some of this "blame" is often colored by political bias, but the point is a substantive one. Without adequate investment in information-gathering and analysis, and in the mobilization of resources for rapid response, famine cannot be adequately dealt with. This, of course, applies to the international relief and development community (which now recognizes the cost of its delayed response to the 1983/84 crisis), as well as to national governments (Penrose 1987; Fraser 1988). It has therefore been argued that "disaster preparedness is probably one-third the province of the international community and two-thirds the province of the Ethiopian government" (Hindle 1988).

The Ethiopian government's task has been a heavy one. It has faced at least four major food crises and numerous minor crises since the mid-1970s. Figure 6 (in Chapter 3) shows that at least 2 million people were in need of assistance every year during the 1980s. Given the country's continuing droughts and food deficits, lack of foreign exchange, high defense-spending related to civil war, inadequate infrastructure, and the lack of a clearly defined famine-response strategy, famine has been a considerable problem for the government to deal with (Asfaw 1988; Lancaster 1990).

The RRC is the agency with principal responsibility for operations in the realm of drought and food shortages. Founded in 1974, the RRC was set up to monitor and alleviate the effects of the 1973/74 drought. Its mandate was to provide relief in the worst-affected regions, by acting as the fulcrum of all aid activity. Thus its work was at first dominated by the demands of saving lives. As the crisis subsided, however, the demands of rehabilitation, prevention, and early warning came increasingly to the fore. Africa's first Early Warning System was established in 1977 as part of the longer-term program, followed in 1980 by an Early Warning and Planning Service. Government agencies and numerous nongovernmental organizations (NGOs) contribute data on climate, crops, market prices, and nutritional status to the RRC coordinating body (Cutler and Stephenson 1984; Beyene 1988). These data are collated through a Food Information System set up to strengthen the analytical capability of the RRC. Such data help guide RRC's famine-relief activities.

In 1980/81, the government's budget for relief expenditure stood at 9.2 million birr (US$4.5 million). In 1984/85, this had reached almost 65 million birr, staying at around 60 million birr during 1985/86 (National Bank of Ethiopia 1989). The RRC often collaborated with other agencies such as UNICEF in distributing free food aid and in establishing wet feeding camps. However, the RRC's principal function

appears to have been to document, publicize, and monitor the progression of the crisis. There was no lack of warning about the 1984/85 famine. Indeed, the RRC's role in the crisis has been widely commended (Cutler and Stephenson 1984; Jansson, Harris, and Penrose 1987; Goyder and Goyder 1988). What was lacking was the conceptual, financial, and institutional preparedness required for effective response to the warnings. Ethiopia's experience has tragically underlined the necessity of strong administrative linkage between institutions that identify a problem and those whose responsibility it should be to prevent and, if necessary, remedy that problem. The prepositioning of response measures, combined with monitoring of preventative measures, is essential to famine mitigation.

International Interventions

The inability of the state to cope with famine within its own borders has repeatedly led it to seek external assistance. The international donor community, therefore, plays a third role in the public response to famine. Food shipments aimed at tackling the 1992 aid appeals represent the fourth major effort in a decade to relieve famine in Ethiopia. The key players in this effort operate at two levels: through multilateral agencies and through NGOs.

All major international relief organizations are represented in Ethiopia. Between 1985 and February 1990 these organizations provided almost 3.5 million tons of emergency food aid to Ethiopia, accompanied by more than US$250 million of nonfood assistance (UNEPPG 1990). During the 1985 crisis, they were coordinated by a UN Office for Emergency Operations. This has since been superseded by the UN Emergency Preparedness and Planning Group, which was created in Ethiopia to speed up the mobilization of donor assistance, to work closely with the government in identifying and tackling infrastructural bottlenecks in the food distribution system, and to support the RRC in its contingency planning and early-warning activities.

Another unique international organization is the World Food Programme Transport Operation in Ethiopia. Faced with the logistical problem of moving food to famine victims, the government and the World Food Programme set up a fleet of 250 trucks donated by USAID and BAND AID in November 1985. This fleet played a key role in distributing food aid made available by the international community. Originally designed to exist for one year, two extensions have been requested, the latest to expire in 1992. At the end of the 1980s, the fleet stood at 339 trucks, operated by a staff of over 1,000 (UNEPPG 1989c).

On a much smaller scale of operation, but perhaps of greater visibility in the field, are the activities of NGOs. In May 1985, there were 48 NGOs operating relief projects under the auspices of the RRC. These engaged in activities ranging from relief measures to developmental programs. Table 28 presents such NGO/RRC activities according to their immediate objectives. During the famine, the most common operations were medical operations and feeding programs (intensive or supplementary feeding, and dry ration distribution). From 1985 to 1989, the NGOs (working in collaboration with Red Cross agencies) were responsible for distributing between 60 and 75 percent of all food aid sent by the international donors (UNEPPG 1989b; UNEPPG 1989d).

Second in importance were logistics operations (aid handling, storage facilities, transportation). Long-term rehabilitation programs necessarily had a low priority

Table 28—Nongovernmental organization and Relief and Rehabilitation Commission activities in Ethiopia, by project category, May 1985 and February 1990

Type of Activity	Number of Projects	
	May 1985	February 1990[a]
Medical relief/feeding programs	233	14
Emergency logistics	124	. . .
Construction	9	4
Rehabilitation projects	74	11
Development programs	. . .	16

Source: Compiled from Relief and Rehabilitation Commission, *Location of Ongoing Activities of Nongovernmental Organizations Operating in Ethiopia under the Auspices of the Commission* (Addis Ababa: 1985c); and RRC records.

[a]This was just before the 1990 crisis assumed emergency proportions, prompting a renewed international response.

during the crisis period. Nevertheless, these short-term activities were costly. The major NGOs (some 23 agencies) spent over US$130 million dollars in-country between 1984 and 1988 (RRC 1990b).

By 1987, when the peak of the crisis had passed in most regions, NGOs were faced with the question of where to redirect their efforts. The answer for most was to move from relief to rehabilitation. This raised questions about long-term dependency relationships between beneficiary populations and local NGOs (Curtis, Hubbard, and Shepherd 1988; Elizabeth 1988). However, continued NGO presence in the field was crucial to the successful mitigation of the 1988 crisis. In that year, major NGOs and church organizations joined to form the Joint Relief Partnership. This organization supplied food to over 1 million people during 1988/89 (UNEPPG 1989a). In 1990, it continued to help ease political and logistical difficulties involved in transporting food to famine victims in northern zones of conflict.

In 1990/91, there were still more than 50 NGOs operating in the country (church-related and secular), of which more than half implemented projects in collaboration with the RRC. The total number of NGO/RRC projects has fallen since 1985, and the focus of such activities has shifted from relief efforts to longer-term development projects (Table 28). However, the fewer, more development-oriented projects still represent large capital investments: project costs for activities started since 1986/87 and ongoing in the first half of 1990 exceeded US$100 million (RRC 1990b). Total beneficiaries were estimated at more than 3.5 million.

Instruments For Public Intervention

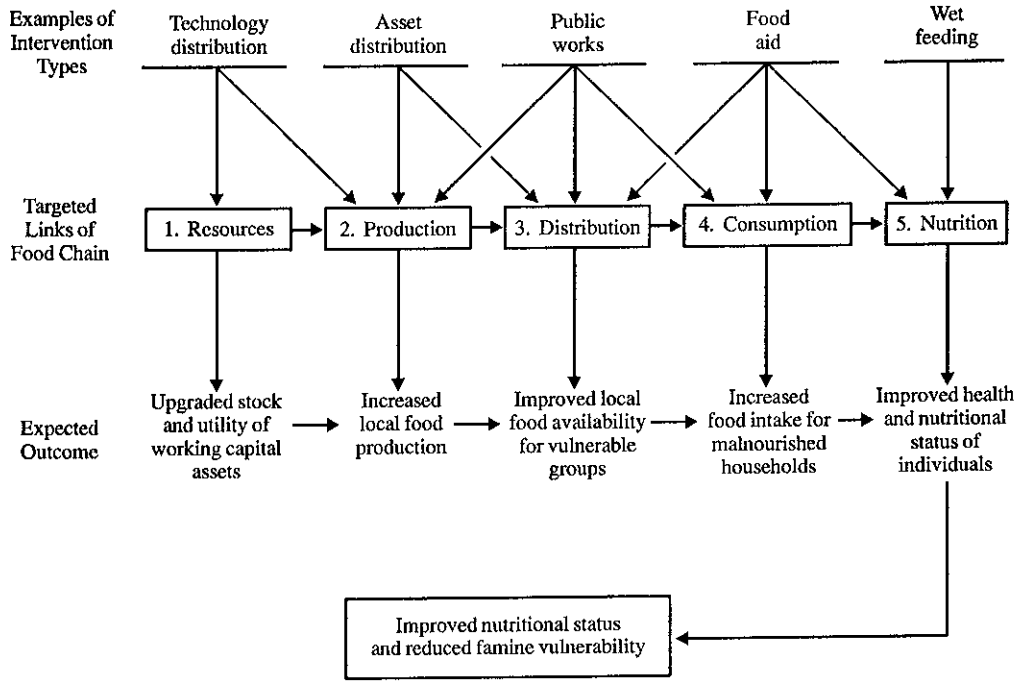
The types of famine intervention initiated through public means were extremely varied. Although the major interventions are put into five (not necessarily exclusive) categories in Table 28, during the famine a considerable range of projects and programs was brought into being to work toward similar goals: securing sustainable nutritional improvements in vulnerable groups, and protecting their productivity and

resources. But the means and time frames adopted by various interventions were often quite different.

For example, the immediate objective of wet feeding programs has the short-term function of preventing people from slipping into malnutrition. By contrast, the goal of programs introducing (or replacing) agricultural assets is to regenerate household production capacity, thereby reducing vulnerability to famine. And developmental activities in the realm of soil and water conservation focus on long-term natural-resource preservation and enhancement.

None of these interventions is mutually exclusive; like the components of a household's coping strategy, the many parts of a public strategy are integral to the overall security objectives desired. Each component attempts to influence food security in one or more of five principal ways: (1) by protecting and enhancing the resource base upon which most households depend for their livelihood; (2) by affecting a household's ability to produce its food (levels of producing power); (3) by influencing the ability of food-deficit households to acquire food (employment creation, levels and variability in purchasing power, food supply mechanisms, price intervention); (4) by affecting the processing and intrahousehold distribution of food; and (5) by acting directly on the physical and nutritional well-being of the individual (see Figure 24).

Figure 24—The impact path of some food and nutrition interventions in Ethiopia



According to the Ethiopian Red Cross Society, relief agencies choose the point of intervention along this path according to the "period of deprivation, . . . population movement, . . . the degree and level of health and nutritional deterioration, the expected or actual food deficit and relevant information gathered during community surveys" (Yitbarek 1988). Knowledge of these conditions represents an ideal case. In practice, there is no time to collect all of these data and to assess their message. Famine is characterized by urgency at all levels, from the household to the international community. Thus, most operations focus on links 3, 4, and 5 in Figure 24; that is, they attempt to influence the ability of households to consume sufficient calories to survive. At other times, when the emphasis is more on rehabilitating households, priority is placed on actions that replace or enhance the productive capacity of households (links 1 and 2).

But which of these types of intervention (most of which have been represented in Ethiopia during the past decade) succeeds best in targeting vulnerable groups? And which do so in optimal economic and human-resource-enhancing terms?

Currently, few evaluations ask all of these questions. Yet, according to the International Labour Office (ILO), evaluators should seek to determine to what extent, and under what conditions, income (or other benefits) generated by a given intervention have been distributed over specific sectors of the population, in particular to the poorest within a project area. The crucial point, according to ILO, "is to make sure that the share of benefits accruing to target-group beneficiaries in total benefits generated by [the project] over a period is as high as possible" (ILO 1988). The RRC concurs with this view, arguing that "the primordial task in relief operations is the selection of beneficiaries. Proper selection makes relief work effective. Improper selection makes the work not only ineffective, but meaningless as well" (RRC 1985b).[34]

It is with these informational gaps in mind that the household surveys (described in Chapter 4) were designed to capture some of the necessary data regarding the effects of intervention. No attempt was made to derive cost-benefit evaluations for each project, since the quality of data available from the projects themselves was inadequate for such an exercise. Such an analysis remains essential to the improved efficiency of future famine intervention, but has yet to be convincingly achieved (Svedberg 1991). Rather, this study sought insights into how projects were organized and implemented, who participated and why, what the household experience of participation in such interventions was, and how things might have been done differently. Empirical information concerning these four areas is sparse; yet these are the areas that matter most to the households struggling through a food crisis. The following sections therefore present findings on the microlevel effects of seven relief and development activities in seven famine-prone regions of Ethiopia.

Evaluation of Project Activities

Table 29 provides an overview of the types of intervention considered at each site and the implementing agencies involved (each of which collaborated closely with the

[34]It is interesting, in this context, to note that seventeenth century Abyssinia's legal code, the *Fetha Nagast* (the Law of Kings), enshrined the principle that charity should be given only "to those who truly have need" (Iliffe 1987).

Table 29—Types of relief and rehabilitation interventions operating at the survey sites

Survey Site	Collaborating Agencies	Major Interventions	Dates of Intervention
Adele Keke	World Food Programme/ Ministry of Agriculture	Food-for-work Food aid	1987-89 1986
Beke Pond	CARE	Food-for-work Food aid	1987-90 1988
Debre Berhan	International Livestock Centre for Africa	Technology transfer Food aid	1985-87 1986
Dinki	OXFAM America/International Livestock Centre for Africa/ Lutheran World Federation	Asset distribution Food-for-work Technology transfer Food aid	1985-86 1986-89 1985-86 1985
Doma	UNICEF/Relief and Rehabilitation Commission	Cash-for-food Food aid	1986-87 1985, 1986
Gara Godo	Redd Barna	Food-for-work Feeding camp Food aid	1985-88 1985-86 1985,1988
Korodegaga	UNICEF/Relief and Rehabilitation Commission	Cash-for-food Food aid	1986-88 1982-89

Source: IFPRI survey, 1989/90.

evaluations). The agencies comprised two multilateral organizations (UNICEF and World Food Programme), one international research institute (the International Livestock Centre for Africa [ILCA]), three NGOs (OXFAM America, CARE, Redd Barna [Norway]), and one church organization (Lutheran World Federation). At the first two sites (Doma and Korodegaga), the RRC was closely involved in the implementation of relief activities (in association with UNICEF) and was very helpful in facilitating the field surveys. The same was true for Ministry of Agriculture staff at Adele Keke.

The projects examined at the survey locations fall into four broad categories, with seven variants:

- Direct food transfers: feeding camps; food-aid distribution
- Public works: food-for-work; cash-for-food
- Asset transfers: ox-seed distribution
- Farm technology transfers: single-ox plow; crossbred cattle

There was usually more than one intervention at each of the survey sites (Table 29). It should be reemphasized that the surveys were originally designed to provide

samples of participants and nonparticipants associated with a single project at each location. In practice, it was discovered that households at most of the locations were involved in more than one project. Consequently, attention was paid in the survey to as many of the interventions found at each site as possible. The following analysis considers each of the intervention categories in turn, starting with an examination of how activities were organized in the field, and the impact of those activities, followed by an analysis of issues relating to costs and project sustainability.

Direct Food Transfers

Feeding Camps

The principal goal of relief is to save lives. Thus the most urgent famine intervention (in a situation of late public response) often takes the form of emergency feeding camps. At the height of the famine almost 300 such camps around the country were distributing dry and wet food rations to the seriously malnourished. Camps were opened at two of the survey sites, Doma and Gara Godo. These were not large camps on the scale of Korem, where in early 1985 over 10,000 children were fed each day (Appleton 1988). Nevertheless, they each covered several communities in their attempts to rehabilitate thousands of malnourished children and mothers.

The Doma camp was opened in February 1985 for three months by the regional Drought Relief Committee. Using food remaining from a local food-for-work project, the camp distributed a monthly ration of 10 kilograms of grain and 1 liter of oil to all households. This was not sufficient to survive on, but it helped raise consumption during the difficult transition period before the new village was established.

In 1986, the camp was reopened by UNICEF in response to deteriorating nutritional conditions. Malnourished children were selected for wet feeding according to weight-for-height. Pregnant women, the sick, and the elderly were also fed. Mothers were permitted to sleep with their children in the camp, and it was they who prepared the food, consisting of oats and canned tuna. Unfortunately, there were problems of palatability, since neither food was common to the area. This was partially overcome by mixing the fish into sauces, and mixing the oats into a sorghum and maize batter for pancakes. Only 16 children died during the four months of operation, out of more than 200 children admitted.

The scale of the problem was greater in Gara Godo. Opened in May 1985 by Redd Barna, this camp admitted only children less than 70 percent of weight-for-height. These children were given intensive medical care until they exceeded the 70 percent mark again. At that point, they were released from intensive care but were monitored during a period of supplementary feeding, followed by a monthly checkup during which a family food ration was distributed.

For 1985 as a whole, an average of 105 marasmic children were under critical care and intensive feeding each month. More than 70 percent of those admitted to critical care were less than 65 percent of weight-for-height (Jareg 1987). Another 209 relatively less malnourished children benefited from supplementary feeding. And over 200 family rations (60-75 kilograms of grain, plus 3 kilograms of supplementary food for each child under five) were given each month.

The principal foods provided were wheat flour and soy-fortified sorghum grits, faffa, corn-sugar milk, and fish powder. Palatability problems arose with the fish powder and sorghum grits, which were subsequently targeted only to children less than 9 months old (Jareg 1987).

The brunt of the crisis passed by the second half of 1986. By June 1986, the proportion of children below 80 percent of weight-for-height had fallen to less than 3 percent from a high of 35 percent in July 1985 (Table 30). Relief activities were suspended in September 1986, and attention was turned to projects aimed at the rehabilitation of famine-affected households.

Unfortunately, the improvements were not sustainable. The return of drought in 1987 and 1988, coupled with malaria and meningitis epidemics, raised the rate of severe malnutrition back to 18 percent by mid-1989 (Table 30). As a result, emergency feeding activities were resumed toward the end of 1988. Some 10,000 packets of oral rehydration solution were dispensed during 1988, with over 1,000 children being supported by food rations amounting to 3,000 tons of grain and 100,000 liters of oil (Redd Barna 1989).

During the 1985 crisis, at least one child was admitted to the camp from 35 percent of the survey sample households. Two-thirds of these households came from the middle and lower income terciles. Yet 32 percent came from households in the upper tercile. On the one hand, this supports the argument that variables other than wealth, such as hygiene and disease, play a role in determining nutritional status and famine impact (de Waal 1988; Kennedy and Cogill 1987; von Braun, Puetz, and

Table 30—Percentage of children severely malnourished in Gara Godo, selected dates from 1985 to 1989

Date	Weight-for-Height		Sample Size
	Below 80 Percent	Below 70 Percent	
1985			
March	21.9	6.0	800
July	35.0	7.5	467
December	4.5	0.1	n.a.
1986			
March	6.0	0.5	n.a.
June	2.5	0.1	n.a.
1987			
March	3.5	0.7	2,507
December	4.7	0.8	1,881
1988			
June	10.5	n.a.	3,200
December	8.9	n.a.	2,996
1989			
May	18.3	2.9	234
September	11.7	1.2	343

Source: Compiled from various Redd Barna nutrition survey records in Gara Godo, and Pal Jareg, ed., *Lessons Learnt from Relief Work: Ethiopia* (Addis Ababa: Redd Barna, 1987).

Note: n.a. means not available.

Webb 1989). On the other hand, it should be emphasized that even the "wealthiest" households in Wolayta are among the poorest households in the sample as a whole. Most admitted children remained under intensive care for six to nine months. Only one child from the sample households remained in the camp for more than a year, returning home only when the camp itself was closed down. Only two sample household children died in the camp.

Most parents were satisfied that the intervention had saved lives. Almost 50 percent of respondents noted that "all would be dead" had it not been for the camp. The other 50 percent felt that without the intervention more people would certainly have died, but that there were problems to be confronted. For example, it was felt that too many patients contracted infections while in care. Over 56 percent of respondents referred to the danger of contagion resulting from overcrowding in the camp. Although cholera and other epidemics were successfully avoided in Wolayta through mass vaccinations (2,000 children were vaccinated by October 1985), half of those admitted did contract some kind of disease during their stay (Jareg 1987; Appleton 1988). Most were of an enteric nature, probably due to poor sanitation facilities. During 1985, water and firewood were collected for the camp by volunteers in the community. It was not until late 1986 that public latrines were dug, and none of the springs were protected from contamination (Jareg 1987).

The second complaint concerned project-community communication. While the selection process followed standard anthropometric criteria, not all project staff had the time (or local language fluency) to explain routines, timetables, and rationales to the community at large. As a result, many households regretted a lack of communication and the fact that the role of mediator between project and community fell, by default, to the perimeter guard. Given the frustration and anxiety and the psychological pressures of the famine on the community, the guard, standing between the patients and those who had not been admitted, became a focal point for anger. One report notes that the guard was "continually in danger of being attacked himself, and the field staff reported difficulties in bringing under control large numbers of desperate people during distribution of family rations" (Jareg 1987).

The third problem related to the family rations. Many households felt that such rations were too small. Households larger than five people received 75 kilograms of cereals per month. This ration was based on an assumed average household size of 6.0 people. However, the average household size in the present survey sample was 7.9 people. Larger families therefore found it difficult to cope.

These problems have been acknowledged by the NGO that operated the camp, and real efforts have been made to analyze the 1985/86 experience in order to establish contingency plans for the future (Jareg 1987; Redd Barna 1989).

Free Food-Aid Distribution

Despite the unresolved intellectual debate concerning the cost-effectiveness and morality of food aid, few voices were raised in 1984/85 against a mass mobilization of emergency food to Ethiopia.[35] The unprecedented scale of the response is well

[35]Food aid has been subject to considerable intellectual scrutiny in recent years. For overviews of the ongoing debate, see Stevens 1979, Riddell 1987, Balde et al. 1989, Jones 1989, Hopkins 1990, and World Bank/World Food Programme 1991.

known, and its impact was widely felt. Households in all seven survey sites received food aid during the famine years, but at different scales according to need (Table 29). In Dinki, for example, 95 percent of survey respondents received some food aid, compared with less than 2 percent in Debre Berhan. Similarly, the frequency and volume of food received also varied by site. As pointed out in Chapter 5, food distribution was a common activity in Ethiopia throughout the 1980s. Thus, many households in drought-prone regions have obtained food aid (primarily wheat) for several years running. Aid distributions have been concentrated not in a single year but throughout a period starting in 1984 that did not end until 1987 (Table 31). The only exception is Debre Berhan, where a single household obtained food aid just once during 1986. In Beke Pond, Dinki, Gara Godo, and Korodegaga, on the other hand, some households received food aid during four successive years. In Korodegaga, a majority of households received food aid during the 1981/82 crisis, and some continued to have access to food distributions throughout most of the decade.

In most cases, the RRC or an NGO carried out the distribution, conducted on average once every two months, although this varied by site according to availability, transport, and local storage facilities. Only in Beke Pond did a large proportion of households receive food rations on more than a bimonthly basis. In Gara Godo and Doma, on the other hand, a majority of households received rations only one to three times during their worst year of famine.

Distribution procedures also varied. In some cases anthropometric measures were used to guide distribution (Young 1986; Shoham and Borton 1989). In others, food went to people who were "skinny in their appearance, and that had nothing more to sell" (Erni 1988). And in some instances, lists of the needy were drawn up by village leaders, and it fell to them to ensure an equitable distribution of the food (Intertect 1986). There is little evidence from the survey sites that such distribution was manipulated in favor of wealthier households. Households that cut their consumption back to one or two meals per day during the crisis received on average twice as much food as households still consuming three meals per day (Table 32).

On the other hand, the amount of food aid received was small. Standard rations recommended by the RRC were 15 kilograms of cereals and 600 grams of oil per capita per month, equivalent to roughly 1,700 kilocalories per capita per day, still 25

Table 31—Number of sample households receiving food aid, by survey site, 1982-88

Survey Site	1982	1983	1984	1985	1986	1987	1988
				(households)			
Adele Keke	0	0	5	64	0	3	0
Beke Pond	0	0	3	17	15	1	0
Debre Berhan	0	0	0	0	1	0	0
Dinki	0	0	1	31	17	5	0
Doma	0	2	0	3	47	0	0
Gara Godo	0	0	1	20	5	3	0
Korodegaga	29	2	2	12	0	2	1

Source: IFPRI survey, 1989/90.

Table 32—Food aid received by survey sites during worst famine year, by meals consumed per day

Survey Site[a]	Number of Meals Consumed per Day during Famine		
	One or Fewer	Two	Three
	(kilograms of food aid/household/year)		
Adele Keke	48	85	175[b]
Beke Pond	378	333	20
Dinki	140	221	100
Doma	92	89	33
Gara Godo	223	207	50
Korodegaga	173	159	100

Source: IFPRI survey, 1989/90.
Note: The worst year of famine varies according to individual household responses for the period 1983-88.
[a]Debre Berhan is not included because only one household there received food aid, on a single occasion.
[b]This is an average based on three cases, two of which brought food aid with them from Kenya.

percent below the recommended minimum intake of 2,300 kilocalories (Yitbarek 1988). This "ideal" ration was rarely provided to sample households for more than a few months. Households received an average of only 180 kilograms in the worst year. Only at three sites did households receive more than 200 kilograms for the year, and this in itself is insufficient to sustain a family of six for more than 60 days.

In other words, food relief in the survey areas appears to have been designed to protect household consumption for a limited time only. It could not on its own support households through the entire crisis. Instead, food aid acted as a temporary measure until other, more far-reaching interventions could be set in place. In Dinki, for example, food aid was distributed for six months in 1985, prior to the implementation of a more complex asset-distribution project. When the latter was established, food aid stopped. The implications of a lack of overlap between such interventions is taken up later.

Public Works

Ethiopia has a wealth of experience in the realm of income transfers via public works. First, it hosts the largest food-for-work program in Africa (Hareide 1986). Second, it served as a testing ground for the first large cash-for-food program in Africa (operated by UNICEF). These programs utilize different approaches to the same problem: namely, how to secure employment and adequate consumption levels for participants, while at the same time generating sustainable assets. The food-for-work projects implemented at four of the survey sites offered food as their wage/incentive, while households participating in cash-for-food at three sites received monthly cash wages. These programs are examined in turn.

Food-for-Work

There are four principal categories of food-for-work projects, (Burki et al. 1976; Clay and Singer 1985):

- Emergency relief projects, providing temporary (food) wage employment to supplement or replace a crisis-induced loss of income;

- Seasonal projects, aimed at supplementing the income of poor households during slack agricultural seasons;
- Regular (infrastructural) projects, designed to create or enhance productive assets by tapping available labor while providing employment opportunities for disadvantaged households;
- Long-term employment-generation projects, designed to tackle chronic unemployment and underemployment by offering longer-term job activity, particularly to the urban poor and the landless.[36]

Ethiopia has considerable experience with the first three categories. In 1986, NGOs ran about 60 food-for-work projects, the majority of which constituted emergency relief activities; only 4 percent of these projects were initiated prior to 1985 (Hareide 1986). By 1989, the number of projects had risen to 75, but most had been transformed into seasonal employment projects (run by many NGOs as precautionary measures during years of low harvest), or longer-term regular projects that deal primarily with infrastructural development or soil and water conservation or both (WFP 1989).

The microlevel impact of food-for-work was examined at four of the survey sites.[37] The largest program is funded by the World Food Programme and administered through the Ministry of Agriculture. The World Food Programmme is the single largest player in food-for-work in Ethiopia. From 1980 to 1990, it contributed over US$230 million to labor-intensive projects in food-deficit areas (Holt 1983; UNEPPG 1987; WFP 1990, 1991b). Its most recent phase (US$78 million) has been aimed at rehabilitating 2.6 million hectares of degraded land by offering 27 million workdays per year (WFP 1989).[38] The Adele Keke site examined here is in the Alemaya catchment of Hararghe Province. This catchment has the highest project food utilization in Hararghe, providing work for almost 1,500 people during nine months of the year, for which 2,500 tons of grain and 99,000 liters of oil were paid in 1988 (Vallee 1989; WFP 1991b). The project, initiated in 1984, involves soil bunding, contour terracing, afforestation, and feeder-road construction.

The other three projects were implemented by NGOs. The first was in Dinki.[39] Started in June 1985, its initial goal was to provide food to famine victims while

[36]Since all four project types aim at providing employment while generating assets, the distinction between them can often be thin. For example, the latest World Food Programme project in Ethiopia is called "Rehabilitation of Forest, Grazing, and Agricultural Lands." However, its stated aim is "to improve the economic status of farmers in project areas" (WFP 1990). The two aims are, of course, compatible, but the most urgent priority remains ambiguous.

[37]While food-for-work questions were asked at each of these sites, more detailed analysis was pursued at Adele Keke and Gara Godo.

[38]Other donors are active in this food-for-work program. Since 1983/84, the European Economic Community has provided 30,000 tons of grain per year to projects in Eritrea and Tigray; from 1984 to 1990, Australia donated 11,000 tons annually to projects in Sidamo and Gamo Gofa; Finland has provided nonfood support valued at US$1 million; and the United Nations Development Programme, Food and Agriculture Organization of the United Nations, German Agency for Technical Cooperation (GTZ), and Switzerland have all been involved in technical support and research (UNEPPG 1987; EEC 1989). Currently, over 130,000 tons of grain and oil per year are channeled to food-for-work projects operated by the Ministry of Agriculture (Tato 1989). This excludes quantities used by NGOs.

[39]This project was financed by Canada, CARITAS, the Swiss Red Cross, and the Swiss Development Corporation. Field activities were organized by the Lutheran World Federation.

also improving local road communications. The first car to drive to Dinki arrived in June 1986, heralding improved access to food and medical care. After October 1986, the focus turned to afforestation and bunding. The project ended in June 1988.

The second project, in Gara Godo (Wolayta), started in 1988. It covers some 6,000 households in 30 communities (Redd Barna 1989). During 1988, 600 men and 200 women in Gara Godo provided 23,000 working days for road building, tree planting, and gully bunding; their remuneration totaled 68 tons of maize (Redd Barna records).

The third NGO project examined was implemented in Sidamo by CARE with the International Livestock Centre for Africa and the Fourth Livestock Development Program. This program was unusual because the participants were pastoralists and because its activities were often innovative. Food was offered for digging ponds, maintaining wells, building cement-lined water tanks, and hay-making. The latter was new to pastoralists, who therefore learned the benefits of hay-making and storage in advance of the long dry season, while at the same time earning food for their labor.

Participation in Food-for-Work. The employment provided by such projects differed by site according to type of activity, criteria for participant selection, and local response to the food wage offered. Table 33 shows the average number of days spent by households on various food-for-work activities between 1985 and 1989. The average annual total across the four sites was 83 days. This compares closely with the figure of 90 days estimated for Ethiopia by Holt (1983) and the average of 86 days observed by Kohlin (1987) in Wollo for 1986.[40] However, food-for-work was more

Table 33—Average working days spent by household members on food-for-work activities, by survey site, 1985-89

Survey Site	Main Project Activities[a]	1985	1986	1987	1988	1989
		(average days/year/household)				
Adele Keke	Bunds, roads, terraces	59	112	58	104	108
Beke Pond	Wells, hay, ponds	90	83	60	60	78
Dinki	Roads, bunds, trees	150	112	109	141	...
Gara Godo	Roads, trees, bunds	30	95	65	60	60

Source: IFPRI survey, 1989/90.
[a]Bunds = Bunding (with soil or stones) of gullies and steep, degraded slopes.
Roads = Rural road construction and maintenance.
Terraces = Contour terracing of hillsides against soil erosion.
Wells = Digging of new wells.
Hay = Cutting and drying of hay for long-term storage.
Ponds = Excavation of ponds.
Trees = Nursery seeding and transplanting of grown seedlings.

[40]The World Food Programme estimated that from 1980 to 1982, participants worked an average of 55 days (Holt 1983). On the other hand, the current 1987-90 project assumes an average annual employment of only 25-30 days per household (UNEPPG 1987).

important in Dinki and Adele Keke than at the other sites. Households in Dinki provided 150 days to food-for-work during 1985, indicating the extreme nature of the crisis and the lack of alternatives for households seeking food. In Adele Keke, the participation peak was in 1986.

Many projects accept that all households wishing to participate should be permitted to (EEC 1989). This principle assumes that food-for-work is a self-targeting intervention from which the wealthy voluntarily exclude themselves (Traore 1989). Given the generally low levels of income in the study population, targeting may not be a particularly relevant issue in the context of the study sites. Nevertheless, it is interesting to assess the relatively poorest's access to food-for-work when it was supplied in the communities. Few projects made an attempt to target the poorest. A recent survey of projects in Wollo found that only 30 percent of 228 respondents felt that the poor had priority access to food-for-work (Kohlin 1987). Admassie and Gebre (1985) similarly found only 17 percent of respondents reporting a recruitment bias toward the poor.

If that be the case, who does participate, and why? Admassie and Gebre (1985) found no uniform system of recruitment in the 24 projects that they surveyed. The same was true for the present survey. On the one hand, at no site were female-headed households given priority. On the other hand, in Dinki and Beke Pond, all households were accepted, even if the only family member strong enough to move stones was a young girl, while in Gara Godo, only households with able-bodied members were registered. And in Adele Keke, although the Ministry of Agriculture/ World Food Programme officially accept all households wishing to work, recruitment was managed by village leaders and a ministry foreman, based again on "ability to work" coupled with undefined criteria set by the foreman. Seventy-two percent of the nonparticipants had applied but been rejected according to the latter "criteria." All 72 percent claimed that registration was unfair, referring to bribery, kinship, and personal connections as the real criteria guiding selection.

While allegations of corruption always surface when discussing food-for-work, the present analysis shows that at three of the four sites, participation by the poorest was not significantly lower than in wealthier households, even taking household dependency ratios into account (Table 34). In general, a picture of rather equal access

Table 34—Sample household participation in food-for-work at selected survey sites, by income tercile

Survey Site	Income Terciles		
	Lower	Middle	Upper
	(percent of participants)[a]		
Adele Keke	24 (54)	40 (60)	36 (55)
Beke Pond	33 (50)	27 (60)	40 (55)
Dinki	34 (50)	34 (48)	32 (32)
Gara Godo	31 (57)	39 (54)	30 (55)

Source: IFPRI survey, 1989/90.
[a]Dependency ratios (the percentage below 15 and above 60 years of age in the total population) are in parentheses.

emerges, with the exception of one site (Adele Keke). In Adele Keke (where complaints of unfair selection were the strongest), only 24 percent of sample participants were in the lowest income tercile, compared with 36 to 40 percent in the other terciles, despite similar dependency ratios across terciles. Furthermore, Table 35 indicates that the poorest households in Adele Keke worked many fewer days (thereby receiving much lower food payments) than households in the upper tercile, while female-headed households also appear to have been disadvantaged (in terms of days worked) when compared with households headed by men.

These differences, one might suspect, may represent the outcome of selection criteria based on "able-bodied members." Yet, with the exception of Dinki, dependency ratios do not differ much between the income terciles. A stronger, more explicit, consideration of targeting is clearly required to strengthen the food-security potential of such projects.

Food wages. The standard food wage recommended by the Ministry of Agriculture was 3 kilograms of grain (usually wheat) and 120 grams of oil per day. This ration was to cover daily subsistence requirements for six people, offering some 1,800 kilocalories per head (Holt 1983; Admassie and Gebre 1985; UNEPPG 1987). However, there were frequent deviations from the standard because of constraints on availability (international food pledges not always matching requirements) and difficulties in estimating numbers of potential participants (Hareide 1986; USAID 1987). For example, payments did not vary greatly by gender of household head within projects; they did vary across income terciles and also between projects (Table 36). Based on participants' own recall, the poorest households in Dinki and Gara Godo received payments that exceeded not only the standard payment for a day's work, but also the payments received by households in the middle and upper terciles. By contrast, households in the lowest tercile in Beke Pond and Adele Keke received payments below the recommended ration. The low grain payments in Beke Pond arose because food-for-work was seen by the implementing NGO as a means of

Table 35—Days worked in food-for-work activities at selected survey sites during worst famine year, by income tercile and gender of household head

Survey Site	Income Terciles			Gender of Household Head	
	Lower	Middle	Upper	Male	Female
	(average days worked/household/year)[a]				
Adele Keke	21	19	71	62	17
Beke Pond	72	78	83	76	[b]
Dinki	128	121	101	116	[c]
Gara Godo	52	79	76	69	65

Source: IFPRI survey, 1989/90.
Note: The worst year of famine varies according to individual household responses for the period 1983-88.
[a]Figures are presented on a per household rather than on an adult-equivalent basis because recruitment and food payment generally follow the former system.
[b]No female-headed households in Beke Pond participated in food-for-work.
[c]There were no female-headed households in the Dinki sample.

Table 36—Average grain payments received by food-for-work participants, by income tercile and gender of household head

Survey Site	Income Terciles			Gender of Household Head	
	Lower	Middle	Upper	Male	Female
	(average kilograms/household/day)				
Adele Keke	1.3	2.2	1.4	1.9	1.6
Beke Pond	0.6	0.9	0.6	0.7	[a]
Dinki	3.6	2.8	3.2	3.4	[b]
Gara Godo	3.6	2.5	2.2	2.6	2.7

Source: IFPRI survey, 1989/90.
[a]No female-headed households in Beke Pond participated in food-for-work.
[b]There were no female-headed households in the Dinki sample.

initiating activities that would become self-sustaining, and because the NGO did not wish to establish a dependency relationship.

Oil payments were also erratic. It was often easier for agencies to secure wheat than oil. Thus, none of the survey sites reached the recommended ration of 120 grams per day. Unfortunately, the lack of oil in food payments, a perception that grain wages were too low, and frequent delays in distribution led many households to believe that they were being deprived of promised wages. In Gara Godo, 33 percent of participants complained of late payments, while 41 percent felt that they were not receiving full wages. In Adele Keke, 91 percent of participants reported late deliveries, and 94 percent claimed that they never received a full payment.

Food wages were mostly consumed by the household. In Wollo, Kohlin (1987) found that 71 percent of food-for-work payments were consumed. Admassie and Gebre (1985) derived an average of 85 percent from their surveys. A comparable figure of 72 percent was found in Gara Godo. The remainder was sold to purchase clothing and other durables (24 percent) or to pay taxes (4 percent). However, in Dinki and Adele Keke, sales were much lower. In Dinki, all food wages were consumed, while in Adele Keke, 97 percent of the wage was consumed, with 3 percent sold to purchase salt and sugar.

Sales of the food wage during 1988 averaged 137 kilograms per household in Gara Godo despite an average price of only 0.2 birr per kilogram received for wheat, compared with an average 1987 price of 0.5 birr per kilogram.

More than 80 percent of respondents saw the price of both wheat and cooking oil fall after food-for-work payments were made. However, the fall was insufficient to prevent households selling part of their payment. In Gara Godo, 50 percent of respondents often purchased food-for-work wheat at the lower price, but the amounts were small because of limited income. The major benefit of food-for-work rations was that at certain times they substituted for the need to purchase food. Almost 50 percent of respondents in Adele Keke and 78 percent in Gara Godo reported that they made fewer food purchases because of food-for-work. Thus, as Ingram has argued, the "food is really a substitute for cash" (Traore 1989).

Which brings us to the food wage versus cash wage debate. The evidence that participants would support a shift in labor-intensive works away from food wages to cash wages (currently much discussed in Ethiopia) is not strong.[41] Kohlin's (1987) study found that 70 percent of respondents preferred a food wage. Admassie and Gebre (1985) found that 90 percent vote in favor of food. The present findings do not challenge earlier ones. In Gara Godo, 89 percent of respondents preferred food, and in Adele Keke the figure was 91 percent. Only in Doma was it found that 83 percent of sample respondents preferred a cash wage over food. As noted in Chapter 6, this was largely because of fears of delays in food payments resulting from the logistical difficulties of reaching isolated locations.

Given that income transfer is one of the key objectives of such projects, the more important question is, What is the real value of the alternative wage forms to the participants themselves? Holt (1983) estimates that in the early 1980s the value of a cash wage was roughly 2.5 birr, while the average cash value of a food-for-work ration at local market retail prices was at least 2.7 birr. However, few studies provide comparative data on the relative purchasing power of food versus cash wages on a time-series basis.

One exception is Erni's (1988) evaluation of the Lutheran World Federation project in Dinki. Taking the period from late 1986 to early 1988, Erni found that only during the first half of 1987 would a fixed cash wage have had a higher market value to recipients than the food wage actually received. His conclusion is that the food wage was both more urgently needed and more popular than a cash wage would have been.

Figures 25-27 illustrate a similar comparison for three other parts of the country. These figures indicate the quantity of maize that could be obtained by food-for-work participants (where the wheat ration is sold to purchase the cheapest alternative cereal, maize) versus the maize that could be purchased by recipients of a public works-based cash wage.[42] The results are mixed. In Dera (Arssi), food-for-work rations would have been of greater value to recipients than cash (in terms of maize equivalence) twice during the 1980s: at the peak of the famine (1985 to late 1986), and again temporarily at the end of 1988 (Figure 25). At other times, a cash wage would have been more valuable.

However, the story is different at other sites. At Hagere Mariam (Sidamo), the food wage was much more valuable than a cash wage from 1985 to late 1986 (Figure 26). But aside from a few months in 1987, the food wage remained more valuable than a cash wage up to the end of the observed period. More striking still is the picture in Alemaya (just 9 kilometers from Adele Keke). Here, the value of food wages remained consistently and substantially above the value of a cash wage throughout the period from 1985 to 1989 (Figure 27).

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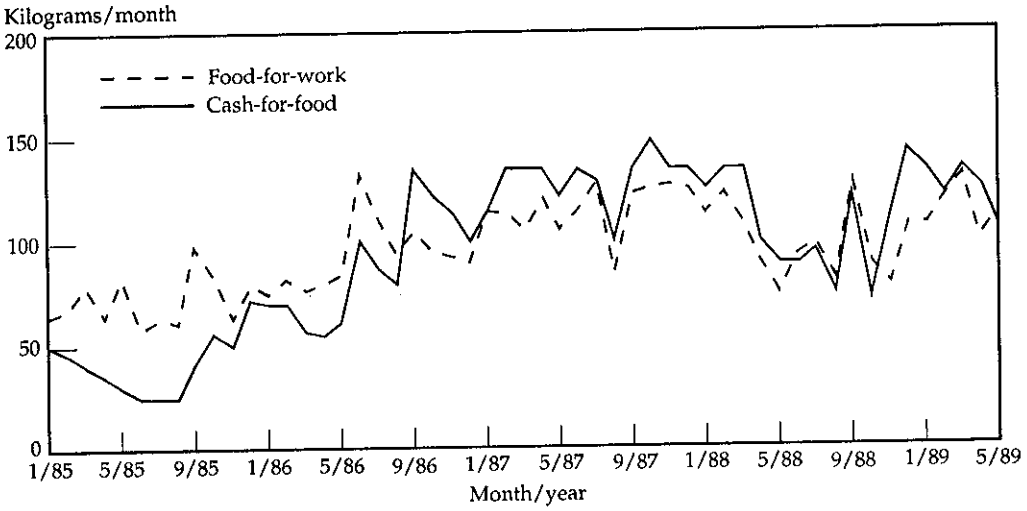
[41]For discussions, see Kumar 1985, Holt 1983, Hay 1986, D'Souza 1988, Maxwell and Belshaw 1989, and Rahmato 1990b.

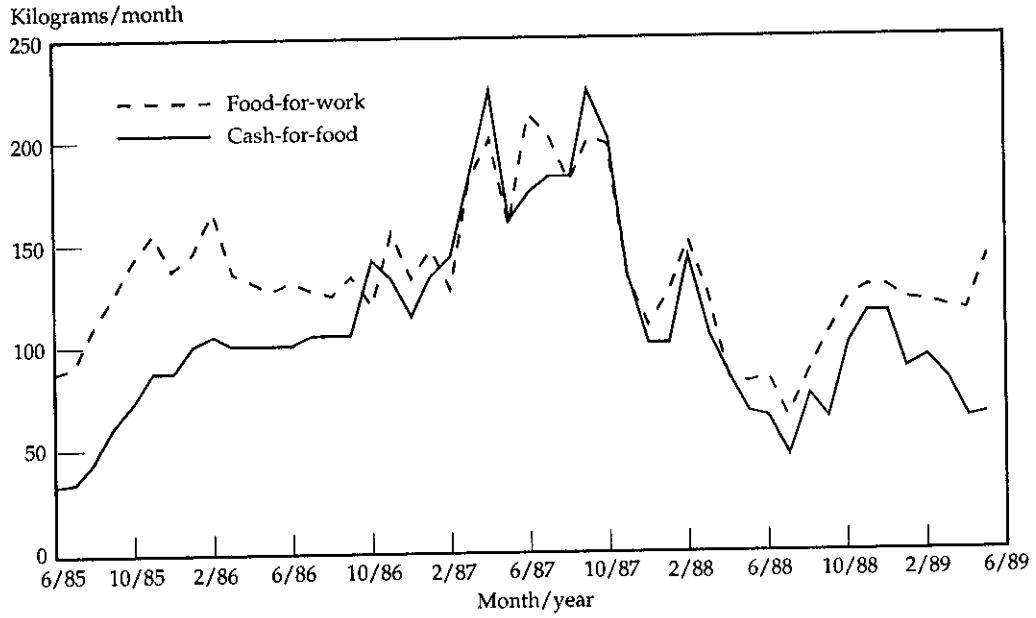
[42]The food wage is set at a notional 3 kilograms of wheat per day for 20 days per month. The maize equivalence is calculated using free market prices for wheat against maize. The cash wage is based on an average monthly wage of 45 birr per household paid by UNICEF in its cash-for-food program. Details of this program follow

Figure 25—Maize-equivalent value of food-for-work versus cash-for-food payments at Dera market (Arssi), 1985-89



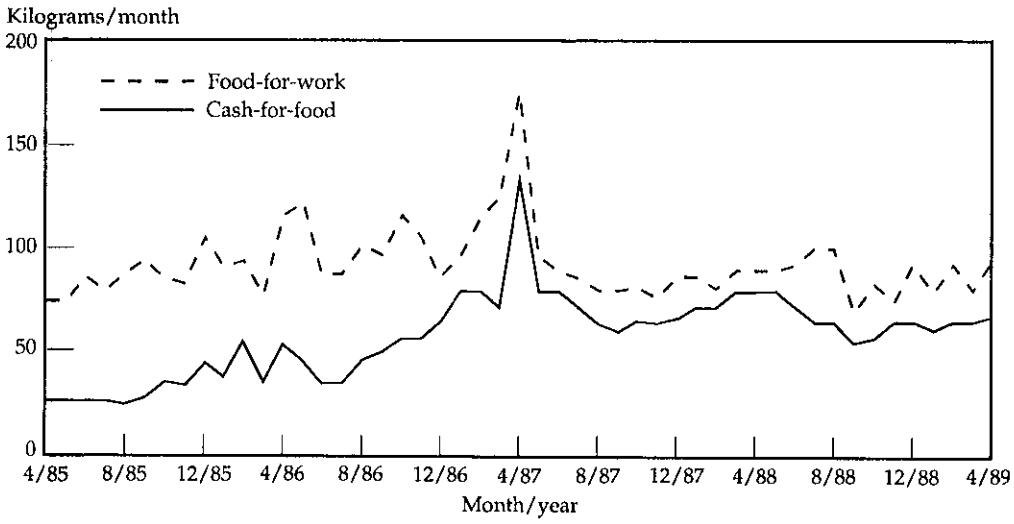
Source: Famine Early Warning System Project data disk obtained from Central Statistics Authority, Addis Ababa.

Figure 26—Maize-equivalent value of food-for-work versus cash-for-food payments at Hagere Mariam market (Sidamo), 1985-89



Source: Famine Early Warning System Project data disk obtained from Central Statistics Authority, Addis Ababa.

Figure 27—Maize-equivalent value of food-for-work versus cash-for-food payments at Alemaya market (Hararghe), 1985-89



Source: Famine Early Warning System Project data disk obtained from Central Statistics Authority, Addis Ababa.

While these are theoretical comparisons (since one rarely finds a food-for-work project in the same vicinity as a cash-paid public works project), they reinforce the earlier conclusions that where integration is poor, (1) markets operate very differently from one region to the next, and (2) food transfers via public works have a valuable role to play in the regions in which markets are the most constrained (Coate 1989). In other words, a close consideration of local conditions is essential to decisions about the most appropriate intervention at each location, and even for different phases of a crisis. A mixed food/cash wage may be preferable to single-commodity wages to allow greater flexibility in wage-value adjustments according to seasonal and annual fluctuations in purchasing power. The wage value itself may also be varied according to technical or more social (targeting) objectives. A flexible, rather than dogmatic, approach to the design of public works is clearly required, resting on complementary combinations of cash, food, and technical resources rather than on single resource inputs alone.

Disincentive Effects on Production. Another question frequently raised in the literature pertaining to public works is, Do food-for-work activities and payments have a negative effect on local agricultural production? The danger that food-for-work might have a depressing effect on agricultural production has been widely discussed (Maxwell 1978; FAO 1982; ONCCP 1986; Fitzpatrick and Strong 1988; Bryson, Chuddy, and Pines 1990). While this issue should not be discarded lightly, there is growing evidence (at the microlevel at least) that the danger may have been

overstated.[43] Household interviews conducted by Holt (1983) and Kohlin (1987) in Wollo, CARE-Ethiopia (1988) in Hararghe, Erni (1989) in Shoa, EEC (1989) in Eritrea and Tigray, Maxwell, Belshaw, and Lirenso (1990) in Gamo Gofa, and Admassie and Gebre (1985) across the country, all conclude that food-for-work has no negative effect on food production by participants.

The present survey concurs. Only a handful of respondents reported that they farmed less when participating in food-for-work. In Adele Keke, 54 percent of participants spent the evenings cultivating their farms after working on food-for-work during the day. In Gara Godo, almost 70 percent of respondents split their time in this way. Households not farming in the evenings usually had other household members to take over farm activities while the head was away on food-for-work. In Dinki, almost all participants reported that they had no option but to try to grow as much food as possible in case there is another drought; the food-for-work project did not change that need.

Technical and Social Value of Projects. Food-for-work is not just about providing work; it is also about putting labor to useful effect. The long-term impact of food-for-work depends on how technically sound the project is and how useful it is seen to be by local communities. Two of the factors most widely blamed for failed projects are poor technical design and implementation, and low community involvement in project selection and subsequent maintenance (Maxwell 1978; Holt 1983; Clay and Singer 1985).

On the technical side, design problems may result from a conflict between relief/employment-creation objectives and development/asset-creation objectives. Most food-for-work activities in Ethiopia were initiated in response to crises, both food crises and those of an environmental nature (closely linked to the former). Thus, projects have often been organized in an atmosphere of urgency, with limited assessments of community needs or of the technical validity of projects. Furthermore, many agencies have limited management and supervisory capacities for rapid expansion into the field of public works.

As a result, long inventories of project achievements abound that catalog with extreme precision the length of terracing created and how many millions of trees have been planted. But the quality and sustainability of such assets have rarely been assessed in detail. The World Food Programme itself notes that "the system emphasizes quantity rather than quality, outputs rather than objectives" and that intensive training given to project technicians has "so far had little impact on the selection of appropriate physical structures" (WFP 1989).[44]

For example, the Dinki road project achieved much in a short period of time—680 kilometers of rural roads were created through 2 million workdays of labor, mostly during the first half of 1987 (Erni 1988). But it was later discovered that more work was required to "arrange for proper water control for less maintenance, and in

[43]The macroeconomic disincentive effects of food-for-work on regional market prices and output are not discussed here. However, evidence of negative impact at this level is also slight (Maxwell 1978; Stevens 1979; Clay and Singer 1985; Bryson, Chuddy, and Pines 1990).

[44]Credit should go to the World Food Programme for its efforts since 1985 to evaluate activities in terms of impact and sustainability. Critical self-analysis is unusual among development organizations in Ethiopia.

some places reconstruction of basically wrong alignments" (Erni 1988). Brown (1989a) argues that most of the larger labor-intensive projects in Ethiopia suffer from a lack of anything but the most basic participatory and technical planning. Vallee's (1989) evaluation of 24 projects in Hararghe concurs, noting particularly the lack of adequate planning and predictions of food payment needs. He concludes that, "without good [planning] a technical project involving food-for-work leads to total confusion."

Such assessments are often echoed by the participants. In Gara Godo, 77 percent of respondents felt that none of the assets created through food-for-work will be operational within 10 years. The main reasons given were that bunds and terraces were often erected too hastily, often on bare hillsides, and that roads were poorly finished and unprotected against heavy rains. In Adele Keke, 30 percent of respondents claimed that most assets will be useless in 10 years. Another 35 percent qualified their response by saying that the assets might survive if properly maintained.

But will they be maintained? It has been argued that the main problems with public works are that labor motivation, productivity, and long-term commitment all tend to be low (Maxwell 1978; Clay and Singer 1985; Drèze 1988). Part of this may be ascribed to the characteristics of the labor attracted by public works—the distressed and disadvantaged. But much may be ascribed to a lack of community participation in project selection and implementation. Detailed consultation between communities and agencies before projects start is uncommon. According to Tato (1989), "there is no involvement of the local community in the planning process." This was confirmed by respondents at the Adele Keke site, where 97 percent of households have never been asked their opinions about the project, even by on-site project managers. The record is only slightly better in Gara Godo, with 86 percent of respondents complaining of poor consultation.

An extreme example of consultation failure is provided at Beke Pond. There, the implementing organizations designed projects believed to be of value to pastoral communities. In many instances their judgment proved to be accurate: there was no shortage of applicants for projects such as the digging of new wells, pond excavation, and hay-making. However, for reasons yet to be determined, few people joined food-for-work projects designed to rehabilitate and maintain old wells. According to Hodgson (1990), "that they would not do it even though food-for-work was offered is remarkable because it indicates that they are discriminating about the types of food-for-work they will do."

The same applies to efforts spent by participants on a project and the effort put into its maintenance. If participants do not perceive personal benefits from the project, their application to the task at hand is understandably low. The negative attitude of farmers to soil bunds has been widely reported, due to immediate losses of up to 10 percent of farmland (Admassie and Gebre 1985; EEC 1989; UNSO 1991). Yet more than 70 percent of total labor spent on food-for-work in 1985 went to soil conservation activities such as bunding (Hareide 1986; Franklin 1986). Admassie and Gebre (1985) reported negative attitudes toward water-control activities (ponds, river diversion, and spring development), because continuing droughts make benefits difficult to see. And the low survival rates of new trees is widely documented. Estimates of survival one year after planting range from optimistic highs of 80-85 percent (Finucane 1989; EEC 1989), through a mid-range of 30-60 percent (Erni 1988; WFP 1989; Stahl 1990), to lows of 0-15 percent (Wood and Stahl 1989; EEC 1989; Brown 1989b).

Problems in all three areas seem to stem from disagreements between participants and managers about the best species of tree to be planted where, about whom the tree (or bunds) will belong to in the long-term, and whether the digging of ponds is the most appropriate project for immediate local needs. When sample respondents in Adele Keke were asked what projects were least liked, the most common responses were stone bunds, terracing, and tree planting. Only 3 percent of households believed that assets created through food-for-work would ever benefit them personally: more than 21 percent thought that the government would own all assets, while the remaining 76 percent felt that assets would belong to the community as a whole. When asked what they would rather do instead, a majority of respondents (57 percent) desired to consolidate and extend roads that they had already created. In Gara Godo, on the other hand, pond excavation was the least popular activity, and many people would rather have built schools and clinics. Almost 41 percent of respondents believed that assets generated through food-for-work would belong to the community. The remainder felt that they would belong to the government. As a result, more than 56 percent of respondents were sure that food-for-work assets would never benefit households that had not participated in the project; the food wage was widely perceived to be the only direct benefit of food-for-work.

There is no doubt that improved consultation between communities and project organizers should be a high priority for future projects (Brown 1989a; Diriba 1991). Without a consensus on the validity of project objectives, and a clear understanding of asset ownership rules, few households will be willing to participate wholeheartedly in, and subsequently maintain, food-for-work projects (EEC 1989; WFP 1989).

On the other hand, there is little doubt that food-for-work was largely an effective means of transferring income to vulnerable households in times of need, as well as the vehicle for some valuable development activities. The best resource conservation works were those that required the least maintenance—vegetated bunds and terraces on common-access (but often enclosed) hillsides used purely for tree-planting. Furthermore, the multiplier effects of road-building in certain regions were marked. For example, three years after the food-for-work road had reached Dinki, two water mills had been established (with parts brought by four-wheel-drive trucks), new fruit plantations were planted and the traditional cotton spinning and weaving industry had been revived—all because of much-improved access to highland markets. Many lessons have been learned with food-for-work in Ethiopia, from which modified projects may benefit immensely in the future.

Cash-for-Food

The other type of public works in Ethiopia was the cash-for-food program. This innovative scheme assumed that in certain parts of the country it was a lack of purchasing power, rather than a lack of food, that was causing most hardship.[45] It was therefore believed that recipients of cash in such "pockets" of famine could tap into regional markets where food was still available at reasonable prices, thereby stimulating flows of food to distressed areas. Furthermore, it was anticipated that this

[45]Catholic Relief Services experimented with this approach for a short time during the mid-1980s, and Redd Barna implemented a small operation in Wolayta during 1987/88. However, neither program was on as large a scale as that organized by UNICEF.

was rectified in 1986 through the distribution of cash to households headed by women, mainly for the purchase of milch cows (McCann 1985).

Unfortunately, the poorest households had more difficulty in retaining and capitalizing on their new assets than did the relatively wealthier households. Forty-five percent of sample recipients from the lower tercile lost the ox soon after they received it (resold or died), compared with only 17 percent from the upper tercile. In most cases, loses were due to feeding problems coupled with the poor condition of animals received. More than one-third of all respondents complained that the ox was either in "poor" or "very bad" condition when they received it. A zebu ox in good condition weighs between 300 and 350 kilograms, but project oxen weighed on average less than 275 kilograms, and some weighed little over 200 kilograms (Gryseels and Jutzi 1986). What is more, although most recipients were given 120 kilograms of hay and supplementary feed blocks, many found it very hard to find sufficient feed to maintain the original weight. Almost 20 percent of sample recipients resorted to feeding thatch from their own roofs as well as cactus stems. Consequently, many animals died or had to be sold. Most of the households forced to sell their ox did so during the first harvest season, or less than three months after receiving them. The urgency of distress sales can be ascribed to the fact that immediate food needs were greater than the ability of households to wait three months until the next harvest.

While the loss of recently acquired assets was significant for recipient households, some other households benefited from high animal losses from the project. This was because the project distorted traditional systems of oxen and labor exchange. Prior to 1985, almost 30 percent of sample households engaged in a system called *ye qollo*. In this system, one household loans an ox to another for a year in return for a pre-agreed amount of the ensuing harvest. The borrower then joins another household, which also has access to a single animal to make a pair. The pair is then shared between the two farms on alternate days.[49]

During the project, the influx of 3 dozen new oxen made it easier for households without animals to bargain down the price of a loan. According to respondents, the loan of an ox in 1984 cost an average of 320 kilograms of grain. During the project, this fell to 270 kilograms in 1985 and as low as 180 kilograms in 1986 (Gryseels and Jutzi 1986).[50] Many respondents said that this disruption of the labor market caused animosity to develop between lenders and borrowers. However, feelings appear to have eased more recently. Because of animal mortality and sales, oxen rentals in 1989 had risen to 320 kilograms, placing further strains on the poorest households in their attempt to recover from famine.

In addition to the oxen, many households also received a package of 120 kilograms of seeds.[51] Targeting of the poorest households was effective in this free distribution, with 72 percent of sample households in the lower income tercile receiving seeds, compared with only 22 percent of households in the upper tercile.

[49]For details of such varied oxen- and labor-sharing arrangements in the Dinki area, see McCann (1987b).

[50]The price collapse was not due solely to the project, since the drought-related contraction of area cultivated also played a role (see Table 7).

[51]The package contained 50 kilograms of maize, 30 kilograms of chickpeas, 18 kilograms of teff, 15 kilograms of sorghum, and 7 kilograms of lentils (Gryseels and Jutzi 1986).

However, there were three problems with this part of the project. First, although the rains had already started, a number of households (five of the sample respondents) consumed most of the seed immediately and had none left to plant. Second, although most households did sow their seed on time (distribution took place in May/June of 1985), the 1985 rains were sporadic and poor. Thus, almost 20 percent of households lost their seed during protracted dry spells in the middle of the rainy season. These households argued that several monthly distributions of seed would have been more advantageous, enabling them to catch the later rains. Third, the maize variety provided (the major portion of the seed package) was less successful than expected. Lack of germination and very low yields from the maize were reported by 36 percent of recipients, most of whom argued that they were given a highland maize variety that was unsuited to the drought conditions of the lowlands.

Technology Transfers

It is widely recognized that sustainable growth in African agriculture, with its attendant improvements in food security at a household level, depends largely on technological change (Mellor, Delgado, and Blackie 1987). Such change can be of a longer-term nature, such as the progressive hybridization of cultivars to meet local requirements, or of a short-term nature. One short-term and one longer-term change in agricultural technology, both of which have their own bearing on reduced vulnerability to famine, were examined at two of the survey sites.

Single-Ox Plow

Linked to the Dinki ox-seed distribution considered above was a project component designed to have a more lasting effect on the farming system than the rebuilding of draft-animal stocks. Some farmers receiving the ox-seed package were also given a new type of plow that could be drawn by a single ox rather than a pair. Designed by the International Livestock Centre for Africa (ILCA), this innovation was thought to hold promise for the rapid regeneration of asset-depleted farm economies (Cross 1985). Tests in the highlands indicated that an adequately fed single ox could cultivate up to 70 percent of the area normally plowed by a pair, with no loss of overall yield (Gryseels et al. 1984). It was therefore assumed that farmers with access to only one ox would benefit from reduced dependency on traditional rental arrangements.

The results were disappointing. Most farmers received the plow in June 1985, when the plowing season was already under way, allowing no time for training people or animals in the new technology. As a result, farmers tried out the plow only during seeding, covering, and weeding. Few were satisfied. Even light tasks, such as soil covering and weeding, required much more time to complete than with a traditional pair (partly because many farmers worked their animals only four hours a day for fear of wearing them down). According to 72 percent of recipients, the technology failed because local soils are too heavy and stony, and because oxen were too weak to pull a plow alone. The remaining 28 percent argued that they might have adopted it had they not been forced to sell their oxen, or if the ox had not died prematurely.

In the event, after a few trials, most households never used the plow again. Households in the upper tercile, most of which owned a pair of oxen already, did not bother to use the plow again (Table 38). In 1986, farmers in the middle and lower

Table 38—Households receiving and using a single-ox plow during 1985/86, by income tercile

Item	Income Terciles		
	Lower	Middle	Upper
	(percent of households)		
Received plow	33	66	17
Used plow in 1986 for			
Soil preparation	17	28	0
Seed covering	0	6	0
Third weeding	11	22	0
Used plow after 1986	6	17	0

Source: IFPRI survey, 1989/90.

terciles tried to use the plow more often than wealthier farmers, but only for light tasks. Since 1986, only 23 percent of households have used the plow. Several commented that they had used the beam and yoke for firewood.

Gryseels et al. (1988) found similar results when evaluating adoption rates for the new plow in villages near Debre Berhan. Although preliminary trials were encouraging, "the number of farmers using the system remained a minor fraction of the farm population." The main factors cited for nonadoption were again heavy soils, weak oxen, and excessively sloping land. It was concluded that further research into plow adaptation, coupled with a focus on improving the condition of draft animals, was warranted.

Crossbreeding of Cattle

The last project considered here was designed not as an emergency intervention, but with long-term household food security in mind. Designed and implemented by ILCA, the goal of the project was to raise milk production through the crossbreeding of Friesian sires with local Boran cows. An attempt was made to upgrade the genetic stock of cattle in the region of Debre Berhan.

Between 1982 and 1984, 40 Debre Berhan households purchased cows of 75 percent exotic blood from ILCA (Gryseels et al. 1988). These cost an average of 578 birr, half paid in cash, half standing as credit.[52] Farmers were given access to veterinary services at a nearby ILCA station, as well as training on management of their new resource. Two recommendations were that farmers should cultivate 0.5 hectare of forage crops (a mixture of oats and vetch) and should purchase feed concentrates from Addis Ababa to supplement normal feed.

Of the 40 households that acquired a crossbreed, 32 were included in the IFPRI survey. One-third of the households purchasing a crossbreed falls into each of the three income terciles. This does not mean that additional poor households would not have liked to participate. On the contrary, most nonparticipants wishing to join the

[52]The average weight of the crossbreeds was 385 kilograms; they were sold at 1.5 birr per kilogram live-weight.

project (52 percent) were in the lower tercile, compared with only 16 percent from the upper tercile. Those who did not join felt that they could not afford to.

The crossbreeds proved to be highly productive. Between 1984 and 1987, each cow produced an average of 2.5 calves, with no significant difference in calving rates across terciles. On the other hand, the crossbreeds held the potential of yielding up to six times more milk than cows of the local breed (Wagenaar-Brouwer 1986). Between 1983 and 1985, crossbreeds monitored by ILCA yielded an average of 5.5 liters per day (Gryseels et al. 1988). In 1989, these animals were still producing a daily average of 5 liters, compared with 3.5 liters from the Boran cows (Table 39). Furthermore, although lactation was impaired by a lack of feed during 1987/88 (the worst year of crisis in this locality), the crossbreeds continued to maintain much higher yields than local cows. Crossbreeds gave an average of 4 liters per day during the crisis, compared with only 2.5 liters per day from Boran cows. Indeed, many local cows dried up completely after several months of stress, while no crossbreeds ceased lactating.

Income provided by a continued flow of milk was crucial to household welfare during famine years. Wagenaar-Brouwer (1986) found that household income was increased threefold by ownership of a crossbreed, because of increased milk and butter sales. The present study confirms this pattern. Income from milk and butter sales among crossbreed-owning households was almost six times greater than that received by owners of local cows during the mid-1980s famine. Although sales of milk products declined along with output, households in the lower tercile derived a daily cash income from their crossbreeds during famine years that was almost three times greater than that obtained by households only owning local cows.

However, problems did arise in several areas. First, it proved expensive to feed the crossbreeds. They weighed an average of more than 380 kilograms, compared with local cows weighing an average of 280 kilograms (Gryseels and Anderson 1983). Farmers owning crossbreeds claim that they consumed three times more feed

Table 39—Average milk yields and income from milk and butter sales from crossbreeds and local cows in Debre Berhan during famine years and in 1989, by income tercile

	Income Terciles					
	During Famine Years			During 1989		
Yields/Sales	Lower	Middle	Upper	Lower	Middle	Upper
Daily milk yields (liters)						
Crossbreeds	5.0	4.5	3.8	6.7	2.3	6.0
Local cows	1.2	1.1	5.2	4.8	0.5	5.2
Daily milk sales (birr)[a]						
Crossbreeds	33.0	21.0	29.0	58.2	54.8	46.2
Local cows	10.0	4.0	28.0	6.8	8.5	27.3
Daily butter sales (birr)[a]						
Crossbreeds	9.8	0.4	9.7	18.6	6.0	4.6
Local cows	4.9	2.0	14.1	1.2	3.4	15.5

Source: IFPRI survey, 1989/90.
[a]US$1.00 = 2.05 birr.

than local cattle and had higher water requirements. Although 90 percent of owners did attempt to cultivate special fodder crops as advised, few planted more than 0.1 hectare to oats and vetch (much less than recommended), and neither grew well. This caused shortages of seed in ensuing years, leading to complete abandonment of vetch and a decline in the area of oats planted each year.

Instead, farmers have put increasing reliance on purchased inputs. Monthly costs related to the purchase of hay, straw, and grass (both purchased and rented as grazing) for the use of crossbreeds have risen in all income terciles (Table 40). For example, the average spent on feeding crossbreeds each month by the lower tercile households was 16.3 birr in 1986 (few farmers purchased feed for Boran cows). By 1989 this had risen to an average of 33.2 birr (current prices). This trend in increased spending on feed was stalled among the poorest households only during the worst years of the food crisis (at this location), namely 1987/88. During that period, the poorest farmers could not afford to spend valuable capital on livestock feed, whereas it appears that the relatively wealthier farmers did not experience such a serious constraint.

Regarding the recommendation that food concentrates should also be purchased, few, if any, households were able to obtain such items after 1985: 64 percent of respondents said that the supply, even in the capital, was too irregular; another 20 percent complained of the high costs; and the remaining 16 percent referred to transport difficulties in moving bulky feedstuffs from the capital to the farm.

The other problem was the susceptibility of new cows to disease and to lowered food intake. Between 1983 and 1985, calf mortality was estimated at only 16 percent (Gryseels et al. 1988). However, this increased sharply between 1986 and 1989, which covered the worst crisis years. For example, out of a total of over 100 offspring born to the 40 original crossbreeds, only 35 were still on the farms. The others had either died from sickness and hunger during the crisis (67 percent) or had been sold to purchase food (23 percent).

Sickness was a constant problem. Although the original animals were vaccinated against rinderpest and blackleg and were drenched against liver fluke and worms, access to project veterinary services was suspended after 1985, after which farmers relied on services available through the Ministry of Agriculture. Such services were minimal.

Table 40—Monthly spending on additional feed for crossbred cows in Debre Berhan, by income tercile, 1986-89

Year of Purchase	Income Terciles			Average
	Lowest	Middle	Upper	
		(birr/year)[a]		
1986	16.3	20.9	29.9	22.4
1987	9.5	28.3	30.3	22.7
1988	8.1	31.1	24.2	21.1
1989	33.2	53.8	33.9	40.3

Sources: IFPRI survey, 1989/90; G. Gryseels et al., *Role of Livestock on Mixed Smallholder Farms in the Ethiopian Highlands: A Case Study from the Baso and Worena Woredda near Debre Berhan* (Addis Ababa: International Livestock Centre for Africa, 1988).

Note: Spending on additional feed is for hay, straw, and grazing pasture.

[a]US$1.00 = 2.05 birr.

Vaccines against foot-and-mouth disease were unavailable, and it was hard to secure regular visits from government veterinary officers. This was a severe constraint to achieving optimal output, since 90 percent of the sample claim that crossbreeds were sicker more often than Boran cows. Topping the list of serious ailments was liver fluke, listed by 75 percent of respondents as the worst problem, followed by bloating (74 percent), foot-and-mouth disease (55 percent), worms (37 percent), and mastitis (18 percent).

While the short-term impact of the crossbreeds has been positive through increased milk yields and associated income, the longer-term sustainability of such an exercise in genetic improvement depends on several factors: much-improved control of disease (through greater veterinary support); stronger extension work in fodder cultivation (including improved seed availability); analysis of the economic and technical feasibility of feed-concentrate production and distribution in the rural areas of Ethiopia; and institution building and support of the line ministries that should take responsibility for long-term management of such far-reaching changes in smallholder agriculture.

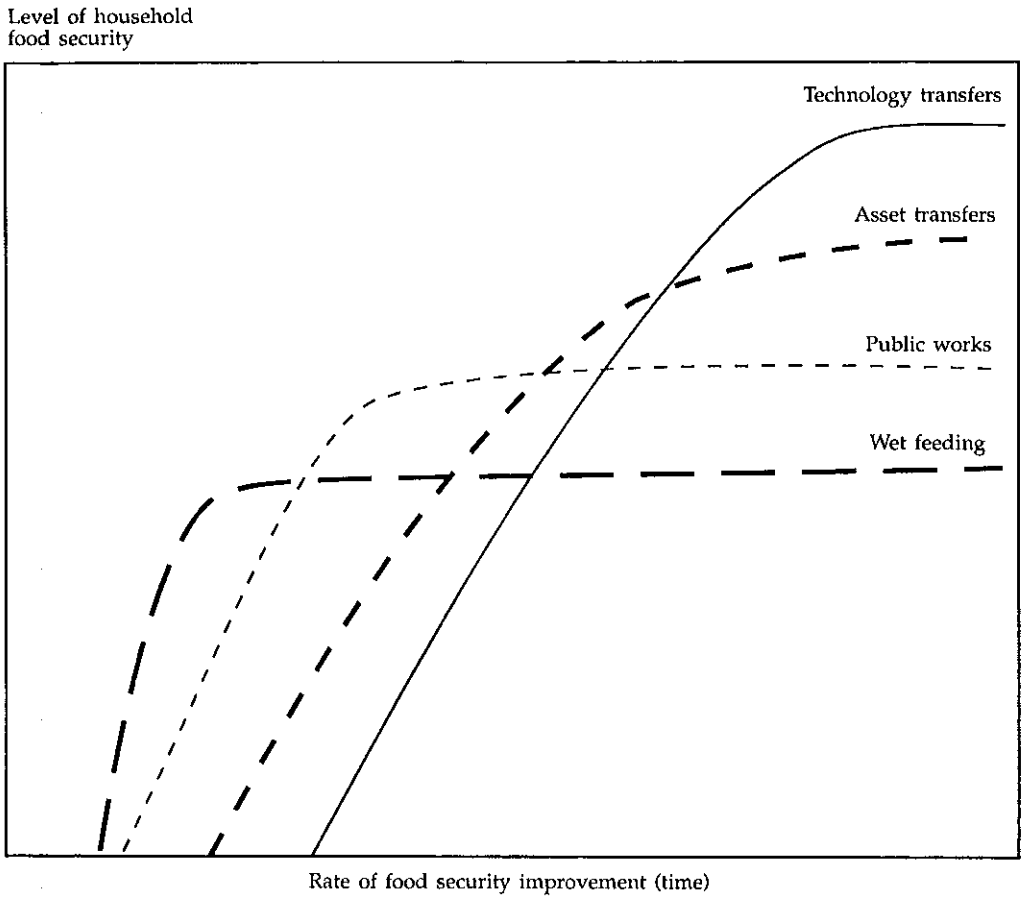
Public Intervention Costs

Thus far in this chapter, operational considerations relating to selected public interventions against famine have been examined. The discussion has shown that public response to crisis in Ethiopia has been characterized by the activation of a wide range of projects and programs. However, a question yet to be raised is, What is the optimal mix of such interventions for achieving a cost-effective reduction in household vulnerability to famine? While the answer lies beyond the scope of this report (because of data limitations), the following section addresses the issue by outlining the key data that would be required for future cost estimations.

Each of the projects considered above works toward a common goal of protecting households against the undesirable consequences of famine (mortality, dislocation, destitution), be it in the short or the longer term. Figure 28 illustrates the potential complementarity of different project approaches that operate under inherently different time frames. For example, the most immediate impact on food security is provided by a wet feeding program, although the longer-term impact of this instrument on sustainable food security is negligible (Pinstrup-Andersen 1988; Hopkins 1990). By contrast, schemes that transfer assets or new agricultural technology have little immediate effect on food security (witness the problem in Dinki where poor households could not retain newly acquired oxen because of short-term food needs), but their potential impact on longer-term food security is more profound.

Of course, the different interventions do not operate in a vacuum. The marginal welfare gains (or losses) associated with individual interventions may depend on which other projects and policies are implemented in the same location; for example, free food aid may compete with food-for-work, and as we have seen, the benefits of cash-for-food may be compromised by policies inhibiting private trade. Ideally, therefore, a public strategy for famine intervention should be based on a sound understanding of the trade-offs between projects, programs, and policies within an overall package of responses. And such an understanding must be firmly grounded in an analysis of the cost-effectiveness of each action taken.

Figure 28—Diagrammatic outline of the effects on household food security of selected public interventions against famine



However, quantification of intervention costs is not straightforward. According to Reutlinger (1988), the cost-effectiveness of an intervention designed to transfer income (most of the projects considered above are income-transfer projects in various guises) depends not only on the marginal income transferred, but also on the subsidy component of the scheme. The marginal income conveyed can be calculated as the difference between income received by project participants and the cost to the participants (such as potential income foregone in other activities). And the subsidy component represents the difference between the value of assets or services generated and the cost of the scheme to the public (Reutlinger 1988).

Unfortunately, the data required for analyzing projects according to these parameters is rarely obtained in an operational setting (Alderman and Kennedy 1987; Berg 1987; Reutlinger 1988). Although research into the cost-effectiveness of specific nutritional improvement programs has progressed considerably since the mid-1970s (see, for example, Reutlinger and Selowski 1976, Scandizzo and Knudsen

1980, Pinstrup-Andersen 1981, Mateus 1983, and Berg 1987), the same cannot be said for research into the cost-effectiveness of famine interventions. Many evaluations do provide detailed audits of input disbursements (food, cash, assets), numbers of beneficiaries, and gross costs (NORAD 1984; RRC 1985b; Jareg 1987; UNHCR 1988). But few generate the data required for detailed net cost calculations.

For example, UNICEF (1988) attempted a cost comparison between public works that pay a cash wage and those that pay a food wage. While the prima facie costs of cash-for-food are shown to be comparatively low compared with food-for-work (Table 41), the cost accounts for both project types are no more than partial financial analyses, which exclude local and regional (private) marketing costs, net inflationary effects on local markets, opportunity costs of participants' time, the discounted present value of income received by target groups from the capital goods (assets) created by the projects, or even the sustainability of income derived from assets created.

A more complete assessment of the comparative costs of these two projects might therefore be hypothesized as follows:

$$\text{Cost-Effectiveness} = \frac{\text{Incremental Calories Consumed by Target Group}}{\text{Total Costs}}, \qquad (5)$$

where incremental calories = (net income effect for participant, effect on prices, effect on production) and total costs = (project fiscal costs + private costs + national costs).

Table 41— Costs of selected public works interventions

Type of Intervention	Food Cost	Capital	Inland Transport, Storage, and Handling	External Transport, Storage, and Handling	Administration	Total Project Cost	Cost per Year
				(US$1,000)			
Food-for-work							
World Food Programme	48,541	...	16,244	11,180	145	139,056	46,352
Government	...	16,946	...	...	19,652		
Other	...	6,174	20,174	...	...		
Lutheran World Federation	2,963	...	1,967	...	1,534	6,596	3,298
Other	...	67	65	...	...		
Cash-for-food							
UNICEF	...	445	6	...	7	458	458

Sources: World Food Programme, *Project Ethiopia 2488 (Exp. II)*, Report No. WFP/CFA:21/14-A, Agenda Item 14(a), presented to the twenty-first session of the Committee on Food Aid Policies and Programmes, 26 May-6 June (Rome: 1986); T. Erni, *Final Report on N. Shewa Relief and Soil and Water Conservation Project in Shewa, Ethiopia, June 1985-June 1988* (Addis Ababa: Lutheran World Federation, 1988); and UNICEF, "Quick Assessment: Cash-for-Food in Ethiopia" (UNICEF/RRC emergency intervention evaluation, draft report, Addis Ababa, 1988).

In such a calculation, the various project, private, and national costs to be taken into consideration might include the following:

- Project fiscal costs
  - Food import and distribution costs (commodity costs, sea-freight, port, storage, road transport)
  - Project implementation costs (consultants' reports, tools)
  - Administration costs (project)
  - Investment in supplementary activities
- Private costs
  - Opportunity cost of target groups' labor time (partly in terms of production lost through possible disincentive effects)
  - Local deflationary costs to food producers
  - Possible transport, accommodation, and food costs to participants
- National costs
  - Project-related government administrative costs (salaries, per diems, equipment, monitoring, and evaluation)
  - Depreciation of roads, port facilities, and road transport fleet

None of the interventions considered for this study have collected all of the above data. For instance, a broad indication of the overall costs associated with some of the public works, food, and income transfer projects considered in this chapter is given in Table 42. Unfortunately, even these data generally exclude fixed costs, foreign personnel costs, recurrent operational costs, depreciation of equipment and materials, opportunity costs of local labor, or total numbers of actual beneficiaries.

However, Table 42 does show that there are quite wide variations in project costs per household even if one compares only gross project costs and numbers of beneficiaries. For food-aid distribution, the range runs from US$12 (in relation to the very accessible Debre Berhan area) to US$50 (for the very inaccessible villages around Dinki). Where food-for-work is concerned, the costs vary from US$35 to US$207. The latter differences can be ascribed partly to scale of operation. While one food-for-work intervention (the large WFP/MOA project) depends on imported food and draws considerable external handling costs as a result (but shares much of its cost with the host government), another much-smaller-scale project purchases local foods, thereby avoiding external transport, shipping, and handling costs, but cannot share its relatively much larger inland handling costs with a government partner because it is the sole implementing agency (Table 41).

These wide differences in gross project costs, coupled with the other serious data limitations outlined above, argue for more thorough, standardized (yet transparent) accounting procedures among agencies involved in famine work to permit improved cost calculations.

Given limited public resources for famine alleviation, concern about cost-effectiveness is not merely academic. The choice of projects and policies used in building up an optimal package of public responses must be guided by the following considerations:

- Intervention coverage. Are vulnerable target groups adequately reached, be it directly or indirectly?
- Cost-efficiency. Are nutritional improvement and increased food security being achieved at least cost (both fiscal and human)?

Table 42— Overview of costs related to selected project interventions

Project Category/ Type	Duration	Donor Cost		Government Cost	Total Participants	Cost per Participant	Main Donors	Implementing Agencies
		Capital	Food	Capital				
		(US$1,000/year)			(households)	(US$/ household)		
Public works								
Food-for-work	1986-88	3,500	2,963	...	31,250	69	Canada/ ADC/ILCA/ Caritas	LWF
Food-for-work	1988-89	n.a.	310	...	8,800	(35)	Redd Barna	Redd Barna
Food-for-work	1987-90	27,568	48,540	62,946	1,000,000	46	WFP	Ministry of Agriculture
Cash-for-food	1984-88	22	431	n.a.	2,016	(39)[a]	UNICEF	UNICEF/RRC
Food transfers								
Food aid	1985	6	46	...	597	12[b]	OXFAM (U.S.)/ GTZ/ILCA	ILCA/OXFAM
Food aid	1985	586	876	...	29,000	50	Canada/ ADC/ILCA/ Caritas	LWF
Income transfers								
Ox-seed distribution	1985-88	102	17[c]	...	597	50	OXFAM (U.S.) AFCF/GTZ	ILCA/OXFAM

Sources: Guido Gryseels and Samuel Jutzi, *Regenerating Farming Systems After Drought: ILCA's Ox/Seed Project, 1985 Results* (Addis Ababa: International Livestock Centre for Africa, 1986); Redd Barna records at Bolosso Sora (1989); T. Erni, *Final Report on N. Shewa Relief and Soil and Water Conservation Project in Shewa, Ethiopia, June 1985-June 1988* (Addis Ababa: Lutheran World Federation, 1988); UNICEF, "Quick Assessment: Cash-for-Food in Ethiopia" (UNICEF/RRC emergency intervention evaluation, draft report, Addis Ababa, 1988); World Food Programme, *Project Ethiopia 2488 (Exp. 2)*, Report No. WFP/CFA:21/14-A, Agenda Item 14(a), presented to the twenty-first session of the Committee on Food Aid Policies and Programmes, 26 May-6 June (Rome: 1986).

Notes: n.a. means not available. Costs exclude overhead and professional personnel.

[a]Based on UNICEF's evaluation of a single cash-for-food site for one year of operation (1987).

[b]Eight kilograms of wheat was distributed to each of 597 households (mean size 6.4) for six months. Wheat (mixed varieties) was purchased from Agricultural Marketing Corporation at wholesale price of 51.65 birr/100 kilograms in 1985/86 (US$1.00 = 2.05 birr).

[c]"Food" costs in this instance represent the estimated value of the seed package distributed to each participant household, based on 1985/86 Agricultural Marketing Corporation wholesale prices.

- Efficacy. Are actions actually moving vulnerable households out of food insecurity, as opposed to just reaching them at a reasonable cost?

An assessment of the comparative costs of intervention types and scales, based on better net-cost information as outlined above, remains essential to improved priority-setting as part of an effective counter-famine strategy. Such an assessment should be a high priority as an early step of any well-funded national famine-preparedness strategy.

8

CONCLUSIONS FOR POLICY AND PROGRAM INTERVENTION

Three major conclusions emerge from this study of famine in Ethiopia. First, famine is inseparable from poverty. Although the experience of famine differs between households and regions, the underlying conditions that contribute to famine in Ethiopia are quite similar: proneness to climate-driven production fluctuations; a lack of employment opportunities; limited asset bases; isolation from major markets; low levels of farm technology; constraints to improvements in human capital; and poor health and sanitation environments. While military conflict and drought contribute to food insecurity and famine, even in zones not immediately affected, they do so principally where people are already too poor to cope. This underlines the importance of combating the root causes of poverty as an essential part of any strategy aimed at preventing famine. However, it is also worth restating the obvious: the drain of human and economic resources associated with war is in itself one of the root causes of poverty that needs to be overcome.

Second, famines do not happen suddenly. Famines build on high levels of food insecurity that the poorest households cannot withstand and that governments are not prepared for. Famines, therefore, result from an accumulation of events that progressively erode the capacity of poor households to deal with short-term shocks to the local economy. Shocks often take the form of environmental extremes, but the conditions that promote household vulnerability to such extremes develop over long periods. The coping capacity of poor households in the famine-prone regions of Ethiopia was substantially reduced in the 1980s. This suggests a limited scope for reliance on private solutions, depending on free access to markets as a means of rectifying past policy mismanagement (Mortimore 1991). The current structural constraints to rural economic growth need to be removed through appropriate, cost-effective action in the public domain.

Third, famines are preventable. The basic building blocks for rural growth, the data and logistical requirements for early warning, and the fundamentals of effective famine-relief interventions are much better understood now than they were at the start of the 1980s. What remains to be elaborated in Ethiopia, as in much of famine-prone Africa, is a comprehensive strategy for overcoming existing constraints to effective policy design and implementation.

It is proposed that such a strategy should be based on the broad principle of employment creation led by rural growth, but should be narrowly focused on a key set of public policy priorities. This priority list assumes the prior implementation of appropriate price-liberalization policies, as well as the freeing of markets for food, labor, and capital. In the short term, the priorities include

- Institutionalization of emergency code legislation. Such legislation defines three areas of public responsibility: (1) capability to record and diagnose

distress signals and to alert appropriate institutions of the danger; (2) development of the local institutional capacity to organize an effective response to such alerts; and (3) design of explicit targeting strategies to cover population groups most at risk. Successful implementation of such legislation, which already exists in final draft form (RRC 1991), requires a strong political, financial, and technical empowerment of local government structures. These structures should also bear primary responsibility for the siting and management of regional emergency food stocks. Recent improvements in early warning have limited value if they are not unequivocally tied to timely response that is based on previously prepared technical and economic appraisals of potential interventions.

- Stabilization of food entitlements for the poor in famine-prone areas. In the short term, improved famine relief remains a priority for Ethiopia. The key issues of improved coordination, targeting, and cost-efficiency need to be confronted more openly by NGOs and donors, as well as by government. Much was learned during the 1980s about the needs of famine-affected households and how to reach them more quickly. However, evidence suggests that food resources alone have limited impact, even for famine mitigation. Improved public crisis response, aimed at minimizing human and capital asset loss, needs to be based on (1) a combination of food and nonfood resources that reduces income and productivity constraints while tackling the primary need of hunger alleviation; (2) participatory planning of project interventions, aimed at improved targeting and communication between managers and relief beneficiaries; and (3) more decentralized supervision of intervention activities. The potential for expanding past grass-roots relief activities of local religious bodies should be explored with a view to improved participatory planning and targeting.

In the longer term, policy emphasis should be focused on four crucial areas:

- Promotion of agricultural growth through technological change and commercialization. In Ethiopia, with its huge dependence on agriculture, improved food security depends on a strategy of agricultural growth. But such a strategy could be inhibited by a narrow focus on staple food production. Concern with national food security driven by domestic self-sufficiency may be at odds with improved household food security based on higher real income from multiple sources. The removal of constraints to growth in food production, therefore, requires a broader strategy emphasizing agricultural growth through technological change and commercialization. This applies to areas of drought as well as to the higher potential (surplus) regions (RRC 1991).

  The adoption of improved technology is one of the keys to long-term famine prevention, both through its potential to enhance agricultural productivity and through its related capacity to increase rural employment. Small-scale irrigation holds much potential as long as local priorities and technical feasibility are kept well in mind. The scope for raising crop and animal yields is great, given adequate investment in cultivar research, in much-improved veterinary extension, and in supporting community-based soil- and water-management activities. Yet improved technology and practices should not be restricted to staple food production, even where improved calorie consumption is desired (von Braun, Puetz, and Webb 1989; Webb and von Braun 1992). Growth in the

staple food sector and the cash crop sector are not mutually exclusive. Both depend on a refocusing of investment on the smallholder as well as on appropriate market and price-liberalization policies, infrastructural development, access to inputs and credit for the poor, and improved tenure rights (for pastoralists as well as farmers).

- Employment creation through labor-intensive public works. Employment creation for both rural and urban populations has taken on a new urgency. In rural areas, the upgrading of infrastructure and containment of natural resource degradation are essential development tasks that public authorities can realize through the offer of private employment. In remote parts of Ethiopia, the multiplier effects of new roads are significant. In other areas, much progress has been made in refining watershed protection and management techniques. Via the income transferred, such works also play a vital role in supporting the purchasing power of the poor. Where markets are severely constrained, food-for-work has an important role to play in transferring food income to the poor. Where markets operate more effectively, a mixed food/cash wage or purely a cash wage is the expressed preference of participants, since this offers more flexibility. In either situation, a more flexible approach to wage-setting over time could improve both targeting and efficiency.
- Support for food security among the urban poor. The scope for reviving the urban construction sector to meet high demand for housing and for urban road and water infrastructure rehabilitation is huge. Many international donors, as well as the new government, argue for a larger role for labor-intensive works in Ethiopia in the 1990s. As with other famine-relief projects, the success of such works will depend on improved technical and participatory design, the complementing of nonfood resources with food (and of public works with other nonlabor-focused interventions), better communication with participants about recruitment and remuneration criteria (including greater flexibility in modes of payment), improved and decentralized management and supervision, and the integration of implementation with sound monitoring and evaluation.
- Improved health and human resources. Epidemic disease spreads rapidly during famine and accounts directly for the mortality of huge numbers of malnourished and unvaccinated people. Investment in an extensive network of rural clinics could help minimize human losses during famine by containing epidemics and could improve the collation and analysis of child-monitoring data. The improvement of potable water supplies also remains a priority. At the same time, improved education is needed. The upgrading of human capital (supported where possible through school feeding programs), with a positive emphasis on female education, has strong multiplier effects in income growth, technology adoption, and the control of population expansion. All are crucial to long-term food security enhancement.

The positive complementarities between these priorities are promising and if allowed to operate in a favorable macroeconomic environment would permit high returns to public investment. There is no single, public intervention that can alone eradicate famine. Nor is there a universal, market-based solution just waiting to be tapped by vulnerable households. Indeed, many of the latter no longer have the ability to take advantage of the potential for private initiatives. It is specifically these households that must be targeted through appropriate public action.

Programs such as wet feeding, food-aid distribution, public works, asset distribution, and technology transfer can operate simultaneously so long as they are carefully coordinated to balance and complement each other rather than compete. But the design of all such programs should be grounded in a better understanding of the dynamics of the rural economy. Sound household-level information is still surprisingly scarce in Ethiopia. A widely held belief in the uniformity of rural conditions prevents appropriate attention being paid to the distributional consequences of policy and project interventions. As a result, the poorest of the poor (those first, and most, vulnerable to famine) are sometimes overlooked.

However, even well-designed and well-targeted projects cannot on their own resolve Ethiopia's famine problem. A consistent set of national policies, designed to support strategic project interventions, is required over the next decade (and beyond) to remove Ethiopia's long-standing obstacles to rural growth. Lasting peace through improved popular participation and sustained poverty reduction through rural economic growth are the best foundation stones for a future without famine.

APPENDIX: PROFILES OF THE SAMPLE COMMUNITIES

The first site surveyed is called Doma (Table 43). Located in Gamo Gofa, 102 kilometers south of Sodo, this village was founded in 1985 with support from the Relief and Rehabilitation Commission (RRC). The settlers chose to leave overpopulated villages in the highlands, which had been badly hit by droughts in 1983/84.[53] They moved to an isolated area of virgin forest and savanna grassland at the foot of the mountains, west of Arba Minch. Although served by two sizable rivers, providing limited irrigation potential, the area was found to be semi-arid (Table 44). Drought destroyed the 1985 harvest. Given the hardships of relocation, low food supplies, and malaria (to which highlanders had not previously been exposed), a crisis was not long in developing. A feeding camp was set up in Doma by the RRC and UNICEF in early 1986. This closed later that year when the crisis abated. However, similar harvest failures in 1988, 1989, and 1990 threatened to trigger a famine greater than that of 1985.

Table 43—Socioeconomic profile of survey sites, 1989/90

Survey Site	Administrative Region[a]	Number of Households in Village	Number of Households Surveyed[b]	Mean Household Size	Main Ethnic Groups
				(persons)	
Doma	Gamo Gofa	230	100	6.2	Gamo
Korodegaga	Arssi	186	102	6.3	Oromo
Dinki	Shewa	120	57	6.4	Amhara/ Argoba
Gara Godo	Wolayta[c]	1,400	65	7.9	Wolayta
Beke Pond	Sidamo	106	48	6.2	Borana/ Gabbra
Adele Keke	Hararghe	350	107	5.8	Adere
Debre Berhan	Shewa	746	68	6.5	Amhara/ Oromo

Source: IFPRI survey, 1989/90.
[a]Pre-1987 regional names are used (see Chapter 3).
[b]Given the differences in sample size at different survey sites, a system of weighting is used whenever data are pooled across sites. The weights are derived according to estimates of the number of households in each of the districts in which surveys were undertaken. These estimates are based on recent population census information.
[c]Although Wolayta is not strictly an administrative region (it being part of Sidamo Province), it is commonly referred to as if it were.

[53]This resettlement was not part of the larger government initiative to move people from drought-prone regions in the north to the southern and western areas of the country. It was an indigenous move assisted by RRC and UNICEF.

Table 44—Agro-ecological profile of survey sites, 1989/90

Survey Site	Mean Annual Rainfall[a]	Rainfall Modality	Main Crops	Main Livestock	Main Cultivation Technology
Doma	500	Unimodal	Tubers/maize	Cattle	Hand hoe
Korodegaga	600	Unimodal	Maize/beans	Cattle	Ox-plow
Dinki	700	Bimodal	Millet/teff	Cattle/goats	Ox-plow
Gara Godo	1,300	Bimodal	Barley/tubers	Cattle/sheep	Hand hoe
Beke Pond	650	Bimodal	Maize/sorghum	Camels/cattle	Hand hoe
Adele Keke	1,200	Unimodal	Millet/maize	Cattle	Hand hoe
Debre Berhan	1,300	Bimodal	Barley/beans	Cattle/sheep	Ox-plow

Source: IFPRI survey, 1989/90.
[a]Data used are for the nearest official rainfall-recording station, 1961-89. The data are recorded by the National Meteorological Services Authority.

The second site, Korodegaga, also faced a renewed crisis in 1989/90 following its earlier experiences in 1985/86. This village lies on the floor of the Rift Valley in the drought belt of an otherwise prosperous region.[54] Continued droughts beginning in 1981 resulted in severe food shortages in 1986. Several respondents noted that they were afraid at that time "of becoming a second Wollo." Conditions have improved only marginally since, and rain failure in 1989 signaled another crisis. Thirty percent of respondents in this village report that the worst of the famine is not over yet.

The third site, Dinki, is in the foothills of the Rift Valley on the border between Shewa and Hararghe. In April 1989 a radio quiz show called "Ersom Y'Mokerut" (Try Your Chance) asked a contestant, "Which village in Shewa was one of the worst famine-affected communities in the country during 1984/85?" The correct answer was Dinki. Unattainable by motor vehicle until June 1986 (when a food-for-work project built a road), this village could only be reached from the highland town of Debre Berhan by a two-day mule ride down steep mountain slopes. Food shortages were severe in 1985, and a cholera epidemic caused high mortality. People died on the way to the river or in the fields and were usually buried where they fell. It is reported that rather than face the risk of burial in unhallowed ground, large numbers of Christians converted to Islam, which places relatively less emphasis on hallowed burial.

Gara Godo is a village located in the densely populated region of Wolayta. Mean population density for Wolayta stood at 222 persons per square kilometer in 1988, compared with a national average of 40 persons per square kilometer (Redd Barna records). The mean size of surveyed households was indeed higher than at the other sites—7.9 persons compared with an average for the other sites of 6.2 (Table 43). Also, the number of households per village is higher than in other areas. Farms are small and households depend as much on root crops, such as enset (Ensete ventricosum), as on cereals.

[54]It too has some irrigation potential (being situated alongside the Awash river), but numerous attempts at developing such potential have failed (for details, see Webb 1989b).

Unfortunately, a paucity of rain in 1983 and 1984, coupled with bacterial disease that destroyed much of the enset crop, led to famine here before most other parts of the country: the so-called "green famine." As Goyder and Goyder (1988) have commented: "To the casual observer, [Wolayta], after the main rains had begun in July 1984, looked like a verdant and fertile area; yet people starved in their own homes." A feeding camp, established in Gara Godo to serve the locality, was closed only in 1987 (Table 45). A malaria epidemic caused considerable mortality in mid-1988. This was followed in November 1988 by an outbreak of meningitis that claimed the lives of up to 10,000 children in the area in just six months.[55] In 1989, 2,500 people (roughly half of the population of Gara Godo) were still officially registered by the RRC as being "in need of assistance" (RRC records in Gara Godo, 1989).

Beke Pond is not a village, but a watering hole in the rangelands of southern Sidamo. Nomadic pastoralists settle in camps around this pond for a few months to several years. The inhabitants of three camps were interviewed: one inhabited by Gabbra pastoralists, who traditionally maintain a high ratio of camels in their herds, and two inhabited by Borana, who have a tendency to stock more cattle than camels. Both pastoral groups were affected by the collapse of livestock prices relative to cereal prices in 1985/86. Rainfall in the area did not exceed 360 millimeters per year from 1983 to 1986, thereby reducing the availability of both forage and water for animal herds. Pastoralists were forced to sell animals at a loss or risk losing them. An RRC feeding camp in the town of Mega was still occupied by pastoral families in 1987 (D. L. Coppock, personal communication 1990).

The last two sites, Adele Keke and Debre Berhan, are both located in the highlands. Adele Keke, lying midway between Harer and Dire Dawa in Hararghe, suffered a crisis when drought spread eastward from Wollo in 1985/86. Debre

Table 45—Household participation in public interventions, by survey site

Survey Site	Total ouscholds in Sample	Percentage of Households Participating[a]					
		Feeding Camp	Food Aid	Food-for-Work	Cash-for-Food	Asset Transfer	Technology Transfer
Doma	100	...	52	2	97	97	...
Korodegaga	102	...	41	4	99	...	...
Dinki	57	...	95	80	...	36	62
Gara Godo	65	35	44	55	10	14	...
Beke Pond	48	...	75	46	...	...	...
Adele Keke	107	...	67	64	...	...	...
Debre Berhan	68	...	2	...	...	...	46

Source: IFPRI survey, 1989/90.
[a]Individual households may have participated in more than one of the interventions.

[55]This is an estimate based on discussions with local RRC officials and NGO staff stationed in the area. The official number of cases reported for the country as a whole in 1988 was only 359. In 1989 the number of cases officially rose to 41,139 (PCEPR 1990).

Berhan, located in northern Shewa, also faced a crisis later than the lowland villages, when shortfalls in food and fodder in 1986/87 (caused in this instance by frost damage and hail storms) resulted in livestock mortality, asset depletion, and, finally, food shortages among the poor. The survey focused not on the town of Debre Berhan, but on four surrounding villages called Fagi, Karafino, Kormargefia, and Milki. These villages, referred to collectively as the Debre Berhan site, escaped excessive hardship in 1985, although a large feeding camp was opened in the town to receive distress migrants escaping from Wollo.

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