DROUGHT AND FOOD SHORTAGES IN ETHIOPIA:
A PRELIMINARY REVIEW OF EFFECTS AND POLICY IMPLICATIONS

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1. SUMMARY

This is a first progress report for the **Drought and Food Shortages in Ethiopia** research project undertaken by the International Food Policy Research Institute (IFPRI), in collaboration with the International Livestock Centre for Africa (ILCA) and the Office of the National Committee for Central Planning (ONCCP). The project currently pursues two major tasks:

- A detailed descriptive and quantitative account of the most serious droughts in Ethiopia during the 1970s and 1980s, with an assessment of their effects on production, markets, prices, and consumption.
- Empirical identification of the population groups most adversely affected by such droughts, and of measures that might assist them cope more effectively with the consequences of drought.

Both tasks shall involve policy analysis and provide tentative conclusions for both policy and programs designed to improve sustainable food security in drought-affected areas. The second of the two tasks, which involves field data collection and analysis, is currently at the data analysis stage. This progress report deals only with preliminary results related to the first of the two tasks. Findings that point to preliminary policy conclusions are as follows:

1) Recurrent famine in Ethiopia is a complex phenomenon closely associated with food and/or income shortages amongst certain sectors of the population. Single factor theories of famine causation ignore the interaction of diverse elements -- historical and contemporary, environmental and human -- that combine to result in mass mortality, destitution and social dislocation. The many contributing factors are not alternatives, but complements. Drought and its short- and long-term impacts is one of the constituting factors that needs to be better understood in the context of the other factors.

2) An analysis of rainfall in Ethiopia's 14 regions during the past 25 years indicates that there has been only a small decline in the overall trend of absolute precipitation. In the worst year (1984), all-Ethiopia rainfall was down by only 21.7 percent from long-term mean levels.

3) However, fluctuations between years and differences between regions are very great, and several extremely bad drought years have occurred in various parts of the country since 1965. In each of these cases, the worst droughts of the past few decades have been a culmination of more than one year of relatively poor rainfall. In future, however, because of progressive resource depletion amongst vulnerable households, single year droughts may be sufficient to cause severe hardship. This danger highlights the importance of an efficient early warning and intervention capability.

4) A simple crop output-rainfall model showed an almost 1:1 relationship between changes in total rainfall and changes in production. Strong rainfall-yield relationships were found for cereals,

with a 10 percent decline in rainfall (below long-term national averages) resulting in a drop in all cereal yields of 9.8 percent. This translates into an 8.4 percent fall in national production. Thus, although a more elaborate model is required to allow prediction of the direct effects of annual precipitation rates, drought is found to be a major factor contributing to food production fluctuations in Ethiopia.

5) Fluctuation of food consumption at national level is much determined by fluctuations in food production. Trade and food aid have increasingly mitigated the transmission of production fluctuations to consumption in the 1980s. However, the relationship remains close. This is even more the case with local-level production effects for consumption. The relationships between production/food availability and famine are therefore closely connected in Ethiopia. Consequently, much could be gained from production stabilization. Drought resistance of cereals and related varietal selections are critical for regional food security as long as markets are not better integrated.

6) While one part of the country may be suffering severely from drought and production shortfalls, other provinces are hardly affected. The distinct lack of correlation between regions where rainfall/production associations are concerned underlines the high potential that exists in the country for interregional trade. Improved facilities for intra-country movements of grain, including rural infrastructure and appropriate policies, are consequently promising for local food security improvement.

7) An approach that increases the mobility of grain flows within

the country might also be coupled during drought years with a reduced flow of grains out of affected areas--that is, government procurement from the smallholder sector in affected regions might be reduced to ease local price inflation by increasing food availability at a critical time of food shortages. The existing procurement policy may be further evaluated in light of its potential contribution to food security in rural areas.

8) Food aid has played an increasingly important role since the early 1980s in narrowing the cereal demand-availability gap. The arrival of more than 1 million tons of food in 1985 and 1988 contributed greatly towards avoiding even greater human suffering. Similarly high aid requirements are anticipated for 1990. Unfortunately, the expansion of food aid has simply been taking pressure off a widening gap between domestic production and food availability. But an improved capability to move large amounts of food to stricken areas is still essential for emergency preparedness.

9) The price effects of food shortages were dramatic in terms of real cereal price increases. A regression computation suggests that a 10 percent decline in production results in a 14 percent increase in food prices. Such price increases were particularly bad for the poor and for pastoralists. The latter were affected by a deterioration of the terms of trade between livestock and cereals. Such deterioration is devastating for speedy recovery after drought, because it cuts into livestock herds assets, including draft power availability in rural areas (oxen). Further consideration is therefore required of the means for preventing deterioration of the asset base of smallholders,

especially where draft animals and pastoral herds are concerned. However, stabilization of cereal prices at lower levels during crisis years would also prevent excessive stress sales of livestock (the fodder base also coming into play at this point).

10) Regional price differences of cereals are persistent, but prices in 1984/85 showed quite similar patterns of increase across the various major provinces albeit with various time lags. This means that food shortages do spread their price effects through most parts of the country. The effects of these price increases in rural areas are not well understood due to lack of household-level information. What is clear is that livestock- and wage-dependent households (as well as those farm households that were confronted with major crop failures, thus becoming net-purchasing rural households) were the most seriously affected.

11) Basic parameters for monitoring and evaluating market developments and their impacts on the food security of poor households in different regions (and of different employment categories) are absent. As a result, appropriate impact evaluations of drought and the design of short- and long-term interventions cannot be effectively carried out. The present research project aims at closing some of these information gaps for improved food security policy and famine prevention.

12) A great variety and a large number of projects and programs for coping with the effects of famine and its underlying causes have been implemented in Ethiopia during the 1980s. A lot of experimenting has been done and a lot of valuable lessons learned. However, the

basic information on the appropriate mix of projects and programs to deal with urgent relief versus medium-term rehabilitation cannot be established on the basis of current information. Potential for further expansion of various types of schemes--for instance, public works versus input supply projects--based on the proven efficiency of such schemes, and their effectiveness by types of instruments, is not clear at this stage. Consequently, data requirements have been identified in the following areas: (a) The impact of drought and subsequent interventions on household-level production systems; (b) Food consumption patterns and nutrition at a household level (in the context of drought and emergency interventions); and (c) Household responses to drought and food crises.

In a world of scarce resources, this kind of information is critical to government decisionmaking on resource allocation toward development and human welfare improvement. IFPRI's current research project attempts to contribute to such data needs by studying in detail existing project experiences at community and household levels. These experiences will yield required information on the effects and costs of alternative types of interventions for food consumption and nutritional improvement of rural populations affected by famines.

2. INTRODUCTION

THE STUDY QUESTIONS

Ethiopia has been hard hit by the experience of drought and food shortages during the 1970s and 1980s. The resultant loss of resource base among poorer farm and pastoral households has led to serious economic deprivation, especially in the north and east. Recovery of the rural economy, and the economy as a whole, is a challenging task given the dangers of recurrent drought, pest invasions, and soil degradation. It is a task made especially difficult by the current lack of available microlevel data on the differential impact of food crises on various population groups, and how the most vulnerable groups may best be helped to cope and be reintegrated into a productive development process.

Food shortages, like chronic undernutrition and poverty, arise out of a complex etiology of economic, political, and environmental factors. The effort to prevent hunger must, therefore, be facilitated through a sound understanding of the varied circumstances from which food shortages arise. Questions of central importance to policymakers and planners are:

Which population groups are most seriously affected by food crises?

- How can these groups be most effectively reintegrated into a productive development process?
- What policies and projects would be the best for coping with drought and food security in the longer run?

While these questions are frequently asked, the search for answers is much impaired by a lack of statistical information--particularly coherent data on the production-income-consumption-nutrition linkages that are associated with drought and food shortages. Given finite resources for development interventions, answers to these questions are crucial to the effective design of policies and projects that will reach those people most at risk.

THE RESEARCH TASKS AND APPROACH

The present project undertakes to address these information gaps by examining the factors that contribute to the onset of severe food shortages, and by probing household capacity to predict and mitigate the effects of food crisis; that is, household coping mechanisms. The research emphasis is on food crises in the context not only of successions of poor crop years but also of the performance of rural markets, the performance of different household food security strategies, and the performance of policy instruments designed to prevent and/or mitigate the impacts of drought. The specific policy questions raised are:

- The current role and potential of infrastructure in reducing the consumption effects of severe production shortfalls; this in-

cludes the role of food aid for employment generation. The fusing of relief and rehabilitation objectives is carefully considered in this context.

- The current role and potential of agricultural technology in drought-prone and degradation-prone regions for improving household food security.
- The needs of institution building and strengthening for an effective coping with food security problems at both regional and national levels.

Towards this end, the project will undertake two major tasks:

1) As a prelude to implementing field research designed to fill some of the knowledge gaps outlined above, the present report provides a preliminary review of existing literature and data on drought and food crises as they relate to the experience of Ethiopia. This review details the most serious droughts and food crises in Ethiopia since the 1960s, with an assessment of their relationships to production shortfalls, markets, and prices. The assessment is set against the overall performance of the food economy, and it provides a basis for the evaluation of alternative policy measures in the fields of agriculture, trade, and infrastructure investment in response to drought.

2) Identification of the population groups most adversely affected by drought, and of policies that may assist these groups to cope effectively with drought.

The research will conclude with an integrative evaluation of the empirical microlevel data with the evaluation at the national food policy level.

The present progress report results primarily from draft results compiled as part of the first task outlined above. More specifically, this report sheds some light on the various factors that must be taken into account when discussing a) production shortfalls, b) the performance of markets during drought years, and c) policies and institutions positioned to cope with the adverse effects of drought.

Chapter 3 presents a descriptive and quantitative account of historical and contemporary famines in Ethiopia. Chapter 4 considers the issue of national and regional level food availability, focusing on drought-induced production shortfalls in different agricultural sectors and on policy responses to such events. Chapter 5 deals with prices and marketing issues. It analyses the evolution of crop/livestock price indices and the importance of market (dis)integration during food crises. Chapter 6 examines the microlevel impact of famine. Household coping mechanisms are considered and an assessment is made of alternative policies and programs for intervention (both relief and prevention) at the micro level. And the final chapter identifies the key issues raised by the foregoing examples and discusses the policy conclusions arising out of the overall analysis.

3. DROUGHT AND FOOD SHORTAGES: A DESCRIPTIVE AND QUANTITATIVE ACCOUNT

Although few elements of the debate concerning drought and food shortages are yet notable for having produced a consensus of opinion, there is at least broad agreement in the literature on two basic points. Firstly, that droughts and food shortages in Ethiopia are not new phenomena. Secondly, that the definition and analysis of such events demands recognition of many diverse variables and their complex interrelationships. It is appropriate, therefore, that we start our analysis from these two points.

THE HISTORICAL RECORD OF DROUGHT AND FOOD SHORTAGES

Ethiopia's history has been periodically punctuated by famines and other disasters. A careful review of the historical literature yields a list of recorded crises in Ethiopia as compiled in Table 3.1. While the distribution of these occurrences is inevitably biased towards the past 200 years (the period for which most detailed records exist), crisis events have been traced as far back as 250 B.C.

In total some 30 periods of food shortage and/or excess mortality have been identified. One author would raise this to 40 (Assefa 1986). However, the documented crises are not all identical. If we

Table 3.1--A chronology of Ethiopian droughts and famines[a]

Date	Regions Affected	Causes and Severity
253-242 B.C.	Ethiopia	Deduced from low Nile floods.
1066-1072	Ethiopia and Egypt	Deduced from low Nile floods and Egyptian famine.
1252	Ethiopia	First of seven famine years during next thirty years.
1258-59	Ethiopia	Severity unrecorded.
1272-75	Ethiopia	Severity unrecorded.
1435-36	Ethiopia	Severity unrecorded.
1454-68	Ethiopia	Severity unrecorded.
1543-1562	Hararghe	Attributed to God's anger at murder of Emperor Gelawdeos.
1800	Ethiopia	Large human and livestock death toll.
1812-1816	Tigray	Severity unrecorded.
1826-27	Ethiopia	Failure of cotton and grain crops.
1828-29	Shewa	Much human mortality, but very severe on livestock.
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 90 percent cattle and 1/3 human population.
1895-96	Ethiopia	Minor drought. Loss of livestock and human lives.
1899-1900	Ethiopia	Drought deduced from levels of L. 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 L. Rudolf drought in Northern Kenya.
1953	Tigray and Wollo	Severity unrecorded.
1957-58	Tigray and Wollo	Rain failure in 1957 with locusts and epidemic in 1958.
1962-63	Western Ethiopia	Very severe.
1964-66	Tigray, Wollo	Undocumented. Said to be worse than 1973/75 droughts.
1969	Eritrea	Estimated 1.7 millions affected.
1971-75	Ethiopia	Sequence of rain failures. Estimated 1/4 millions dead. Fifty percent livestock lost in Tigray and Wollo.
1978-79	Southern Ethiopia	Failure of Belg rains.
1982	Northern Ethiopia	Late meher rains.
1984-85	Ethiopia	Sequence rain failure. 8 millions affected. Estimated 1 million dead. Much livestock loss.
1987-88	N.E.S. Ethiopia	Drought of undocumented severity in peripheral regions.
1990	Northern Ethiopia	Rain failures and regional conflicts. Estimated at least 3 million people facing starvation.

Sources: Pankhurst 1984; Wood 1977; ECA 1984; Wolde-Mariam 1984; Woldemichael 1985; Wolkeba 1985; Degefu 1987; Woube 1987; Gizaw 1988; Gedion 1988; RRC 1990.

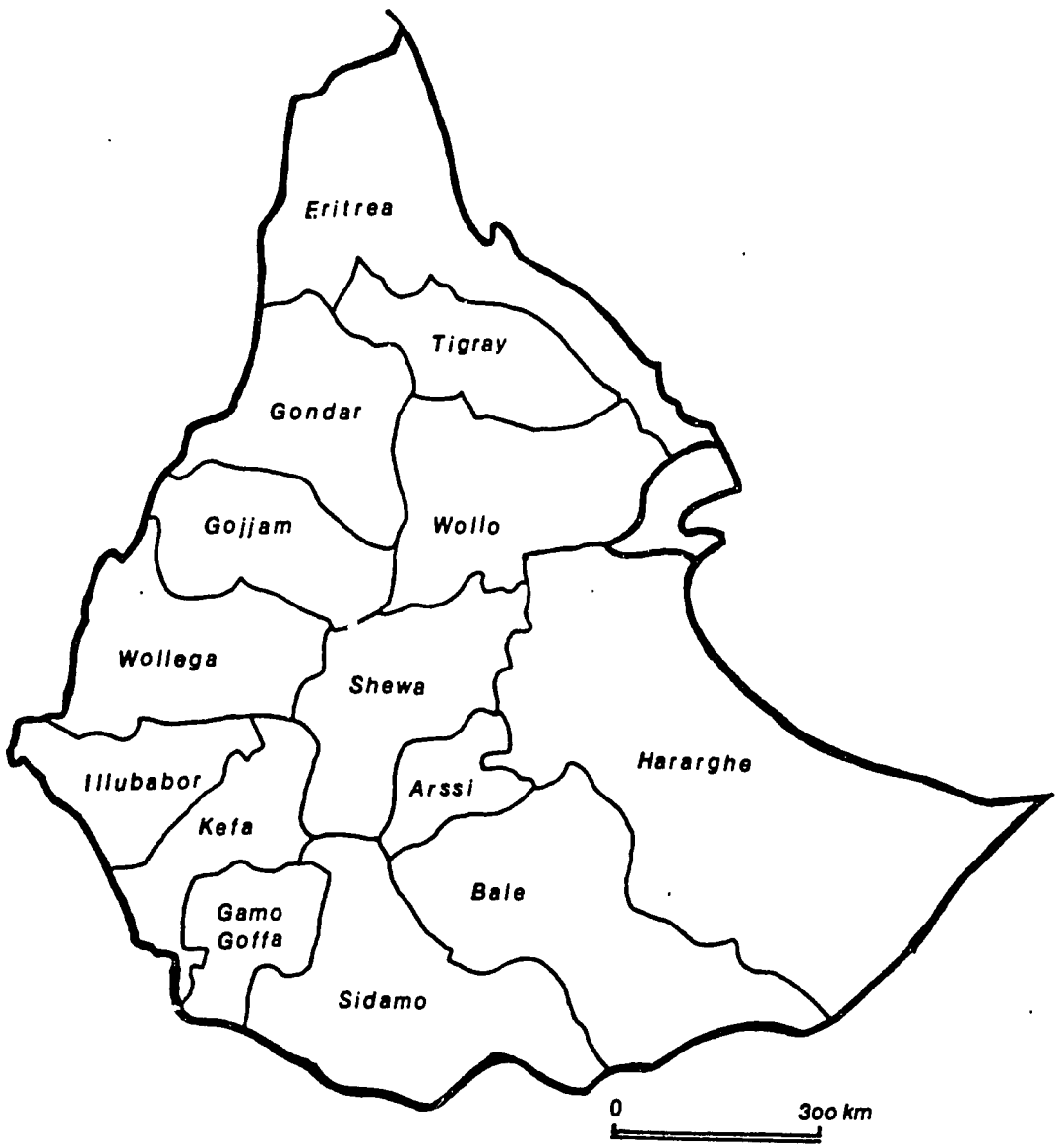
[a] In this compilation exercise, one faces the problem of defining parameters. Few crises in Ethiopia have resulted from catastrophic events such as floods or earthquakes (although some have certainly been associated with epidemics and the outbreak of warfare). Instead, as has been reported for other parts of Africa, food shortages tend to take on famine proportions after their effects have become cumulative (Lugan 1985, Corbett 1988). In other words, it is hard to say exactly when a food shortage or famine or even a drought actually started, and when it ended. Thus, 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.

plot their occurrences on a map, we find that the majority of 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. The second is made up of the crescent of agro-pastoral lands that ranges from Wollo in the north through Hararghe and Bale down to Sidamo in the south (see Figure 3.3). Of the 32 events listed in Table 3.1, at least half of them are said to have been concentrated in these two zones. Furthermore, while the other half of the crises in the list are characterized as countrywide events, they necessarily include the two higher risk zones as well.

Two important points should be made clear here. Firstly, regional boundaries were officially changed in 1987 from those illustrated in Figure 3.1 to those in Figure 3.2. Care must be taken, therefore, in interpreting references to regional occurrences before 1987 and after. Secondly, reference to administrative units (regions) usually masks an ecological diversity within units that is more directly pertinent to the distribution of crisis epicenters. As shall be shown in Chapter 3, the western edge of a given region may frequently succumb to both droughts and food shortages, while the eastern edge of the same region may rarely experience problems.

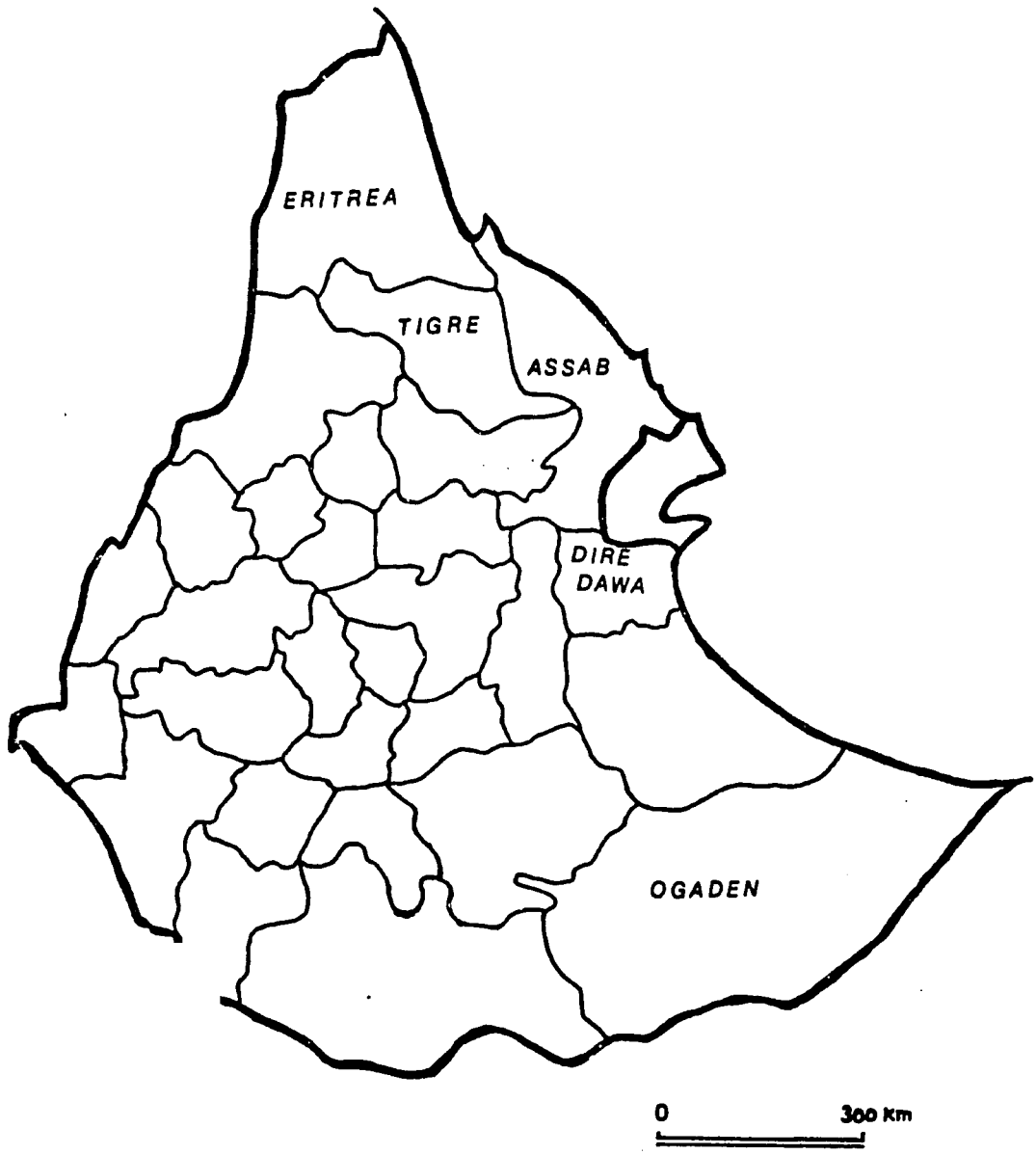
Why then have these areas been disproportionately stricken by crises? Four principal factors make these zones different from other parts of the country. Firstly, they are more than usually prone to drought. A comparison of Figures 3.3 and 3.4 shows that the crisis-

Figure 3.1--Map of Ethiopia with provincial names and boundaries as commonly used before being changed in 1987[a]



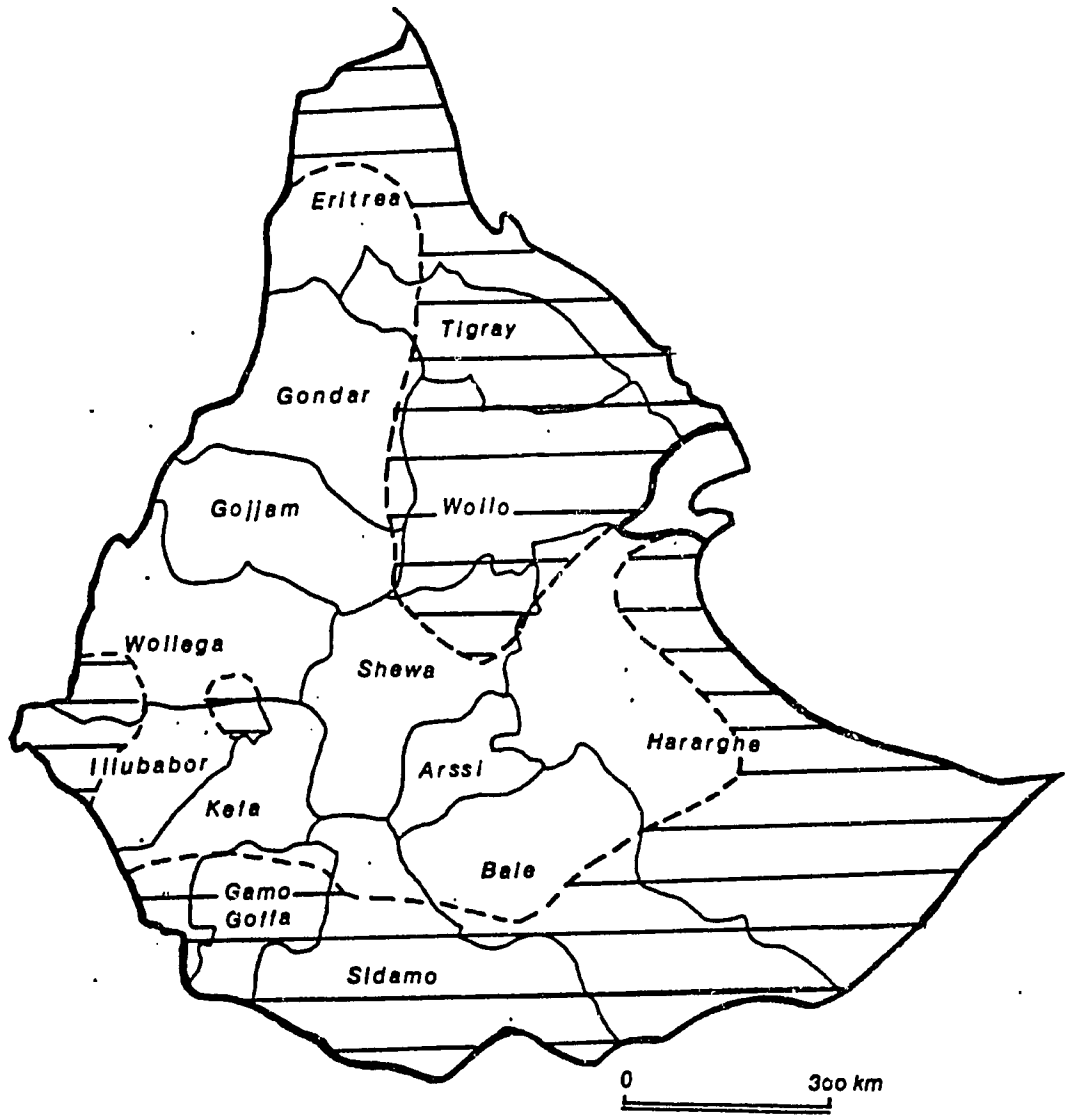
[a] It should be noted that there are no definitive western spellings of Amharic names. The names used in this report follow commonly employed spellings, but should not be interpreted as making any judgement on official appellations.

Figure 3.2--Map of Ethiopia showing approximate boundaries of new provinces, and names of new autonomous regions as approved by the Shengo in September 1987[a]



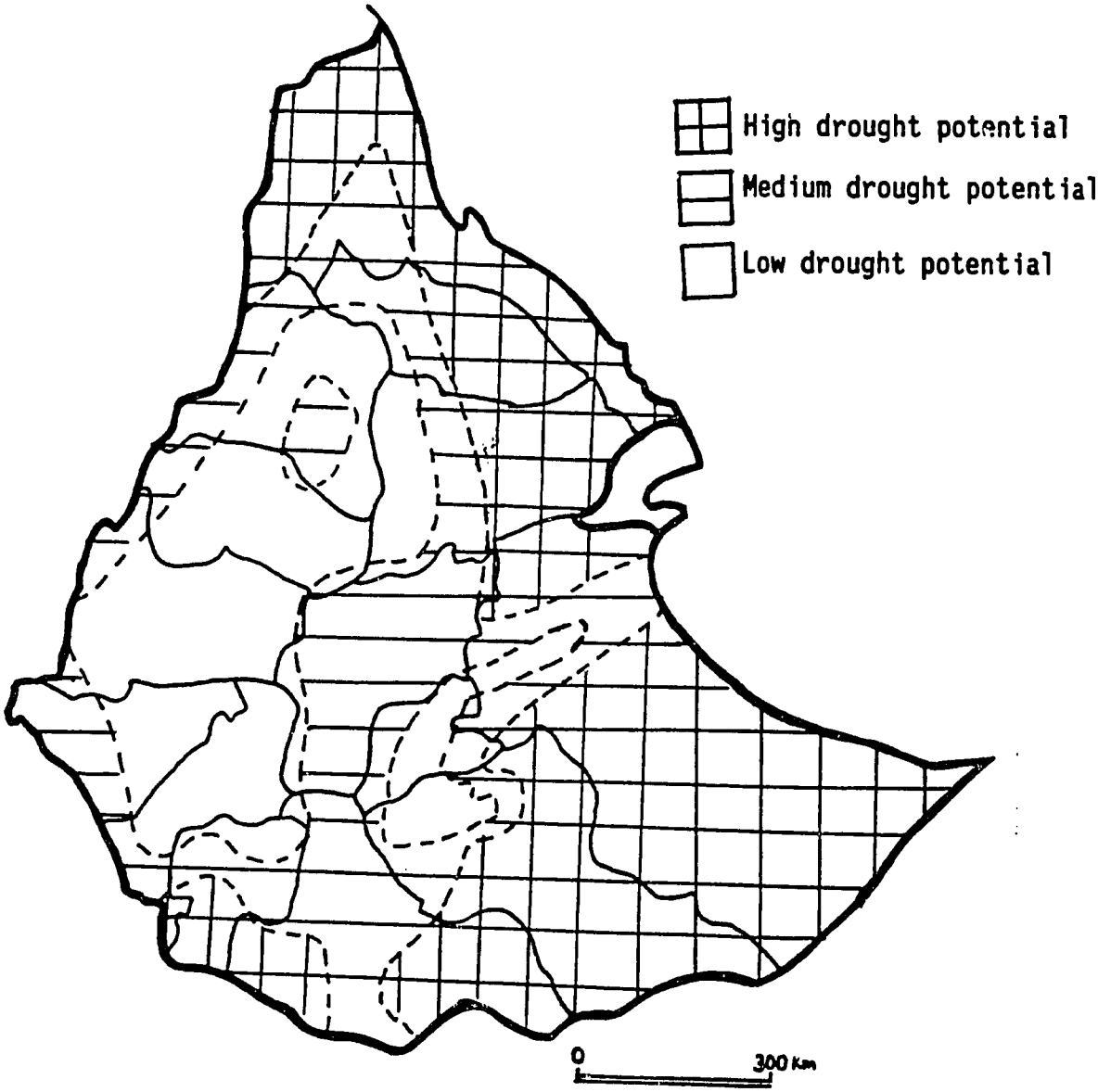
[a] Negotiations are still continuing regarding the positioning of boundaries. This map should not, therefore, be regarded as definitive.

Figure 3.3--Principal regions most often affected by drought and famine in Ethiopia



Source: Compiled from Gizaw (1988), Woube (1987), and Wolde-Mariam (1984).

Figure 3.4--Regional drought propensity of Ethiopia



Source: Based on Degefu (1988).

prone zones are closely correlated with present-day drought propensity as calculated by Ethiopia's National Meteorological Services Agency (NMSA) (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 presented in Table 3.2. These data, compiled from NMSA raw data, underline the fact that relatively low levels of mean rainfall over time (for the 9 provinces generally receiving precipitation below the national average), combine with very high levels of inter-annual fluctuation. For example, the coefficients of variation in column 4 are highest for provinces such as Eritrea (48.7), Tigray (28.9), and Hararghe (49.2). By contrast, regions with the highest levels of mean rainfall, such as Kefa and Illubabor, have coefficients of variation that do not exceed 11.1.

These trends in the stability of rainfall patterns and amounts received do not, of course, mean that the higher rainfall areas have avoided localized crises. Droughts of varying intensity have been experienced in Kefa as well as in Gondar and Gojjam during the past 20 years. However, it is interesting to note that these provinces did not always experience their "worst" years at the same time as the severely drought-prone areas. For example, column 6 of Table 3.2 shows that six of the country's provinces were hardest hit by drought during the 1960s, only one (Wollega) had its worst time during the 1970s, and seven were most critically affected during the more recent drought between 1983 and 1985. Precipitation rates in these worst

Table 3.2--Average levels and variability of rainfall in Ethiopia, 1961-1985

Provinces[a]	Mean	Percent of Ethiopia Average[b]	Standard Deviation	Coefficient of Variation	Rainfall in Worst Year, 1961-85	
					Year	1961-85 Average
Arssi	872.1942	95.5	140.3712	16.1	1980	69.5
Bale	766.0212	83.9	202.7732	26.4	1965	69.3
Eritrea	398.5066	43.6	194.1080	48.7	1966	42.7
Gamo Goffa	746.5256	81.7	155.1746	20.8	1963	48.5
Gojjam	1170.1121	128.1	120.8379	10.3	1983	82.1
Gondar	985.6798	107.9	188.5132	19.1	1966	77.7
Hararghe	496.8399	54.3	136.5761	27.4	1984	49.2
Illubabor	1303.6162	142.7	175.6751	13.4	1965	66.6
Kefa	1321.5664	144.7	147.0864	11.1	1980	80.5
Shewa	829.7932	90.8	87.5736	10.5	1965	76.9
Sidamo	837.2194	91.7	202.4128	24.1	1980	50.7
Tigray	570.8394	62.4	165.3026	28.9	1984	44.1
Wollega	1209.5496	132.4	237.2704	19.6	1970	47.7
Wollo	836.6743	91.6	155.1557	18.5	1984	46.7
Ethiopia[b]	913.4902	100.0	68.4831	7.4	1984	78.3

Source: NMSA

[a] It should be stressed that figures presented on a province-wide basis frequently mask considerable local variability.

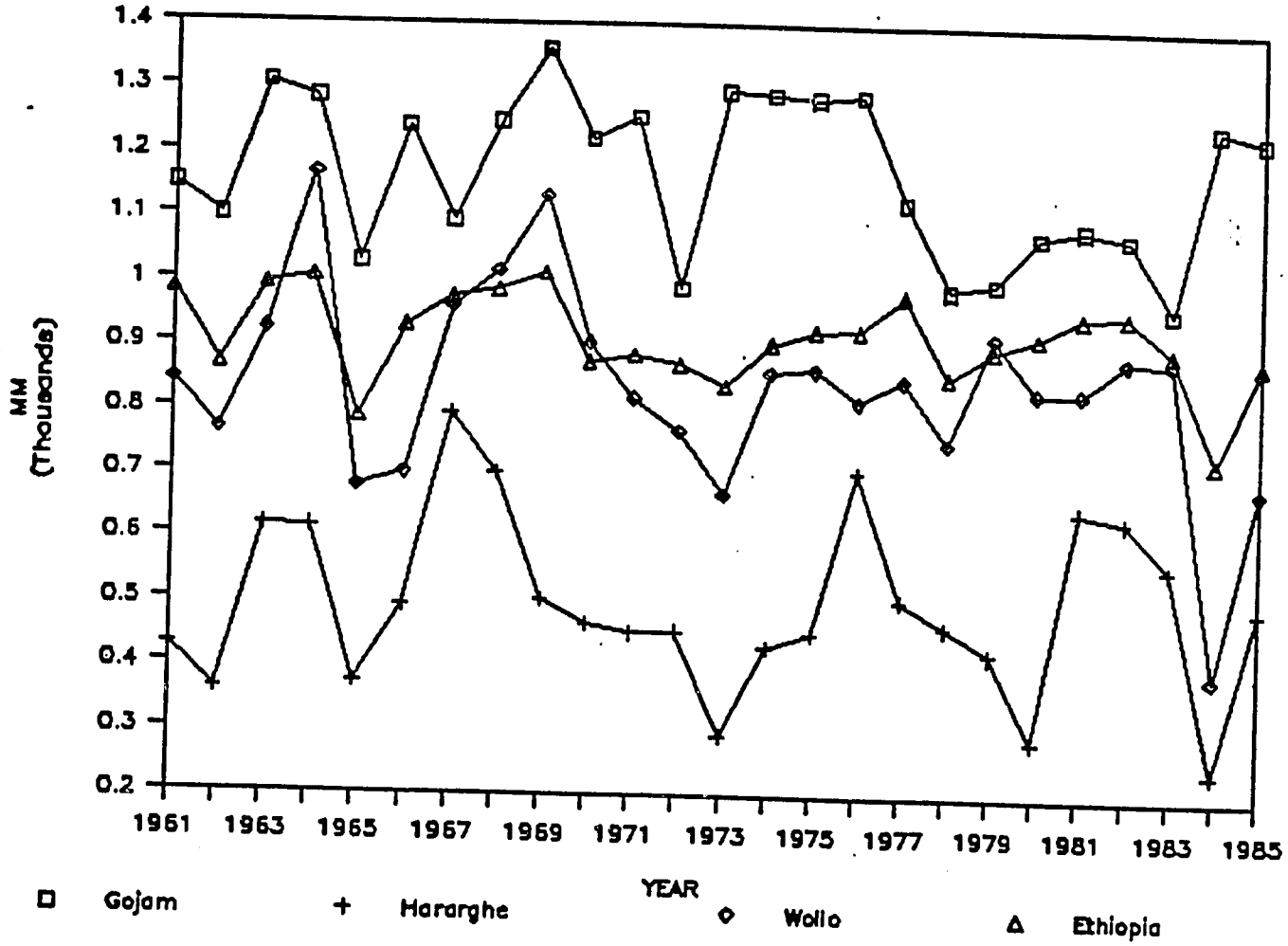
[b] Ethiopia average is computed on the basis of regional cereal production weights of 1980/85 6-year average cereal production by regions.

years ranged from 20 percent below long-term average to as much as 56 percent below. For Ethiopia as a whole, the worst year since 1961 was 1984 with rainfall levels of 78.3 percent of the long-term average.

Figures 3.5 and 3.6 show that rainfall patterns by province are not perfectly correlated over time. Figure 3.5 plots rainfall for the cereal surplus region of Gojjam against two of the worst drought and famine regions of Wollo and Hararghe. Figure 3.6 shows the rainfall patterns of the two northern regions alone. In both figures, rainfall was exceptionally low in all provinces at the same time only during the catastrophic year of 1984, and to some extent also in 1965. The figures also show that interannual fluctuations are much larger in the main deficit regions than is normal for the country as a whole. The common occurrence of drought-inducing fluctuations is of central concern to food strategists and requires due policy attention.

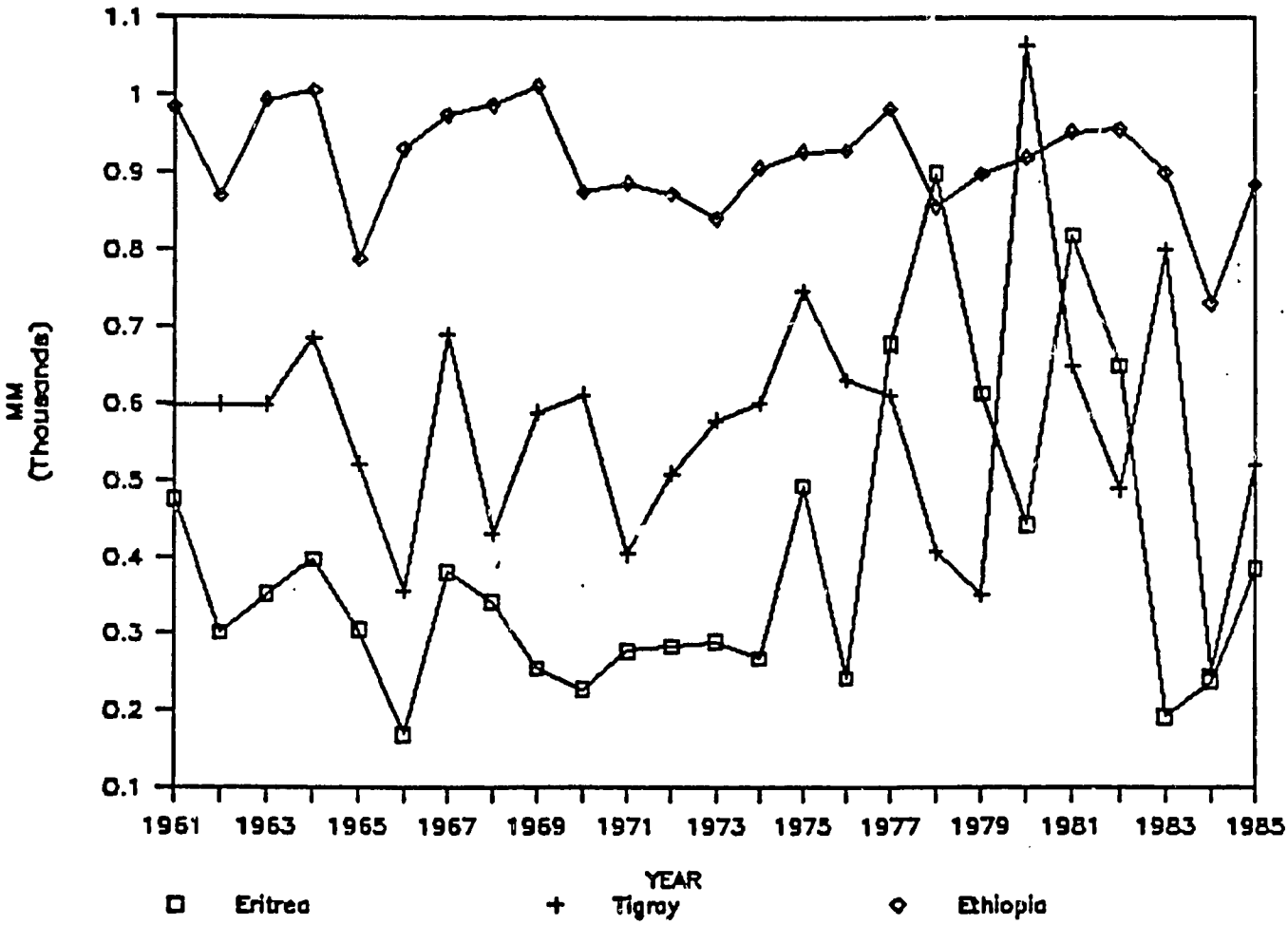
Secondly, these drought-prone regions are more dependent on the short Belg rains for their total annual production than some other parts of the country. The Belg rains fall between February and April (compared with the main Kerempt rains that fall from June to September). Most parts of the country benefit from at least some rain during this early part of the year and roughly five percent of the national food crop is produced by virtue of this rain. The Belg also raises fodder grasses which allow livestock (especially oxen) to recover from the dry season, as well as helping weed control during the main rains by encouraging early growth which farmers subsequently plow back into the ground. However, the regional importance of the

Figure 3.5--Mean annual rainfall from 1961 to 1985 for selected regions of Ethiopia



Source: NMSA

Figure 3.6--Mean annual rainfall from 1961 to 1985 for the northern regions of Ethiopia (Eritrea and Tigray)



Source: NMSA

Figure 3.7--Percentage of Belg rain to that of mean annual total

Source: Wolkeba (1985).

Belg season varies considerably. Figure 3.7 shows that the central and northern highlands receive between 20 and 30 percent of their total annual rainfall from the Belg. In the eastern and southern lowlands, this percentage rises to 40 or 50 percent.

In terms of people dependent on Belg production and total hectares planted during this time, Table 3.3 indicates that Wollo, Bale and (northern) Shewa are the provinces that rely the most on good Belg rains. Unfortunately, it has been calculated that the Belg rains have an even higher coefficient of variability than the Kerempt rains (McCann 1988, 15).

The third and fourth factors that distinguish the high vulnerability zones (particularly their highland areas) from the rest of the country are closely interrelated--that is, high population pressure and ecological degradation. Average population density for the country as a whole stood at 34.34/km^2 in 1984 (Kloos et al. 1988). However, roughly 88 percent of the total population is concentrated in the highland areas of the country which exceed 1,500 meters above sea level (Gryseels and Andersen 1983, Hurni 1988).

Figure 3.8 illustrates that the mild, humid highlands have provided an attractive habitational and agricultural environment for the majority of the Ethiopian population. The highlands have the added advantage of lying out of the reach of Falsiparum mosquitos. The past hundred years have seen an increasing migration of upland settlers down towards the lowlands as the latter have been progressively cleared for cultivation and as malaria eradication programs have been

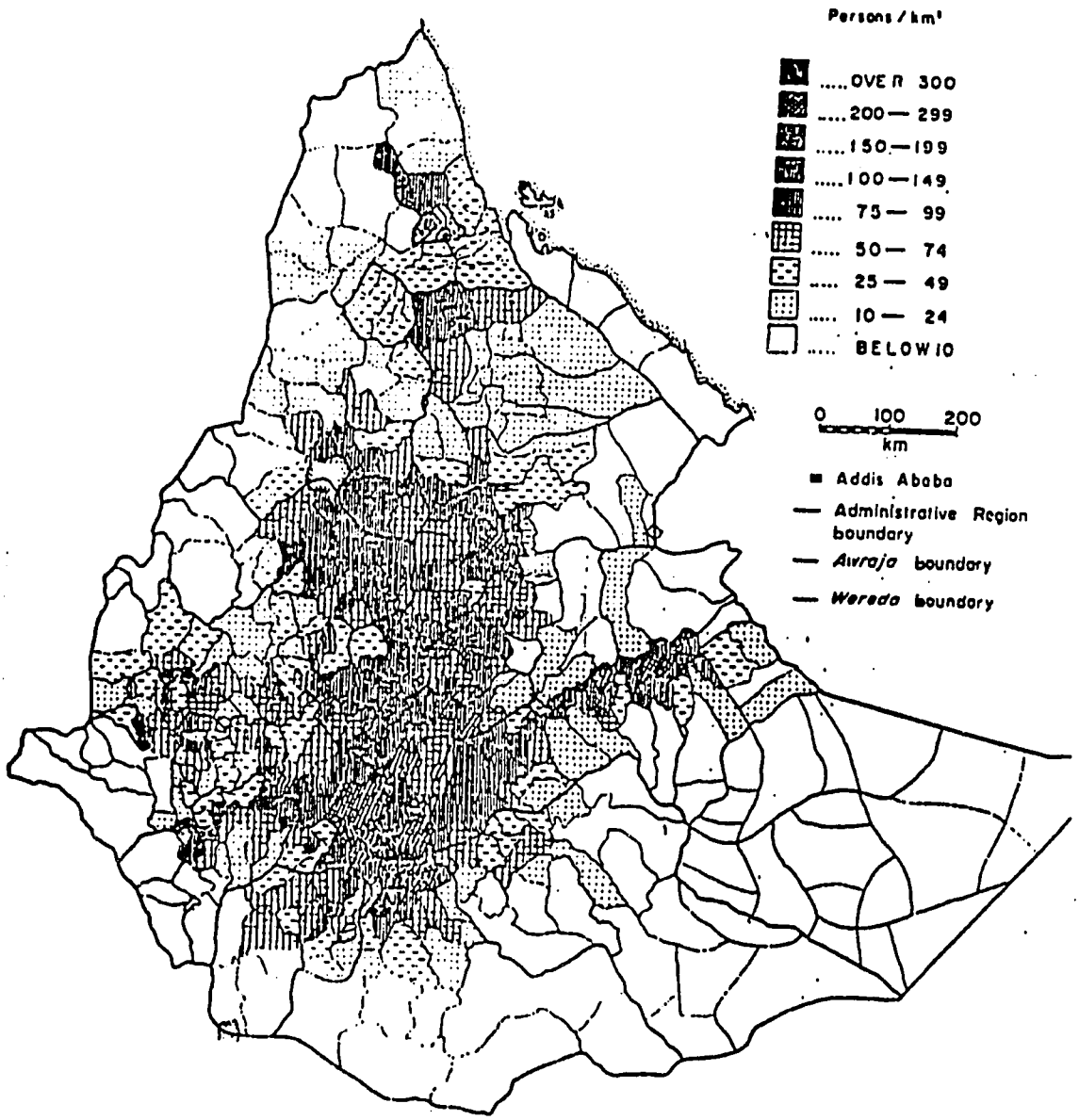
Table 3.3--Provinces with significant Belg production and their dependent population

Province	Hectares Planted to Belg in 1983	Population Dependent on Belg Production
	(thousands)	
Arssi	35.3	344.7
Bale	34.5	368.6
Gamo Goffa	21.7	535.5
Eritrea	n.a.	n.a.
Hararghe	14.5	382.0
Illubabor	3.8	31.0
Shewa	54.7	612.7
Sidamo	12.7	370.7
Wollega	14.5	3.0
Wollo	88.7	544.0
Tigray	n.a.	n.a.
Total[a]	280.4	3,192.2

Source: Derived from FAO/OSRO 1987, Appendix X.

[a] Total excluding Eritrea and Tigray.

Figure 3.8--Population density of Ethiopia, 1984



Source: Kloos et al. (1988, 32).

Table 3.4--Distribution and density of Ethiopia's population, by altitude

Altitude	Area		Population		Mean Density
	Total	Percent	Total	Percent	
(meters)	(x 1,000 sq.m.)				(persons/ sq.km.)
Above 2,600	70.3	5.8	4,352,162	10.4	61.9
2,200-2,600	144.7	11.8	16,458,509	39.2	113.7
1,800-2,200	237.9	19.4	11,717,397	27.9	49.3
1,400-1,800	344.1	28.1	4,858,919	11.5	14.1
1,000-1,400	163.4	13.4	3,452,408	8.2	21.1
Below 1,000	263.1	21.5	1,180,023	2.8	4.5
Total	1,223.5	100.0	42,019,418	100.0	34.34

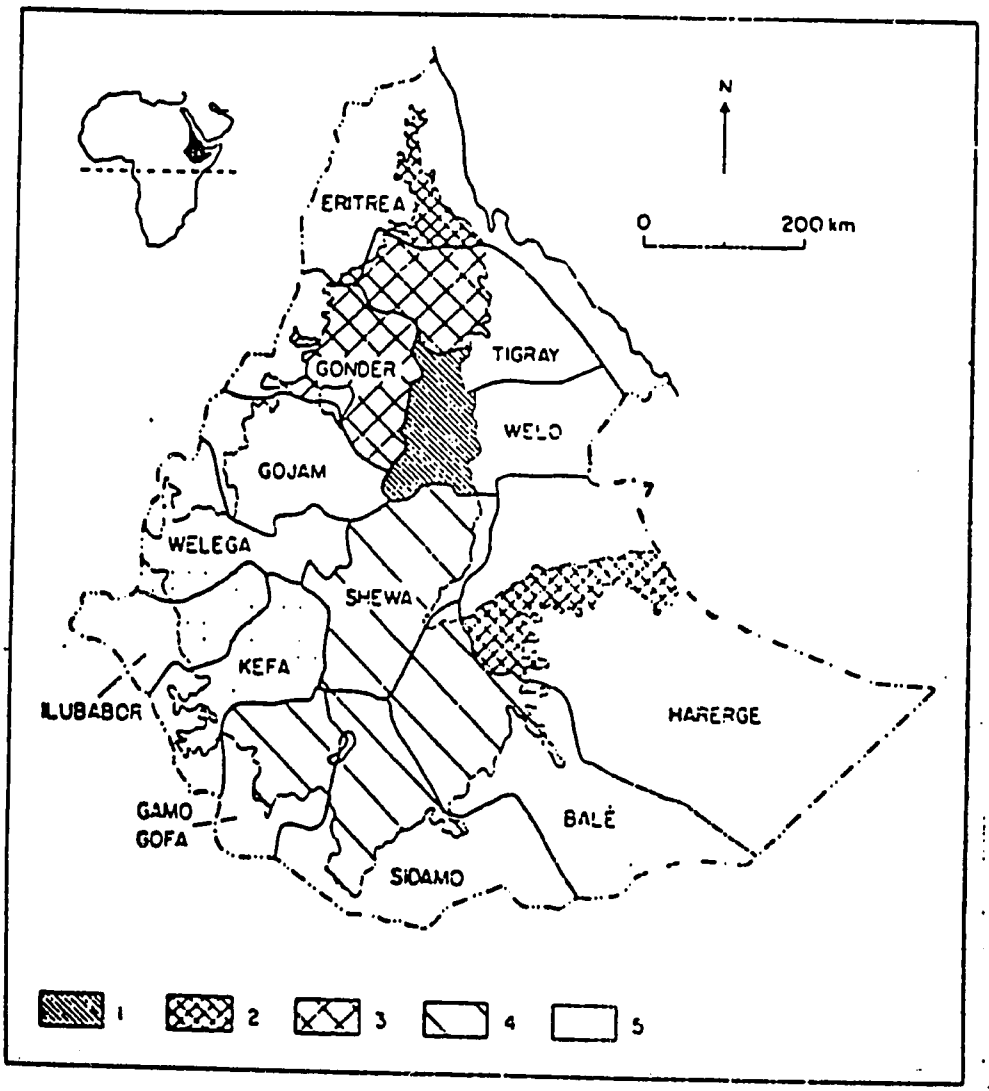
Source: Kloos et al. (1988, 30).

implemented. However, as Table 3.4 shows, the bulk of the population is still congregated on farms above 2,000 meters above sea level. In some regions, this concentration of people and their animals has led to rapid deforestation, overgrazing, and to the cultivation of very steep slopes. As a result, soil loss from currently cropped land has reached an average level of 42 tons per hectare per year. The resulting annual production loss due to soil erosion alone has been calculated at one to two percent per year (Hurni 1988).

The regional severity of this soil degradation is shown in Figure 3.9. Once again, the worst areas (particularly of Zone 1) 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 the farming system to shocks such as droughts (or alternatively to hailstorms and floods).

It is also important to note, however, that neither land degradation nor high population concentrations are as important in the extreme lowland parts of the country--the second broad zone of drought and famine vulnerability. This is the part of the country largely dominated by agro-pastoralists and pastoralists. Population density is lowest of all in the lowlands of Eritrea and in the Ogaden region of Hararghe and Bale. Here the 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 transferability of livestock into grain are the key elements of the lowland

Figure 3.9--Regional severity of soil degradation due to soil erosion In Ethiopia



Key:

1 = extreme (over 80 percent of the soils are only about 20 centimeters deep, and the rest about 100 centimeters).
2 = very serious (60-80 percent)
3 = high (40-60 percent)
4 = medium (20-40 percent)
5 = slight (less than 20 percent)

Source: Hurni (1988).

economy that tend to dictate population size and location (Upton 1986, Donaldson 1986). Nevertheless, as we shall briefly show in the next section, the sequence of events that led from, or through, drought to food shortage and famine are similar in both vulnerability zones.

THE DROUGHT SEQUENCE OF THE 1970s AND 1980s

The lack of correlation between regional rainfall patterns across the country that was illustrated in the last section supports the general argument that there is no discernible long-term pattern (be it trend, periodicity, or cycle) for Ethiopian drought episodes (Lamb 1977, Degefu 1988, McCann 1988). Degefu supports this argument after examining almost 100 years of rainfall data for certain stations in Ethiopia (Degefu 1987). What is more, there appears to be no perfect correlation between drought years and subsequent food shortages. A 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 in certain instances (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.

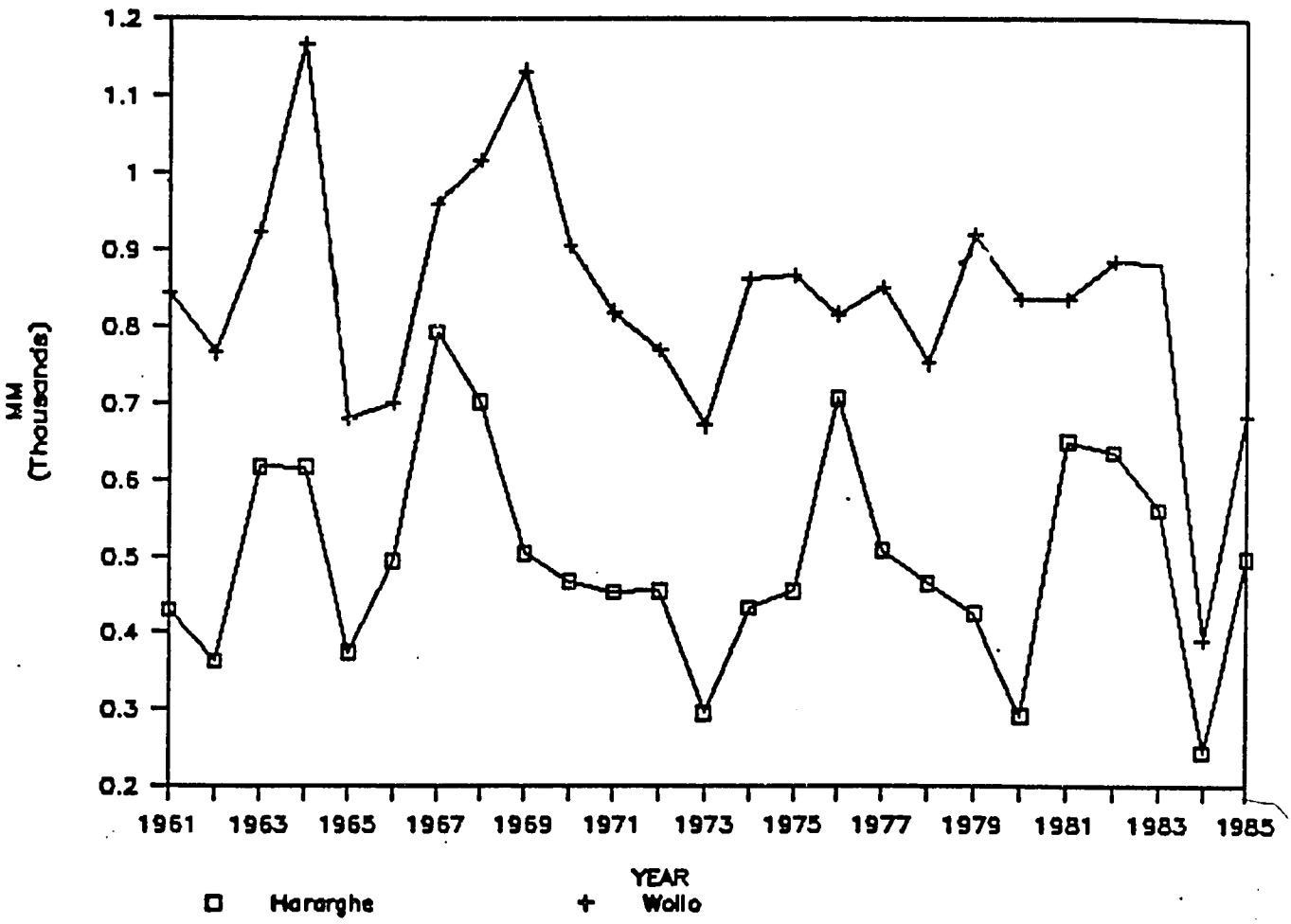
However, one feature of the rainfall data presented in Figures 3.5 and 3.6 that we have not yet considered is the cumulative aspect of drought from one year to the next. The disasters of 1973/74 and 1984/85 did not happen suddenly. They were the culmination of a prolonged process that spread over several years. A number of authors

have recently proposed that an isolated drought is rarely a dangerous drought; it is only when one poor year is followed by another poor year, and then another, that crises take on unmanageable proportions (Hay 1988, Corbett 1988, De Waal 1988, Goyder 1988). This argument is well supported by the data for the past few decades, although the danger should be recognized that repeated food crises have now seriously depleted the capacity of vulnerable household to withstand the shock of even a single year drought.

The Ethiopia total mean rainfall line that was presented in Figure 3.5 does show 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 cancelled out by those from the high rainfall provinces. At a provincial level, however, a clear pattern of cumulative drought emerges. Figure 3.10 reproduces the time series for Wollo and Hararghe. 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 "bad" years of 1979 and 1984.

The crucial characteristic of past famines that emerges from this analysis is its creeping, insidious nature. The so-called 1973-75 drought and famine can be seen as having its origins in the late 1960s. Indeed, many tell-tale distress indicators were apparent long before the crisis was acknowledged: grain prices had begun to rise sharply and the value of livestock was falling (Seaman and Holt 1974, Hussein 1977); in 1971 Awsa Awraja in Wollo petitioned the governor

Figure 3.10--Mean annual rainfall from 1961 to 1985 for Wollo, and Hararghe.



Source: NMSA

for food assistance (Goyder 1988, 80); a Ministry of Agriculture crop assessment report of 1972 gave clear indications of ongoing stress in many districts of Wollo, and warned of impending calamity on a much wider scale (Goyder 1988, 81); and by 1972 at least nine regional governors and administrators were requesting over 46,000 tons of grain and 121,000 cartons of supplementary food from the central government (RRC 1985, 84).

But by now the crisis had both spread and deepened. In December 1972 the Ethiopian Red Cross were helping roughly 1,000 refugees (mainly from Wollo) who had travelled south to the capital (Red Cross 1974). By the end of 1973, some 60,000 refugees were crowded into relief camps in Wollo that were designed to cope with 20,000 people (Holt and Seaman 1976). Many more migrants were flooding into provincial towns. It is claimed that at least 284,000 people sought help at numerous administrative centers (Rivers, Holt, Seaman, and Bowden 1976). A survey of seven provinces in Wollo at this time found that 85 percent of the population examined were "subsisting on less than 1,500 calories per day", with 10 percent critically malnourished (RRC 1974, 16).

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, 11). Towns in Hararghe also reported between 17 and 25 percent of children below 80 percent weight-for-height (RRC, 1974b). Table 3.5 shows how this crisis spread during

Table 3.5--Drought-affected population of Ethiopia, by province, November 1973 to July 1975

Province	Total Population	November 1973	March 1974	August 1974	July 1975
			(thousands)		
Wollo	2,216	900	750	600	400
Tigray	1,897	322	322	400	400
Hararghe	2,740	220	220	300	500
Shewa	4,587	120	120	100	200
Gamo Goffa	878	7	150	100	200
Sidamo	2,459	...	87	200	200
Bale	767	...	87	175	300
Kefa	1,416	...	25	10	11
Eritrea	2,127	...	...	80	500
Illubabor	1,686	...	...	...	200
Wollega	1,770	...	...	30	10
Gondar[a]	1,800	...	...	30	...
Arssi	954	...	...	...	10
Total	25,303[b]	1,569	1,912	2,150	2,614

Source: RRC, May starvation cease: Ethiopia tikdem (Addis Ababa: Relief and Rehabilitation Commission, 1975), p. 10.

[a] The name Gondar has been inserted for the sake of continuity. In the original table the former provincial appellation of Begemdir was used.

[b] This total does not include Addis Ababa or Gojjam. It should also be remembered that these provincial totals may not match population estimates used later in the report. The latter are derived from a different source.

1973 and 1974 from one region to the next, and from a small number of affected people to a major national crisis.

Once the crisis was ended, a post facto body count was attempted. The "1973-74" famine is said to have claimed the lives of roughly 200,000 people in all (Shepherd 1975, Sen 1981, RRC 1985, Fraser 1988). An assessment of the famine impact in seven districts of Wollo province found that 20 percent of the province's population had died (RRC 1975). According to Bondestam (1974, 423), however, the hardest hit during this crisis were the Afar pastoralists who lost 25-30 percent of their population.

Unfortunately, another crisis unfolded during the early 1980s. As early as 1980 the failure of the rains in Tigray had been noted by several NGOs, with widespread crop loss and livestock mortality warning of problems to come (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, 17). Meanwhile the town of Mekelle in Tigray was attempting to cope with the influx of 15,000 refugee families (Fraser 1988, 26).

Table 3.6 gives an indication of how the crisis spread from one region to the next and how it intensified in the worst-hit regions, such as Wollo and Tigray. In the worst months of 1984 and 1985, relief agencies operating in Wollo were recording up to 72 percent of sampled children in camps at less than 65 percent of standard weight-for-height (Jareg 1987, 26). In another part of the country (Kefa in the Southwest), children of nomadic pastoralists were also bearing the

Table 3.6--Drought-affected population of Ethiopia, by province, 1981 to 1985

Province	1981	1982	1983	1984	1985
			(thousands)		
Wollo	450	592	1,100	1,821	2,587
Hararghe	420	384	285	278	875
Shewa	239	533	195	204	851
Gamo Goffa	232	...	...	80	106
Sidamo	...	303	145	355	533
Bale	275	220	60	21	82
Kefa	...	...	...	...	58
Illubabor	...	20	...	...	20
Wollega	...	...	...	...	23
Gondar	67	202	424	324	363
Arssi	185	220	60	21	81
Gojjam	...	84	20	35	76
Totals	1,868	2,447	2,264	3,171	5,768

Source: Compiled from various tables in RRC, Food situation in Ethiopia 1981-1985: Trend analysis report, Early warning system special report (Addis Ababa: Relief and Rehabilitation Commission, 1985), as well as annual Synoptic Reports.

[a] The figures presented may not always match published estimates from other sources depending on methodologies used.

[b] Figures for Eritrea and Tigray not available for every year.

Table 3.7--Unaccompanied children in Wollo (by Awraja), in shelters in the period November 1984-September 1985

Awraja	Number of Child Deaths
Ambassel	341
Wag	204
Rayana Kobo	499
Yejju	160
Dessie Zuria	43
Wore Himenu	211

Source: Dessalegn Rahmato, Famine and survival strategies, Food and famine monograph, series no. 1, IDR, p. 233.

brunt of the famine. A survey of 361 children in March of 1985 showed that 40 percent of them were below 70 percent weight-for-height standard (Kibish 1985). The next stage for many such children was death.

Poor nutritional status, coupled with disease, resulted in considerable mortality. Table 3.7 depicts the mortality of unaccompanied children in a number of shelters in Wollo from the end of 1984 to September 1985. Table 3.8 indicates total deaths (children and adults) for just Bati shelter in northern Wollo. The latter table clearly shows that in this part of Wollo the peak period of mortality came at the end of 1984. It is estimated that of all the deaths that occurred between October 22 and December 9 of 1984 over 70 percent constituted children under 15 years of age (Demissie 1986, 26). Despite an isolated increase in mortality (as a proportion of total shelter inmates) in July 1985 (coinciding with the onset of the rains), the death toll did not again reach the heights of May 1984.

By the end of the crisis, out of almost eight million Ethiopians said to have seriously suffered from a shortage of food during the 1983-1985 crisis, possibly more than 1 million may have died (Jansson 1987; Woube 1987, 79; Rahmato 1988, 2). In addition to this high mortality, many millions more people were made destitute through the loss of their household and farm assets. Such a large-scale erosion of asset base amongst the poor makes them ever more vulnerable to a future crisis.

Table 3.8--Bati shelter population, basic data, 1984-1985

Month	Shelter Population	Deaths	Deaths as Percent of Shelter Population
October	22,836	339	1.5
November	28,112	2,407	8.6
December	23,163	1,617	7.0
January	27,228	1,110	4.1
February	22,463	776	3.4
March	23,813	346	1.4
April	17,121	185	1.1
May	23,440	185	0.8
June	24,552	465	1.9
July	8,169	306	3.8
August	33,549	83	0.2
September	29,149	24	0.1
Total	283,595	7,844	2.6

Source: Dessalegn Rahmato, Famine and survival strategies, Food and famine monograph, series no. 1, IDR, p. 127.

Figure 3.11--Causes of famines hypothesized by various authors (see text)

	Macro-level Causes	Micro-level Causes
Long-term causes	Group One	Group Three
Short-term causes	Group Two	Group Four

THE CAUSES OF THE FAMINE

Opinion remains squarely divided on the central issue of famine causation. The range of indicators used by different analysts both to define a food crisis and to explain its occurrence, is extremely broad. In general terms, explanations for food crises may be conceptualized in four groups (Figure 3.11). In the first group we find macro-level explanations with long-term associations, such as climatic change (Nicholson 1985; Endalamaw 1988; ODA 1988; Wossen 1988), solar cycle activity (Wood 1977), and ecological degradation (Lamb 1983; Constable 1984; Hurni 1988). In Group Two, which remains at the macro level but which focuses on a shorter time span, are explanations that refer to correlations between rainfall rates and sea-surface temperature fluctuations (the El Niño Southern Oscillation event) (Folland et al. 1986; Rasmussen 1987; Glantz 1988; Degefu 1988).

There are also analysts who focus on macro-level (or "external") determinants that are less environmental in origin, such as deteriorating international terms of trade (Lemma 1988, Lofchie 1987), and the political and economic marginalization of Ethiopia along with other African countries (Bondestam 1974; Koehn 1979; King 1986).

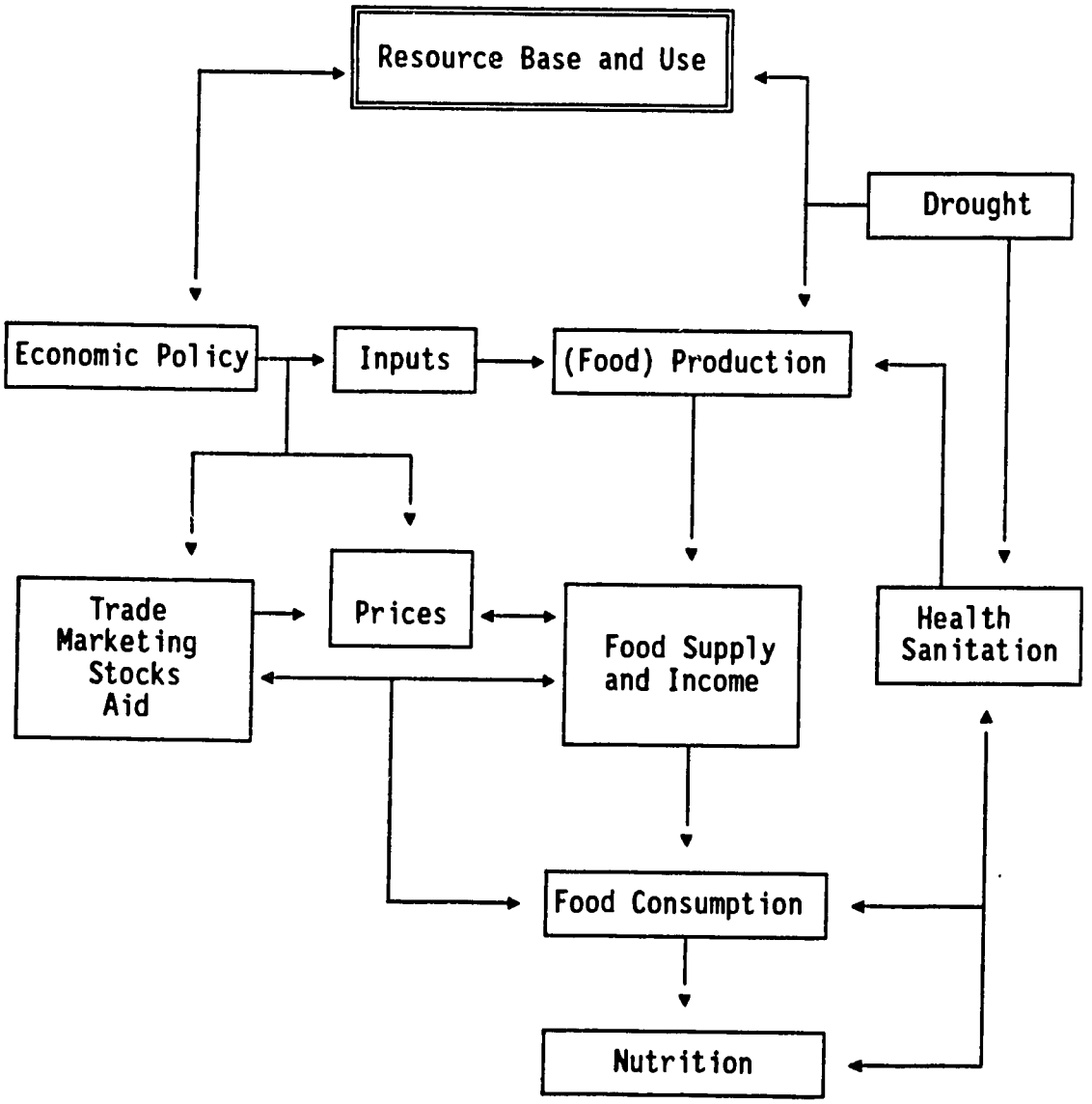
In Group Three, chronic and long-term deficiencies at a more micro level in the realms of low-level farm technology, low fertilizer use, and poor land use practices have been blamed for reduced output per capita (Wolde Mariam 1984; ICIHI 1985; Kebede 1988). The operation (or lack thereof) of regional and local markets is widely seen to

be a key factor mediating between availability of food and real demand (USDA 1981; Ravallion 1987; Rhamato 1988). Regional isolation, caused by inadequate regional infrastructure, is singled out as a major constraint to the proper functioning of those markets (Shaw 1976, Goyder 1988). And government policies, especially investment priorities, land tenure, and pricing policies, are often brought forward to explain the lack of economic growth that underlies susceptibility to drought and famine (Lirenso 1983; Griffin and Hay 1985; Spencer 1987; Gamaledinn 1987).

Finally, in Group Four, which is the realm of shorter-term micro events, the timeliness of intervention (or logistical ability to intervene) during crisis have been highlighted as contributing factors (Griffin and Hay 1985; Jannson 1987; Fraser 1988; Ford and Holmquist 1988). There are authors who lay primary blame for famines on military disruption of production (Shaw 1976; Snowdon 1985; Wolde Michael 1985; Gill 1986; Henze 1988). Others who point out that pest invasions and crop diseases play a role (Longhurst 1987; Skaf 1988). And arguments relating to entitlement failure through a collapse of purchasing power amongst the poor (for example, through reduced income-earning opportunities and fiscal policies that force up the price of food) have gained very wide support (Sen 1981; Currey 1981; Torry 1984; Chandha and Teja 1990).

While the range of causal factors referred to is clearly very wide, most famine analysts generally focus on one or other of the above hypotheses depending upon the scale of their analysis. As one

Figure 3.12--A conceptual framework for the analysis of drought effects on food supply and nutritional status



moves from the macro to the micro, and from the long-term to the short-term, different sets of variables come to the fore in explaining underlying processes and immediate events. Thus, single factor or universalist theories of famine causation inevitably lose sight of the interaction of many diverse elements - historical and contemporary, environmental and human - that combine to set in motion the chain of events that results in the starvation of an individual. The many contributing factors are not alternatives but complements. Thus any definition of famine that does not refer to supply constraints at the same time as to demand failure, plus the institutional mechanisms that mediate between the two, will be inadequate to deal with the problem.

In the following chapters, we shall consider Ethiopia's experience of food shortages with reference to many of the variables outlined above. The various sectors of the food economy, and the many variables sketched above, may be linked according to the conceptual framework presented in Figure 3.12. This figure shows that poor consumption and malnutrition for an individual may result from numerous relationships that tie together the macro and micro elements making up the national economy. Drought has a direct impact not only on annual production but also on the sustainability of the long-term resource base 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 of course influenced by pricing and national food supply policies.

Thus, by examining the factors that contribute (a) to production

level and shortfalls, (b) to the performance of markets during drought years, (c) to the failure of purchasing power among the poor, and (d) to the links between the first three, we aim to shed light on the key factors that are crucial to policies designed to assist the vulnerable in their battle against the adverse effects of drought.

4. DROUGHT-RELATED PRODUCTION SHORTFALLS AND POLICY RESPONSES

THE AGRICULTURAL SECTOR

Agriculture dominates the Ethiopian economy. It employs some 85 percent of the active population and accounts for roughly 50 percent of the GDP. Agricultural products constitute 80 to 85 percent of total exports and they bring in 90 percent of the country's foreign exchange. Coffee alone, the country's largest single export, accounts for 60 percent of foreign exchange earnings and nearly 10 percent of the Government's revenue (through export taxes). More than 95 percent of this crop is produced within the smallholder sector, and exports of coffee have remained steady since the 1960s within a range of 70,000 to 95,000 tons (National Bank of Ethiopia 1988). Yet despite the importance of this sector to the economic life of the country, Ethiopian agriculture has for more than a decade shown disturbing signs of decline.

The agricultural sector is characterized by three conditions: firstly, by its three-tiered organization of agricultural activity; secondly, by a concentration of national food output in a very small geographical area; and thirdly, by a steady downward trend in output and resultant food availability. We shall consider each briefly in turn.

Table 4.1--Number and types of peasant organization, by region, 1987

Region	Peasant Associations	Service Cooperatives	Producers' Cooperatives
Eritrea	637	104	9
Tigray	319	64	6
Wollo	1,223	294	259
Gojjam	1,778	405	477
Gondar	1,063	238	128
Shewa	5,352	1,096	630
Hararghe	1,346	318	255
Sidamo	1,616	274	127
Gamo Goffa	803	126	20
Arssi	1,027	155	395
Kefa	1,621	301	157
Illubabor	978	199	108
Wollega	2,208	425	235
Bale	594	160	115
Total	20,565	4,159	2,922

Source: Tennassie Nichola, Policies and institutions for rural development, in The ecology of health and disease in Ethiopia, edited by Zein Ahmed and Helmut Kloos (Addis Ababa: Ministry of Health, 1988), pp. 67-74.

The Organization of Agricultural Activity

The land reform proclamation of March 1975, which abolished all private ownership of land, changed the face of a centuries-old farming economy. While tenure arrangements, cropping strategies, and levels of farm technology employed varied widely across the country, agriculture prior to 1975 was generally dominated by the needs of a landed gentry, the church establishment, and an overseeing aristocracy (Hoben 1973, Goricke 1979.[1]

The reform measures implemented since 1975 have laid the foundations of a new three-tier system. The largest element of this system is the smallholder farming sector. Any individual wishing to cultivate land has the right to be allocated up to 10 hectares for private production. In practice, average holdings are less than two hectares per household. These small farm households (which together are responsible for around 90 percent of the cultivated land area of the country) are organized into over 20,000 peasant associations (see Table 4.1). These associations control the allocation and use of all settled rural lands, each being responsible for roughly 800 hectares.[2]

Peasant associations are also encouraged to work together towards building up the second tier of the rural system: the formation of

[1] For more details of pre-revolutionary Ethiopian agriculture, the reader is referred to Pankhurst (1966), Westphal (1973), and Cohen, Goldsmith, and Mellor (1976b).

[2] The organization of peasant associations in the pastoral regions has inevitably progressed much more slowly than in the settled areas. Nevertheless, the government is studying ways by which pastoralists might be brought more actively into the process of association.

cooperatives. The first step in this direction is the organization of service cooperatives. Legislation establishing the legal status of service cooperatives defined them as interim stage organizations whose responsibility is to sell farm inputs, to provide storage and processing facilities, to offer fair interest rate loans, to facilitate the sale of local produce, and to work for social and economic development within the framework of socialist philosophy (Cohen and Isaksson 1988). One service cooperative is expected to serve between three and ten peasant associations.

The subsequent stage in cooperativization comprises the formation of producer cooperatives. These cooperatives pool land, labor assets, and resources in an attempt to make agriculture more efficient. As an incentive to encourage farmers to join together, producer cooperatives pay lower agricultural taxes than smallholders, they can obtain interest-free loans from the service cooperatives, and they receive priority access to inputs and consumer goods. In 1983 this sector was responsible for only 1.3 percent of national cereal production (Cohen and Isaksson 1988, 326). By 1986/87, however, this proportion had risen to 3.7 percent (CSA 1987, 3). Table 4.1 indicates the distribution of producer cooperatives around the country.

The third and smallest component of the farming system is made up of state farms. Of an estimated 750,000 hectares of commercial farms operating before the revolution, 67,000 were converted into state farms and from 1979 onwards were run by a new Ministry of State Farms (Cohen and Isaksson 1988, 328). (The remaining portion was dismantled and used either to settle the landless or assimilated into adjoining

peasant associations.) Since 1979 the state farm sector has grown. Table 4.2 shows that in 1986/87, state farms occupied 143,600 hectares and were responsible for 6 percent of main season cereal production. Despite their small output relative to the smallholder sector, however, the state farms have played an important role in supplying grain quotas to the Agricultural Marketing Corporation. Table 4.3 shows that state farms have been providing more than 50 percent of quotas for wheat and maize for most of the period since 1978 when grain quota collections began. The state farms also supply 86 percent of national cotton lint requirements, and all of the country's cottonseed requirements (Worz 1989, 2).

The most interesting point to emerge from Table 4.3 is the extent to which the shares of total grain procurement between the various sectors shifted during the crisis year of 1984/85. While total procurement for that year was down by almost 50 percent from the year preceding, the share of procurements from smallholders dropped by some 19 percent, to be made up in part by an identical increase in the share of grain procured from the state farms (and partly by commercial imports and food aid). This national response to major production shortfalls in the peasant sector made rational sense. Given the logistical and infrastructural difficulties of moving grain out of rural areas to feed the urban population, only for huge quantities of grain to be moved back out to many rural areas suffering serious hunger, the short-term replacement of quotas with imports to feed the urban hungry appears cost effective. Indeed, this instrument could be pursued further as an active institutional response to food crises.

Table 4.2--Area, production, and yields of cereals, by production sector for 1986/87, main season

	Smallholders	Producer Cooperatives	State Farms	Total
Area (000 hectares)	4,252.6	178.3	143.6	4,574.5
	93%	3.9%	3.1%	100%
Production (000 quintiles)	49,320.4	2,034.6	3,255.4	54,592.4
	90.3%	3.7%	6.0%	100%
Yields (Quintile/hectare)	11.6	11.4	22.7	

Source: CSA (1987, 3-5).

Table 4.3--Time series of Agricultural Marketing Corporation procurements of three cereals from the smallholder and state farm sectors[a]

Crop	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88[b]
Wheat									
Total ('000 quintiles)	154.0	1,089.0	1,120.0	1,859.0	1,117.0	647.0	1,352.0	1,763.0	1,668.0
Smallholders (percent)	87.6	18.0	37.4	32.7	47.6	28.1	39.7	44.6	42.5
State farm (percent)	12.4	82.0	62.6	67.3	52.4	71.9	60.3	55.4	52.5
Sorghum									
Total ('000 quintiles)	273.0	294.0	226.0	324.0	194.0	76.0	314.0	363.0	301.0
Smallholders (percent)	71.0	38.1	57.9	67.3	51.0	39.5	99.4	95.8	78.3
State farm (percent)	29.0	61.9	42.1	32.7	49.0	60.5	0.6	4.2	21.7
Maize									
Total ('000 quintiles)	1,312.0	996.0	981.0	913.0	1,183.0	748.0	1,120.0	1,952.0	243.0
Smallholders (percent)	42.4	27.3	25.7	41.0	36.0	12.6	26.7	30.1	29.5
State farm (percent)	57.6	72.7	74.3	59.0	64.0	87.4	73.3	69.0	70.5

Source: Compiled from CSA/FAO, Evaluation of AMC procurement, sales and stockflow, Food information system project, Tables 2, 7, and 9 (Addis Ababa: CSA/FAO, 1988).

[a] This report does not include producer cooperatives as a separate category. Data for teff and other cereals were not provided in this disaggregated format.

[b] Provisional estimates.

Of course, this would by definition make food aid more "urban biased", but its indirect role of relieving rural populations of their quota burdens during times of hardship could be very beneficial.

The Regional Concentration of Production

While the range and volume of cereal procurement by AMC is not uniform across the different sectors of the farm economy, neither is the burden of quotas for AMC uniformly spread across the country. As underlined in the last chapter, Ethiopia's highly diverse ecology and climate provides for a very complex set of agro-ecological environments.[3] This has led (a) to variations in the relative importance of different cereals and root crops by region, and (b) to a very strong concentration of food production (foodgrain production in particular) in a limited geographical area.

Table 4.4, for example, shows that the principal teff-growing regions of the country are Shewa and Gojjam. These two provinces provide three-quarters of the country's total supply of the basic ingredient of the national diet. Barley, on the other hand, is produced in substantial quantities in the highlands of Arssi, Wollo, and Gondar, as well as in Shewa and Gojjam.

[3] Discussion continues today 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 1987, Appleton 1988). Others use more detailed, and consequently complicated, definitions: the 3 zones are stretched to 11 by (Herwig 1988); to 25 or 30 by Michelhill (1986), and even to 51 by Wicks (1987).

Table 4.4--Regional proportions of cereal production, Ethiopia, 1986/87

Region	Teff	Wheat	Maize	Sorghum	Barley	Total Cereals
Arssi	2.5	29.9	3.6	10.0	21.0	10.0
Bale	0.2	12.0	0.3	0.1	4.6	2.7
Gamo Goffa	0.9	0.6	0.9	2.4	1.8	1.3
Gojjam	27.6	10.3	...	3.0	15.4	13.8
Hararghe	0.7	2.0	11.2	23.2	1.3	8.0
Illubabor	4.6	0.3	3.5	3.3	0.4	2.7
Kefa	7.9	2.2	11.0	9.7	3.2	7.5
Shewa	35.8	28.7	28.3	28.3	23.0	28.2
Sidamo	0.8	...	13.2	1.8	3.0	5.1
Wollega	6.6	1.4	15.6	4.9	2.0	7.7
Wollo	4.0	7.0	1.9	15.2	14.0	7.5

Source: CSA and FAO data.

In terms of total output, however, the concentration of production is unequivocal. The major cereal-producing regions in order of volume of output in 1986/87 were Shewa, Gojjam, and Arssi (see Table 4.5). The provinces producing the least amounts of grain are Gamo Goffa (which depends largely on root crops) and Illubabor (which is a major coffee-producing zone).

Given this spatial distribution of production, it is not surprising that purchasing by AMC would follow the same pattern. As is shown in Table 4.4, the bulk of grain procured by AMC derives from the so-called cereal surplus provinces of Shewa, Arssi, and Gojjam. In these regions, generally good rainfall coupled with favorable soils and high investments has permitted relatively high output since the early 1970s. But the burden of supplying the rest of the country's cereal needs has grown too heavy in recent years.

PRODUCTION TRENDS AND FOOD AVAILABILITY

Food availability in Ethiopia is to a very large extent determined by its domestic production of cereals (the correlation between availability and production per capita is 0.76). Both national-level cereal production and resultant food availability have followed a downward trend since the 1960s. Based on data from the Central Statistics Authority, the Ministry of Agriculture and FAO, Figure 4.1

Table 4.5--Regional contribution to national cereal production and to AMC cereal procurements

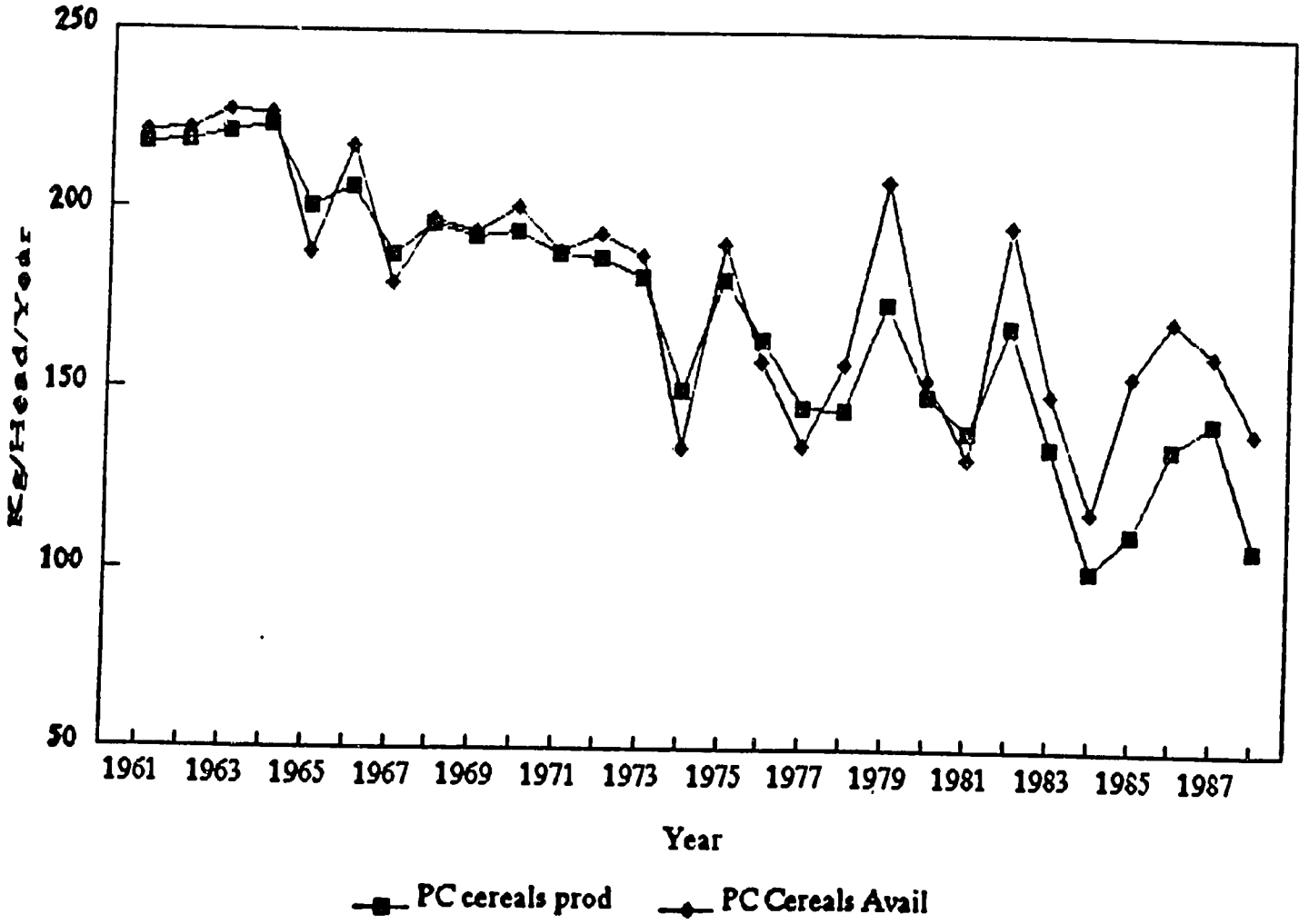
Region	Estimated Rural Population[a]	Cereal Production 1986/87[b]	AMC Cereal Procurement[c]
		(percent of national)	
Arssi	4.1	10.0	19.8
Bale	2.5	2.7	3.5
Gamo Goffa	3.1	1.3	0.7
Gojjam	8.0	13.8	27.9
Gondar	7.2	5.5	3.8
Hararghe	10.3	8.0	1.9
Illubabor	2.4	2.7	0.3
Kefa	6.2	7.5	1.4
Shewa	19.7	28.2	31.4
Sidamo	9.5	5.1	0.9
Wollega	6.0	7.7	5.2
Wollo	9.2	7.5	3.4
Total	100.0	100.0	100.0

[a] CSA data.

[b] CSA time-series data on production.

[c] Figures for 1986/87. CSA/FAO, Evaluation of AMC procurement, sales and stockflow, food information system project, Table 8 (Addis Ababa: CSA/FAO, 1988).

Figure 4.1--Per capita cereal production and availability, 1961-1988



shows that per capita cereal production has been declining by an average of 4.1 kilograms per annum.[4] The decline has not be smooth and uninterrupted for the entire period. Certain years such as 1975 and 1979 saw large increases in cereal production which may have been associated partly with better than average rainfall, and partly with changes in policies.

The decline has also not been smooth across all regions. Table 4.6 (which correlates cereal production from 1979 to 1986 in six provinces) indicates that poor or good production in one province is not directly correlated with the production levels of any other province. There is, therefore, a fair amount of 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 the trend lines of per capita cereal availability and per capita food availability. Cereal availability per head has been declining at an average of 3.3 kilograms per annum, while per capita availability of all foods (cereals plus pulses and roots) has been declining by 2.7 kilograms per year (see Figures 4.2 and 4.3).

The interannual fluctuation in the food availability line is much less than in the cereal availability line. This points to the buffer-

[4] Due to the differences in survey methodologies adopted by CSA since 1979, the production data of 1961 to 1978 and 1979 to 1986 were not directly comparable. We have adjusted production data from 1961-1978 by a factor of 1.27 in order to make both data sets comparable. Following population growth rates were used: 1961-1974 2.63%, 1974-1980 2.74%, 1980-1984 2.8%, 1984-1986 2.5%.

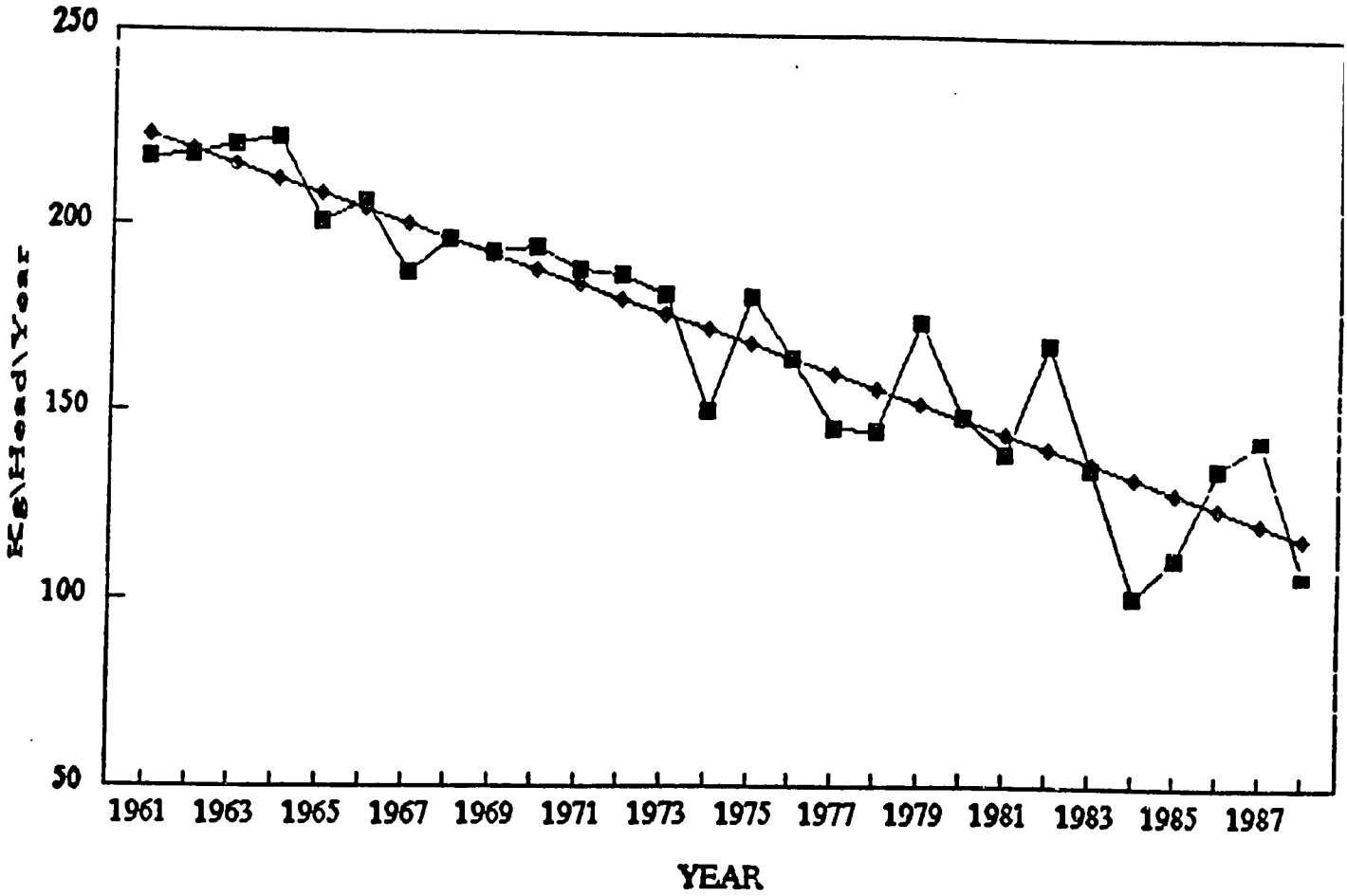
Table 4.6--Correlation of per capita cereal production in six main provinces, 1979-1986

Region	Correlation Coefficients						Average Per Capita Production
	Arssi	Shewa	Hararghe	Gondar	Sidamo	Wollo	
							(in kilograms)
Arssi	...	0.37	0.30	0.24	0.53	0.42	290
Shewa	0.37	...	0.90*	0.65	0.73	0.71	153
Hararghe	0.30	0.90*	...	0.64	0.64	0.58	95
Gondar	0.24	0.65	0.64	...	0.10	0.54	152
Sidamo	0.53	0.73	0.64	0.10	...	0.31	53
Wollo	0.42	0.71	0.58	0.54	0.31	...	151

1-tailed significance:

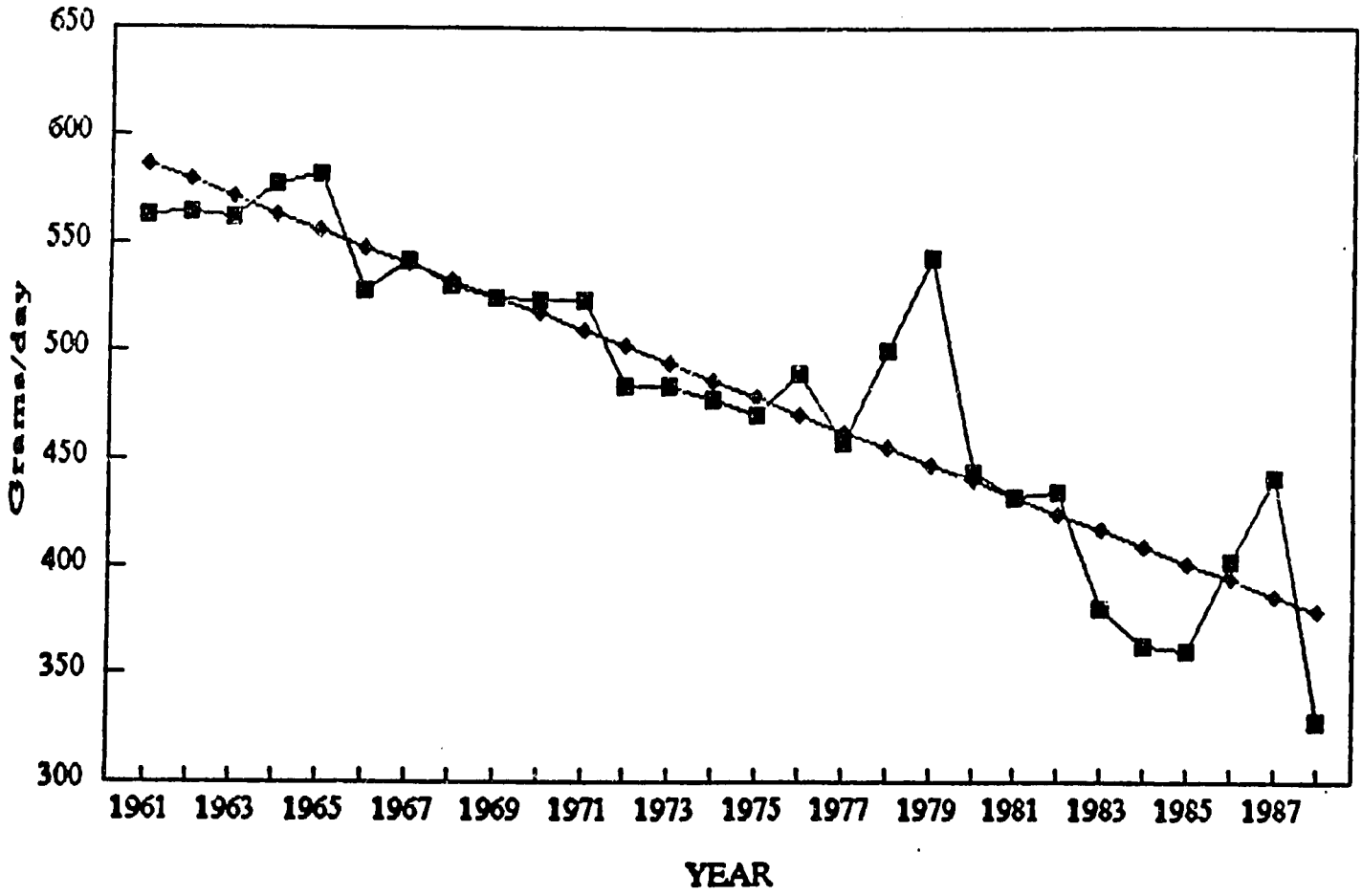
* -0.01.

Figure 4.2--Per capita cereals production trend, 1961-1988



Source: CSA and FAO data.

Figure 4.3--Per capita daily food availability, 1961-1988



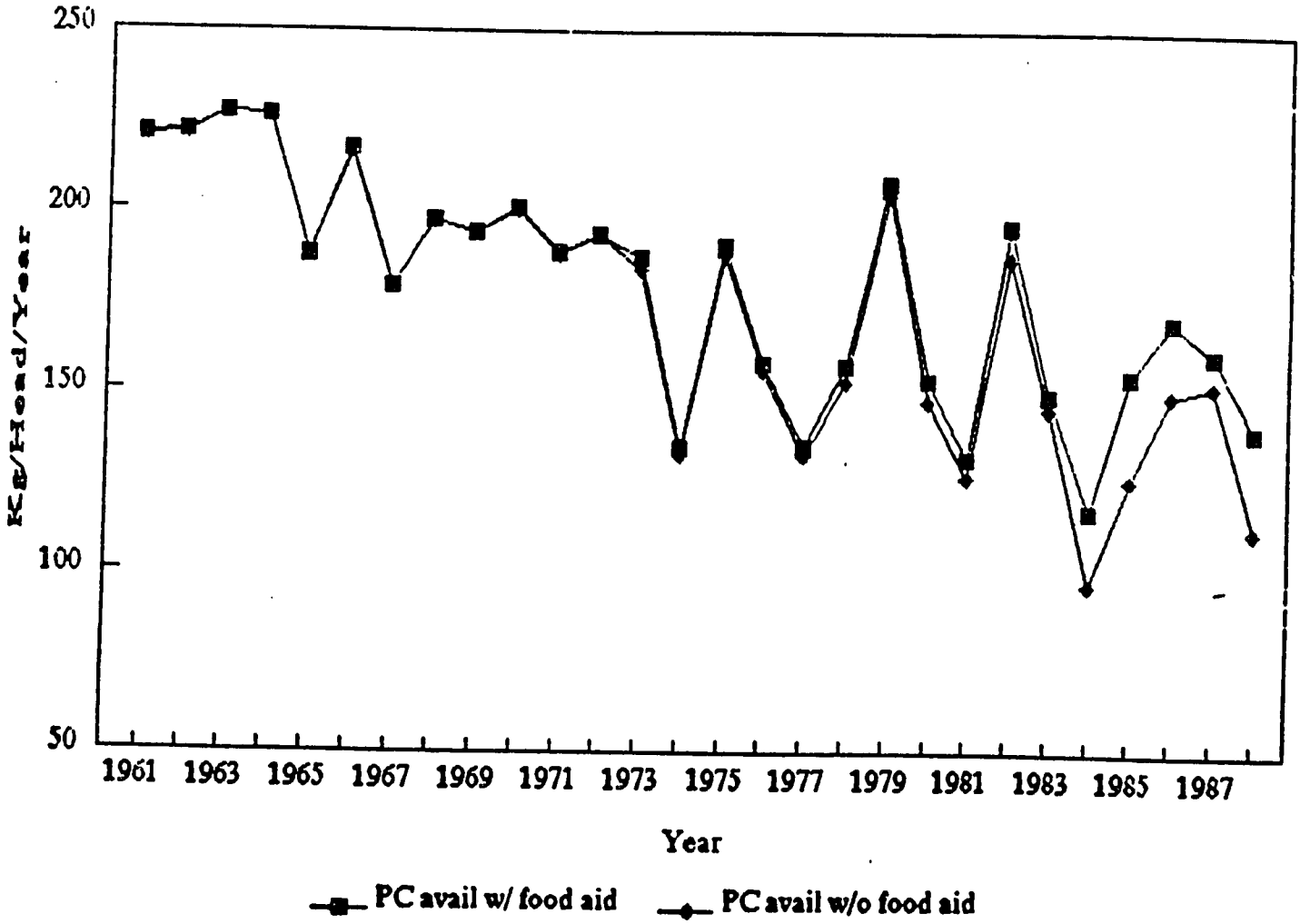
Source: CSA and FAO data.

ing 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 has increasingly widened during the 1980s. Commercial imports and food aid have taken up much of this slack, but not all. Figure 4.4 illustrates the important contribution made by food aid in the critical years of 1983 to 1985.[5] In overall terms, however, food aid contributed at most only 20 kilograms per capita in these years (Figure 4.4). In 1988 the total amount of emergency food aid arriving in the country exceeded 1985 levels following severe droughts in a number of regions (such as northern Shewa). New donations from the USSR and the European Community largely provided for this increase. The total in 1989 declined again to just under half a million tons. Predictions for 1990 are difficult, but it is expected that emergency aid will need to at least match the 1988 total.

Commercial imports contributed even less than 20 kilograms per capita until 1985 when the imports of wheat and rice in particular rose dramatically (Figures 4.5, 4.6, and 4.7). It is not clear whether this trend will continue after the good harvests of 1988/89.

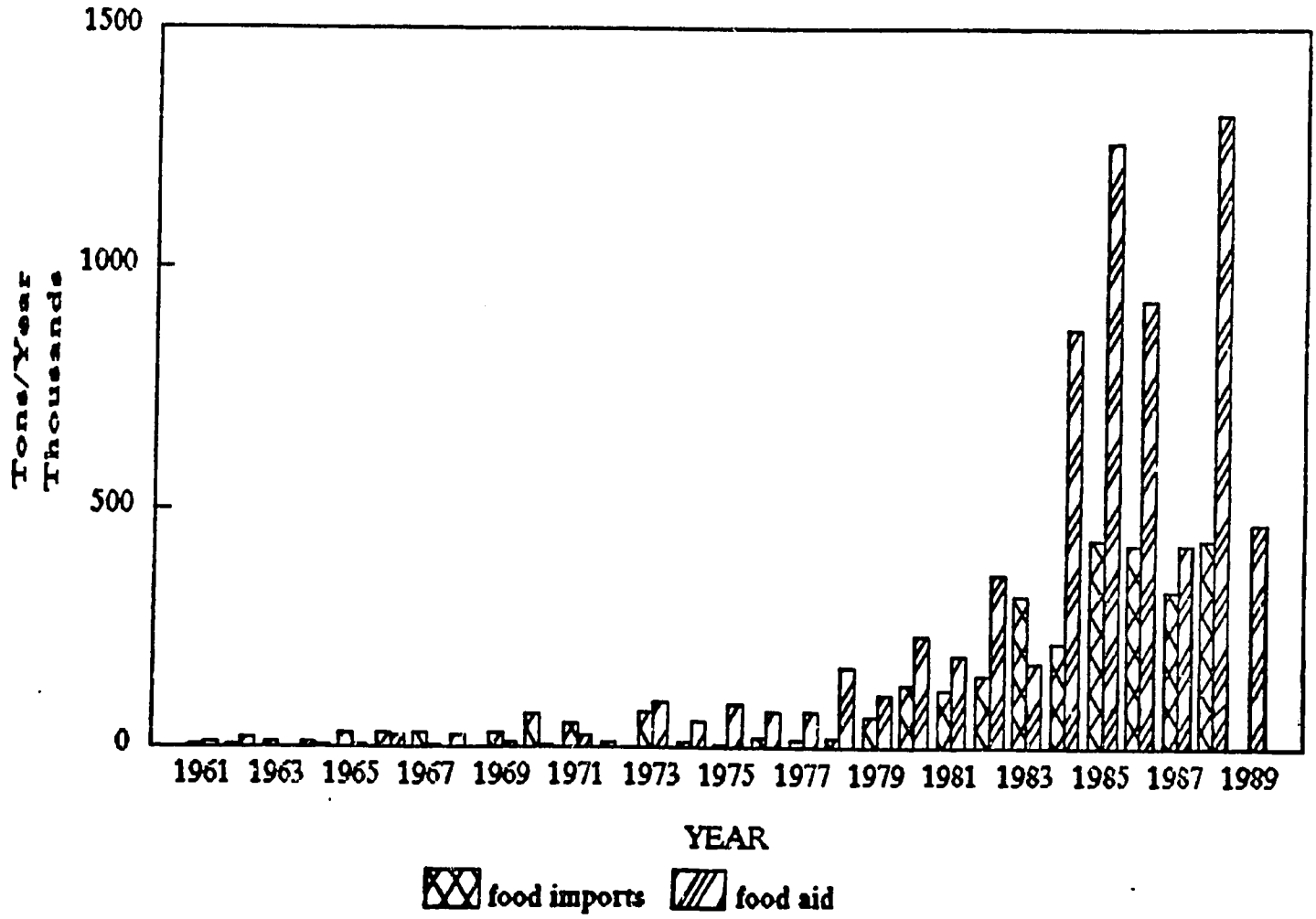
[5] There is a surprising paucity of collated long-term, time-series data relating to food aid and commercial imports. There continues to be a considerable amount of detailed recording of weekly port arrivals and pledges by UN/EPPG, but much of the disaggregated work does not go far before 1984. The present data is derived from FAO records, USAID reports, IFPRI food aid files, and UNEPPG reports.

Figure 4.4--Ethiopia: Per capita cereal availability with and without food aid, 1961-1988



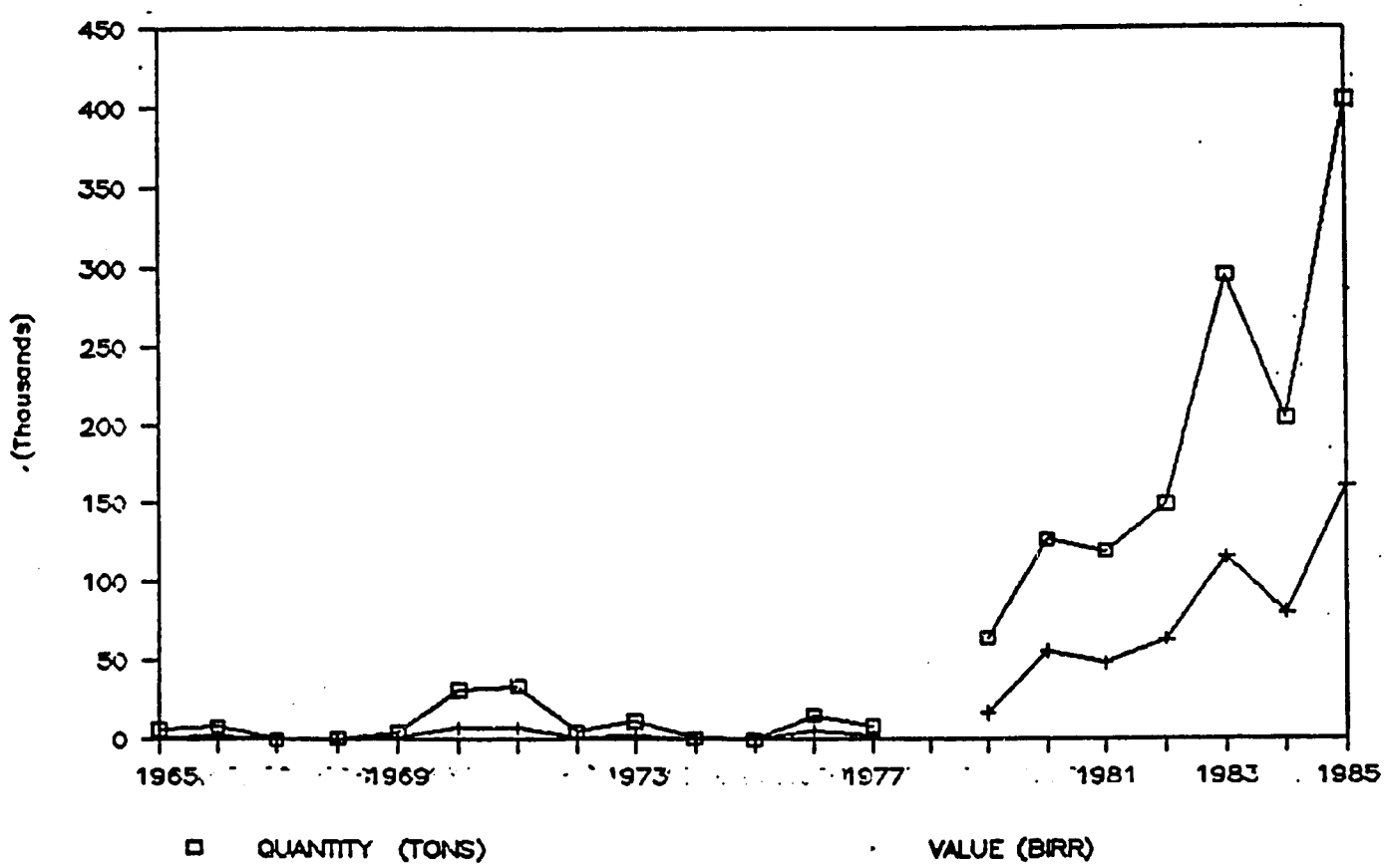
Source: FAO, CSA, WFP/EPPG

Figure 4.5--Bar graph of food aid and commercial imports from 1961-1989



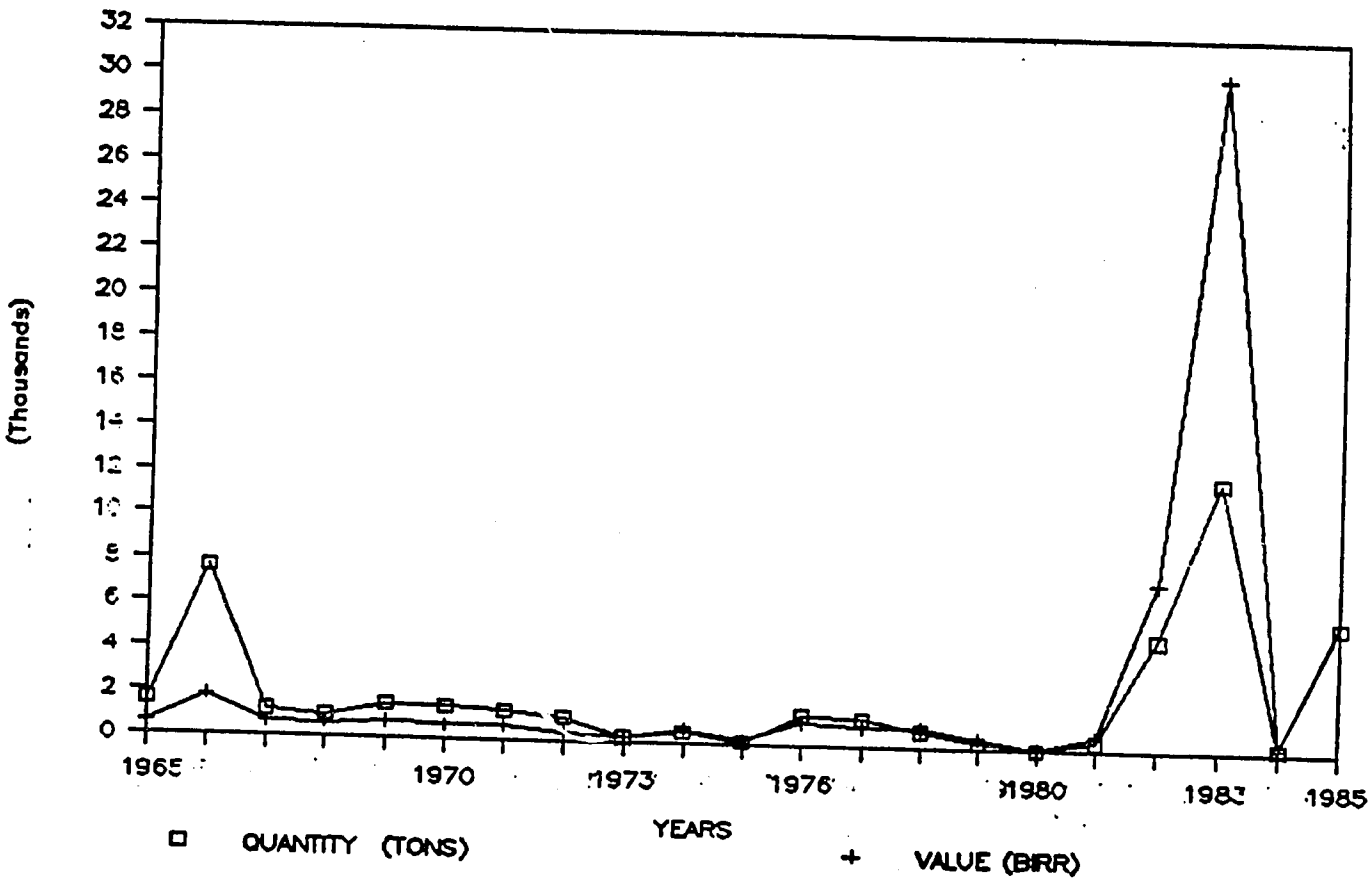
Source: FAO, WFP/EPPG

Figure 4.6--Wheat imports, 1965-1985



Source: CSA data.

Figure 4.7--Rice imports, 1965-1985



Source: CSA data.

DROUGHT-PRODUCTION RELATIONSHIPS

Drought is not the only climatic factor that can induce production shortfalls in Ethiopia. Frost, hail and floods also play a part. However, drought is the only element for which detailed data are available, and it is certainly the most important climate-related determinant of cereal production at a national level (Cohen, Goldsmith, and Mellor 1976).

The effects of drought on crop production impinge primarily on crop yields per unit of land. It may, of course, also affect cropping patterns through farmers' responses to perceived chances of drought. It was found, however, that in comparing the 1970s with the 1980s, no major changes took place in Ethiopia in the proportions of cereal crop allocated to land area. Table 4.7 shows that only minor changes have been recorded, such as a continuous reduction in the area share of teff since the late 1970s. By contrast, there has been a relatively small upward trend in maize during this period.

The relationship between rainfall quantity, timing, and distribution and resultant crop yields and production is complex. Nevertheless, a correlation is expected between absolute rainfall levels and production and yields. While a whole range of other factors are important in this realm, such as economic incentives (output and input prices) and the ability of farmers to respond to actual incentives (functioning of supply systems, financing, labor availability, and so

Table 4.7--Area share of cereal crops in total cereal areas, 1970-86

Year	Teff	Barley	Wheat	Maize	Sorghum	Millet	Oats	Total
1970	29.29	17.25	15.21	16.01	18.33	3.72	0.19	100.00
1971	28.71	17.67	15.31	16.53	17.80	3.79	0.19	100.00
1972	30.38	16.93	14.71	15.89	18.24	3.65	0.20	100.00
1973	30.38	16.94	14.70	15.89	18.23	3.64	0.22	100.00
1974	27.29	17.08	17.15	16.79	16.83	4.61	0.27	100.00
1975	32.56	12.33	12.13	16.56	17.58	8.55	0.29	100.00
1976	31.62	16.81	12.97	15.90	17.66	4.71	0.33	100.00
1977	29.28	17.91	11.06	19.07	17.13	5.22	0.34	100.00
1978	30.05	18.06	11.03	19.64	15.68	5.14	0.39	100.00
1979	30.04	18.06	9.66	17.28	20.37	4.28	0.31	100.00
1980	28.91	17.64	11.38	15.61	20.78	4.94	0.75	100.00
1981	28.76	17.50	14.79	14.09	18.24	4.89	1.72	100.00
1982	27.83	18.05	14.20	16.30	18.01	4.48	1.13	100.00
1983	27.95	16.89	13.27	17.41	19.36	4.57	0.55	100.00
1984	27.94	17.20	13.71	19.66	15.95	4.76	0.77	100.00
1985	25.97	18.56	15.60	17.33	17.19	4.57	0.78	100.00
1986	26.59	18.76	13.83	21.16	15.93	2.88	0.86	100.00

Source: CSA, FAO, and MOA data.

on), the dominating role that rainfall seems to play for cereal production in Ethiopia in the short run is assumed to limit the significance of such missing variables in the following modeling exercise.

Two simple types of model have been estimated: firstly, an attempt is made to explain production and cereal yield per hectare for the years 1961 to 1985 by considering total annual rainfall in millimeters for the respective years. It was expected that the effect of incremental precipitation on production would decrease at the margin (to be picked up a rainfall squared variable). A dummy variable was also included which separates the time-series data into two portions: before 1978 and after 1978. This year is important because it saw the introduction of new methods for calculating farm yields and production.

The results, presented in Table 4.8, do explain a large share of the actual variance in cereal production over time (R^2 = 0.707). As expected, incremental rainfall results in decreasing increments in national cereal production.[6]

The second model is set up as a pooled cross-sectional analysis for 1979 to 1985 across all provinces. This model resembles model (2) in Table 4.8, with the addition of a block of dummy variables separating each province from the other. This time an attempt is made to analyze the differential effects of rainfall variability on the major cereal crops. Apart from barley yields, this approach depicts

[6] The effect of increased rainfall on cereal yields remains positive up to the level of 1,800 millimeters per annum at weighted national average levels. These are roughly twice the actual long-term average of rainfall in Ethiopia.

Table 4.8--Rainfall-cereal production relationships in Ethiopia: regression analyses for 1961-85

Dependent Variables	Explanatory Variables				R^2	F-Value	Degrees of Freedom
	$RAIN_t$	$RAINSQ_t$	$DUMMY_t$	CONSTANT			
$CEPROD_t$	60034.2 (2.51)	-32.267 (-2.40)	-1367180.3 (-7.21)	-22183798.7	0.707	19.5	20
$CEYILD_t$	15.680 (2.86)	-8.489E-3 (-2.75)	-317.5 (-7.28)	-6048.7	0.717	20.4	20

Note: Parameters; t-values in parentheses.

Variables:

$CEPROD_t$ = total cereal production in tons in year t.

$CEYILD_t$ = cereal yield in kilogram per hectare.

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

$RAINSQ_t$ = RAIN squared.

$DUMMY_t$ = dummy variable for separation of production series before and after new statistics system (1979).

Table 4.9--Crop-specific analysis on rainfall-yield relationships[a]

Crops	RAIN	RAINSQ	$\bar{R}^2$	F-Value	Degrees of Freedom
Teff yield	1.0687 (2.13)	-3.040E-4 (-1.24)	0.332	4.00	65
Barley yield	1.0082 (1.68)	-4.4468E-4 (-1.52)	0.137	1.95	65
Wheat yield	1.2223 (1.84)	-4.425E-4 (-1.36)	0.321	3.83	65
Maize yield	3.6387 (4.12)	-1.414E-3 (-3.27)	0.359	4.36	65
Sorghum yield	2.5698 (2.92)	-8.837E-4 (-2.05)	0.302	3.59	65

[a] The regional dummy variables are not listed.

Table 4.10--Effect of a 10 percent drop of rainfall below long-term average level rainfall[a] on crop yields, by type of crops at country level

Crop Yields	Change in Yields (Percent of Average Yield)
Teff yield[b]	- 3.9
Wheat yield[b]	- 4.0
Maize yield[b]	- 7.1
Sorghum yield[b]	-16.1
All cereals yield[c]	- 9.8
Total cereal production[c]	- 8.4

[a] Production share weighted national average rainfall based on province level information.

[b] Calculated from parameters in Table 4.9.

[c] Calculated from parameters in Table 4.8.

the rainfall-yield relationships reasonably well, as is shown in Table 4.9. These results suggest that a 10 percent decline in rainfall below long-term national averages results in an average drop in all cereal yields of 9.8 percent. As some substitution with area may occur, we find a drop in total cereal production by 8.4 percent for a 10 percent decline in rainfall. The latter occurs as a result of disproportionately large declines in the yields of sorghum and maize (see Table 4.10). The latter two crops are grown in the drier regions of Hararghe, eastern Wollo, and Bale. Since these regions are also prone to greater than average rainfall fluctuations, the crops seems also to be more responsive to such fluctuations.

The rainfall-production link is not perfect (research at the International Livestock Centre for Africa points to the fact that soil type, depth, and location of plots can have a large effect on yields and total production, even within a limited area (Henricksen and Durkin 1985). However, drought is a major factor contributing to food shortages in Ethiopia. The effects on yields and production do 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 tradeoffs between the two need to be better understood. Further analysis along the lines of these models is therefore required.

5. POLICY AND INSTITUTIONAL RESPONSES TO DROUGHT

There is no doubt that Ethiopian governments have been made aware of the implications of food shortages. The present socialist government of Ethiopia was itself born partly out of the traumas of famine (RRC 1985). And it was with famine prevention in mind that many of its early agricultural policies were conceived.

The policy response of the post-Imperial government to the experience of the 1973 to 1975 famine was to order change in three major areas of the rural/agricultural economy. These changes were: 1) land reform, 2) the aggregation of production (the policy of peasant associations and cooperatives), and 3) a fundamental shift in the focus of agricultural strategies and investments.

LAND REFORM

Proclamation No. 31 of 1975 has already been referred to above. In its attempt to redistribute income and stimulate smallholder agricultural production, the land reform proclamation abolished private ownership and made all land in Ethiopia the collective property of its people. Tenancy was prohibited by making the hiring of labor illegal. And the user rights of pastoralists using government lands were to be respected.

These moves went far in equalizing access to land and providing improved security for the landless. However, several commentators have argued that the reform measures were most welcomed (and therefore implemented the most smoothly) in the southern regions of the country (Cohen, Goldsmith, and Mellor 1976; Goricke 1979; Abate and Teklu 1979). This was because the south was characterized by extensive absentee ownership of land, tribute farming, and large-scale commercial agriculture (Cohen 1974a; Markakis 1974; Blackhurst 1980). In the north, characterized more by smallholder production on already fragmented holdings, the reforms apparently held less immediate attraction.

It has also been pointed out that access to land is only one variable in any farm income function. Equality of access to quality land and access to oxen (one of the critical elements in Ethiopian agriculture) were both largely unaffected by the reforms, such that in 1984 it was estimated that only 36 percent of farmers owned a pair of oxen and 30 percent had no oxen of their own at all (Gryseels and Jutzi 1986, Goyder 1988).

Yet, these comments are largely based on broad estimations of current conditions. Very little detail is known about the impact of ongoing developments in land reform implementation and income redistribution, especially by types of household within a community and by income group. As the planning process concentrates on smaller and smaller areas, such detailed knowledge of situations and problems is essential. The Ministry of Agriculture and the Institute of Agricultural Research have gone a long way toward describing the broad out-

lines of the many varied farming systems that characterize country (Sisaye 1980; Ministry of Agriculture 1986, 1988; Institute of Agricultural Research 1987). However, as Wicks (1987, 14) has recently argued, "simple farming systems descriptions are not adequate...more detailed and complete studies must be undertaken."

THE AGGREGATION OF PRODUCTION UNITS

The second major area of policy change (the aggregation of production groups) has also been described in the last chapter. The establishment of peasant associations and cooperatives has proceeded rapidly, such that by September 1987 over 4,000 service cooperatives were serving the needs of 18,200 peasant associations (88 percent of the total number of PAs) (Ministry of Agriculture 1987). In addition to these organizations, nearly 3,000 producer cooperatives were in operation by the end of 1987, of which 33 percent had reached the final stage of development--Welba, or full socialization (Nichola 1988).

More than a few analysts have highlighted the potential of these organizations as a good basis for rapid gains in rural productivity (Cohen, Goldsmith, and Mellor 1976; Griffin and Hay 1985; Rahmato 1987). In the mid-1970s several authors claimed that, "[the establishment of associations] has been remarkably successful" (Shaw 1976, 1239).

Once again, however, detailed empirical research that can document the gains made by the rural poor via the process of association

is lacking for many parts of the country (Teka 1984, 53). The many useful documents that describe the procedures and processes of association and cooperativization cannot in themselves shed light on the practical aspects of intracommunity redistribution of resources and income.

AGRICULTURAL POLICIES

In addition to the above two sets of policies that laid the foundation for the socialization of the rural economy, a number of other agricultural policies were proclaimed during the 1970s. The first of these to have a widespread impact on the economy was the dismemberment of the commercial farms as part of a more general discouragement of large-scale private farming.

Prior to revolution, the 1960s had witnessed an ever-increasing emphasis in government policy on capital-intensive and highly mechanized agriculture. Parts of the country, such as the Awash river valley, the Chilalo district of Arssi province, the Wabi Shebele river, and Ada district of Shewa, became the focus of development projects that were designed primarily to increase domestic production of crops for export. Special tax and credit incentives were made available and infrastructure investments were planned around commercial enterprises (Cohen and Weintraub 1975, Bondestam 1975). Foreign investors were attracted with privileged profit-withdrawal agreements (Bondestam 1974).

These developments were largely successful in terms of production

and in terms of earning profits for their owners and shareholders. By 1971, for example, 25 percent of some 200,000 hectares of irrigable land in the Awash valley had been developed for cotton and sugar production (Bondestam 1974, 428). Two years later this had risen to almost 33 percent of the available land. More than half of this land was controlled and managed by Dutch and British companies. It has been calculated that one of the Dutch companies (H.V.A. - Ethiopia) involved in sugar production reaped 58 million Ethiopian dollars in net profits from 1960 to 1967, and that more than 50 percent of this profit was repatriated to Holland (Gilkes 1975, 152).

A similar pattern applied to cotton. Bondestam (1974, 435) has shown that the net value of cotton in 1973 was 1,600 Ethiopian dollars per hectare. In that year the total outflow of such profits from Awash had already exceeded total foreign investments in the region (Bondestam 1974, 435-436, 438).

While the investors were content, it has been argued that the expansion of commercial agriculture in Awash, as well as in other commercial farming regions, was made at the expense of local smallholders. Many authors have shown that the Afar pastoralists, the traditional occupiers of much of the Awash valley prior to its redevelopment, were simply pushed off their lands (Bondestam 1974; Harbeson 1975; Ball 1976; Gamaledinn 1987). This not only excluded them from benefitting from the projects but also reduced the area of dry season grazing land which they could depend on in drought years.

Similar things happened in Arssi. Here, the Chilalo Agricultural Development Unit had introduced high-level mechanization along with

packages of new seed varieties and fertilizer in an attempt to raise the yields and production of cereals such as wheat and barley.[7] Within a few years, it was found that the project had been very successful in stimulating growth and had increased real household incomes of participating families by 200 to 300 Ethiopian dollars per year (CADU 1971, 4). However, more detailed analysis of the project showed that the social cost of the economic growth was tenant eviction on a massive scale. As large landowners and landlord began to perceive the profit potential of the project, land prices nearly doubled, tenant rents rose to one-half of crop harvest, and more than 5,000 tenant households were evicted from their farms during the first five years of the project (Kifle 1972).

The appropriation of fertile lands for the production of commercial food crops and non-foodstuffs has, therefore, been proposed as a contributing factor in the shortfall of food associated with the 1973 famine (Kifle 1972; Markakis 1973; Cohen 1974). Koehn (1979, 52) argues that the Imperial policies of resource allocation towards commercial agriculture "often retarded the production of food for domestic consumption by small-scale farmers and pastoralists." Reimer (1975, 123-126) concurs, pointing out that while people were starving during the famine years, exports of oilseeds and pulses actually increased.

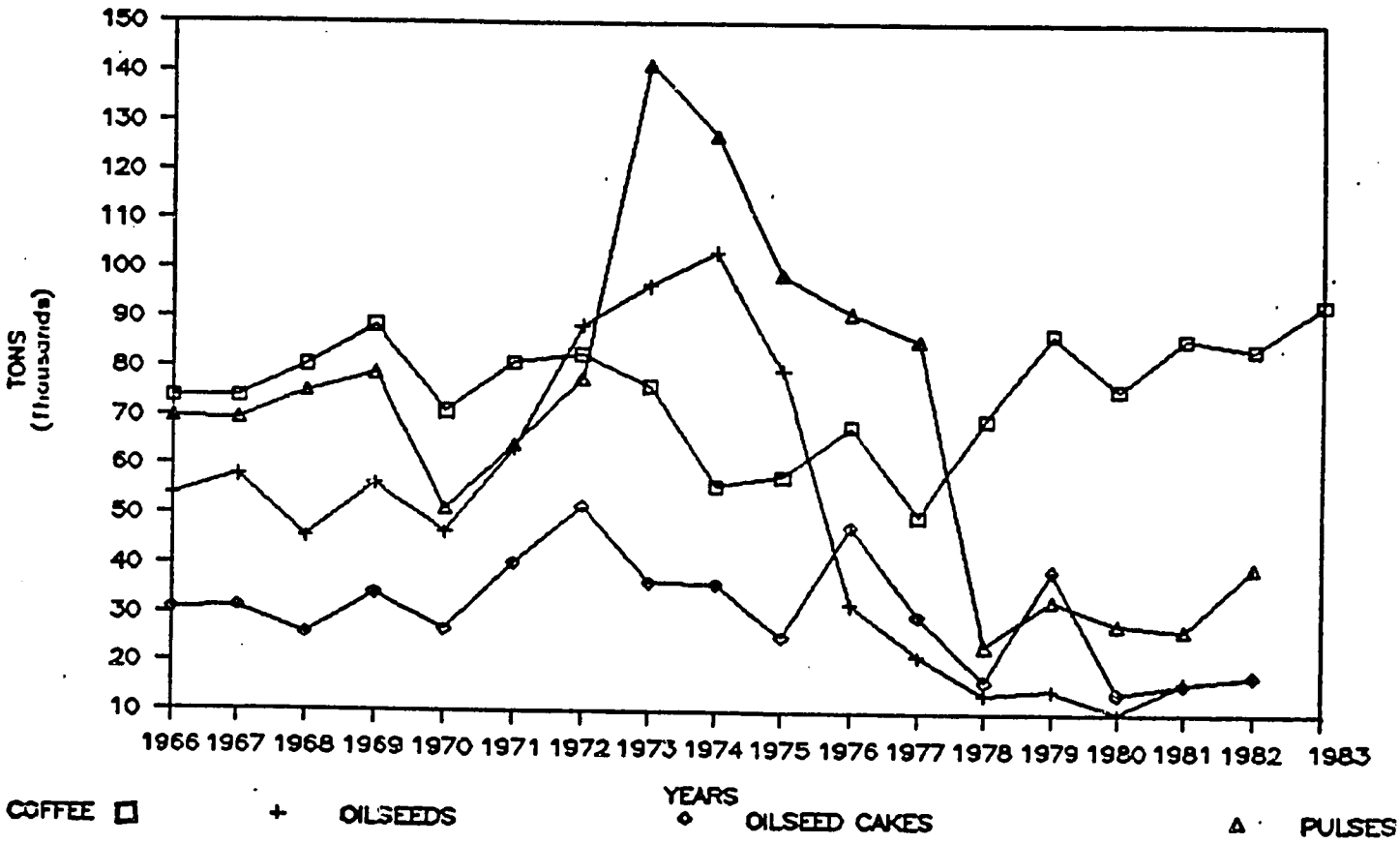
Reimer's assertion is supported by the data in Figure 5.1, which

[7] The CADU project also included components designed to increase local production of flax, fodder crops, and milk. Health, water, and veterinary programs were also introduced.

shows levels and value of exports for some of the main commodities from 1966 to 1983. These data indicate that the exported quantities of oilseeds and pulses rose sharply during the critical years of 1973 and 1974. In fact most exports commodities did not suffer excessively during the early years of the famine, including coffee which declined a little during 1973 and 1974 but picked up in the following few years.

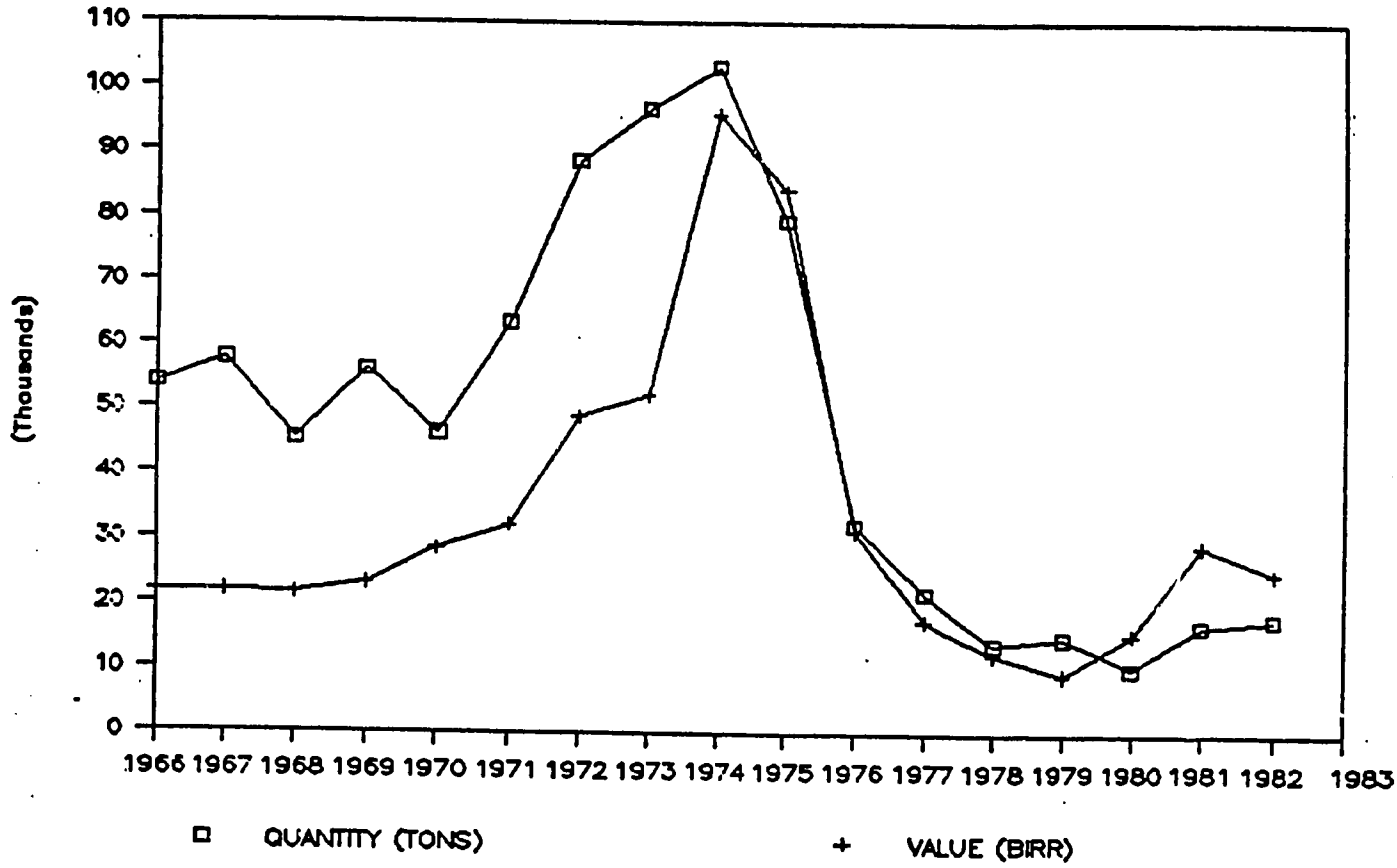
However, many things changed after 1975. One of the new government's first moves was to discourage the cultivation of crops for export (except coffee and hides and skins) and to reemphasize the importance of smallholder food production (Shaw 1976, Holmberg 1977). This had an immediate impact on the export of, for instance, pulses. Figure 5.2 shows the immediate decline in pulses exports (both quantity and value) from 1975 to 1976. It is important to note, however, that the government did not discourage the export on nonfood cash crops, the lifeblood of the government's finances. By fortunate coincidence for the country, the world market price for coffee rose dramatically in the two years following 1975 as a result of the failure of the Brazilian harvests. This phenomenon took coffee earnings up from ETB 153 million in 1974 to ETB 600 million in 1979, just when the country needed foreign exchange very badly (see Figure 5.3). Since 1979, earnings from coffee have fluctuated considerably from one year

Figure 5.1--Quantity of principal exports, 1966-1983



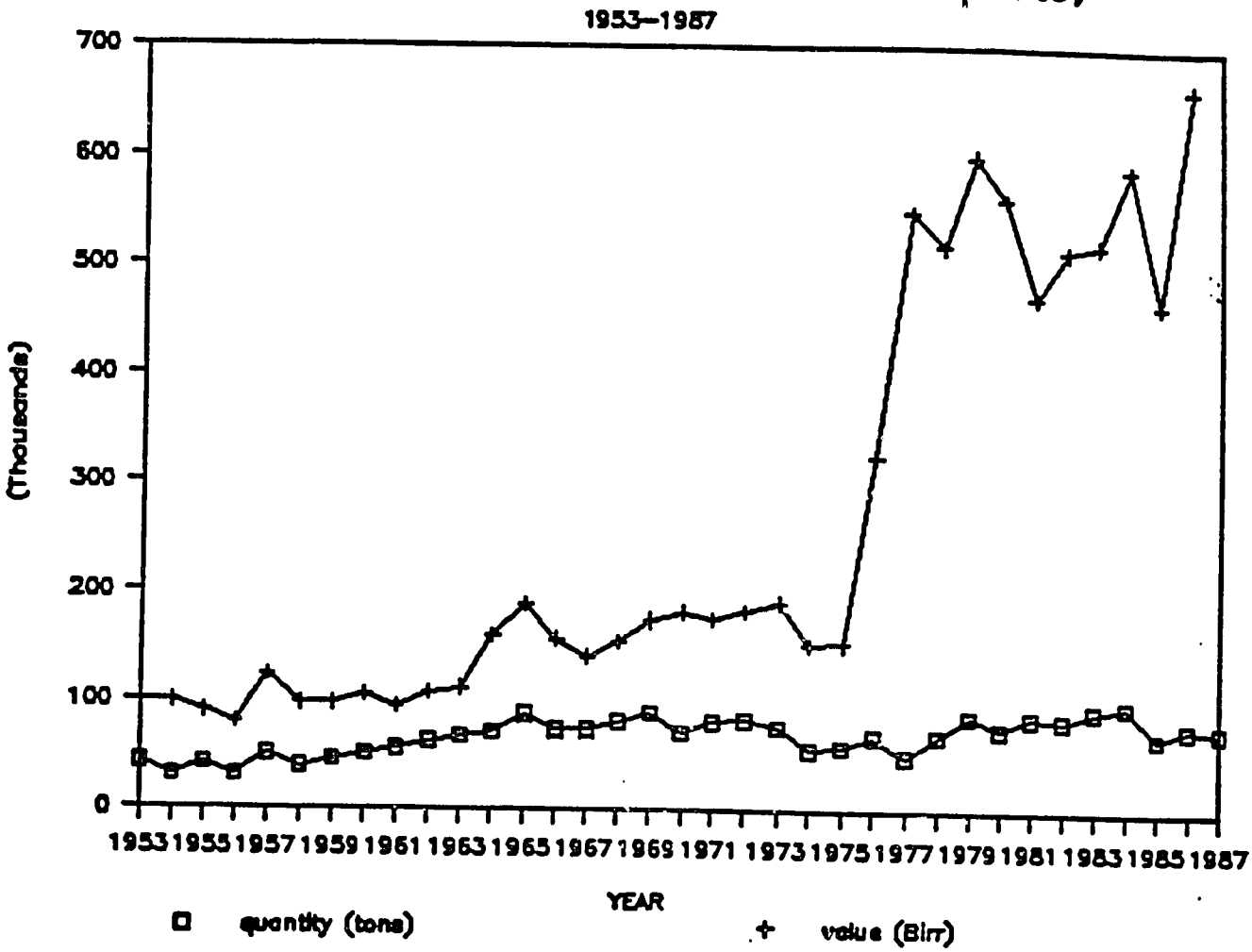
Source: National Bank of Ethiopia annual bulletins.

Figure 5.2--Exports of pulses, 1966-1983



Source: National Bank of Ethiopia annual bulletins.

Figure 5.3-- Quantity and value of Coffee Exports, 1953–1987

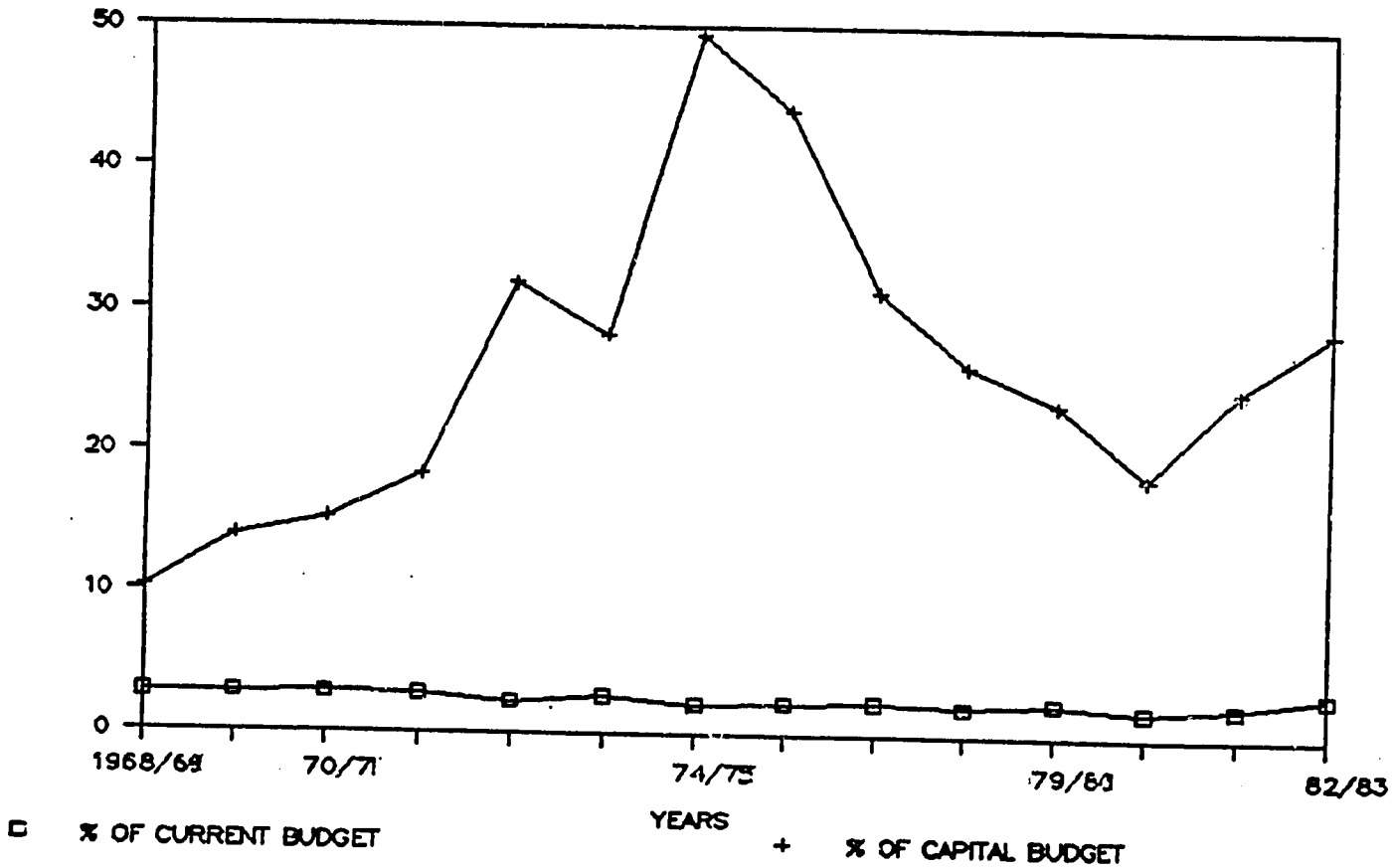


to the next, but have remained within the high range of 450 and 650 million Birr per annum.

In order to ensure the success of its policies, the Provisional Military Administrative Council decided that crown lands, commercial farms and all large private holdings should be broken up and distributed to tenant farmers and the landless. Some of the large estates were, however, retained for conversion into state farms that would be devoted to the production of food crops for domestic consumption (Shaw 1976, Koehn 1979). Finally, a new price policy for grains was instituted that was designed to favor producers and keep the domestic price of major domestic food grains at a high level (Holmberg 1977, Lirenso 1987).

Interestingly, the main thrust of the redesign of the agricultural sector after the revolution involved a substantial reorganization of resources, policies, and activities, but it included little addition to the resources available to the agricultural sector until 1978/79. Figure 5.4 shows that the share of agriculture in the government's current expenditure budget has remained fairly constant throughout the period from 1970/71 to 1984/85. Agriculture's share of the capital budget, however, rose sharply from 28 percent to almost 50 percent between 1976/77 and 1977/78 (reaching an absolute level of ETB 209 million). The latter year saw the launching of new drives in the agricultural sector towards the socialization of farming: increased resources were pledged for the strengthening and expansion of cooperativization (including input and tax subsidies), a new quota system was introduced for the national procurement of food grains, special regu-

Figure 5.4--Percentage share of the agriculture sector in the national current and capital budgets, 1970/71 to 1982/83



Source: National Bank of Ethiopia annual bulletins.

lations were brought in to protect and manage forest resources, there was a new emphasis on farmer training and extension, and the national literacy campaign was begun. Since that peak investment year, however, the share of agriculture in the capital budget has fallen back to between 20 and 30 percent in line with commitments made in the Ten-Year Development Plan of Socialist Ethiopia (1980/81-1989/80) and the subsequent Five-Year Plan.

AGRICULTURAL INSTITUTIONS

The key to the successful implementation of these many new policies in the agricultural sector was seen to lie with the institutions that would have to put them into practice. As a result, a number of pre-existing government organs were dismantled or reorganized and new ones were created. Between 1975 and 1979, some of the following more important restructuring took place:

- The former Ministry of Agriculture became the Ministry of Agriculture and Settlement;
- The Relief and Rehabilitation Commission (RRC) replaced the former Drought Commission;
- A Resettlement Authority was founded;
- The State Farm Authority was founded;
- The Agricultural Marketing Corporation (AMC) replaced the former Ethiopian Grain Corporation, established since 1960;
- An effort was made at strengthening local administrations at provincial and district levels.

In the realm of drought and food shortages, it was the RRC that was assigned the burden of relieving the effects of the 1973-75 famine and of rehabilitating agriculture in the affected areas in the hope of preventing future catastrophes. The RRC was founded in 1974 upon the recommendations of a National Emergency Relief Committee that had been set up to monitor and alleviate the effects of the drought. Its primary mandate was to provide relief in the worst-affected regions. To do this it was empowered to act as the fulcrum of all governmental relief activity and to directly solicit and distribute relief supplies. Its organizational structure, as laid down in July 1974, is shown in Figures 5.5 and 5.6.

The work of RRC was at first dominated by the demands of saving lives. It had to face all the difficulties of moving food and other emergency supplies from congested ports to remote villages. The use of such diverse technologies as pack mules and airdrops became commonplace for tackling such problems. As the crisis subsided, however, the demands of rehabilitation and prevention came ever increasingly to the fore. RRC consequently became engaged i) in short-term rehabilitation projects, such as fertilizer, seed, and oxen distribution; ii) in medium-term projects, such as food-for-work programs designed to replace and improve rural capital assets like roads, wells, and forest stands; and iii) in longer-term development projects such as range management schemes, soil and water conservation programs, feeder road master planning, and so on.

As part of the longer-term program, RRC also established in 1977 Africa's first Early Warning System (EWS), followed in 1980 by an

Figure 5.5--Relief and Rehabilitation Commission organization chart

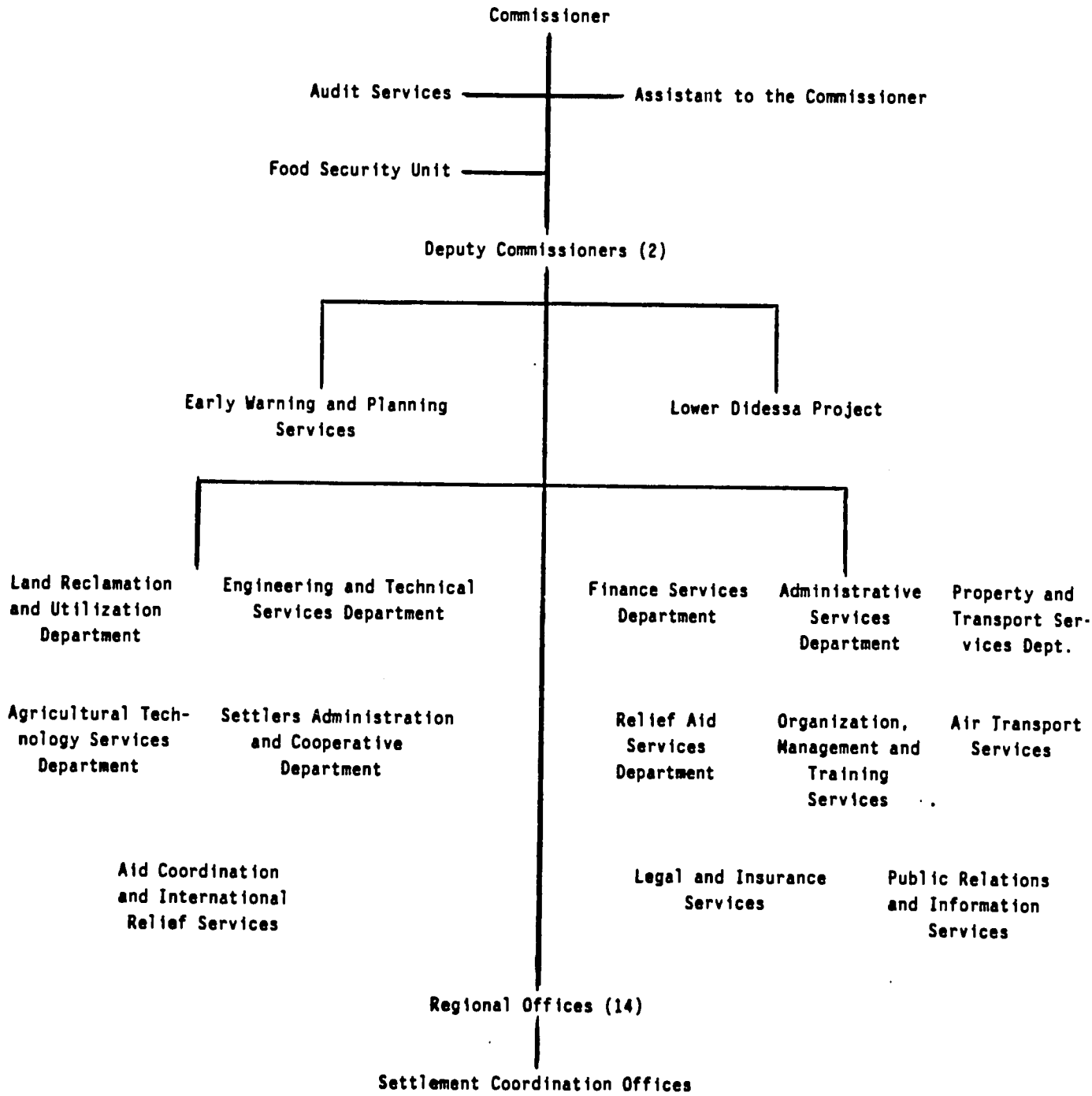
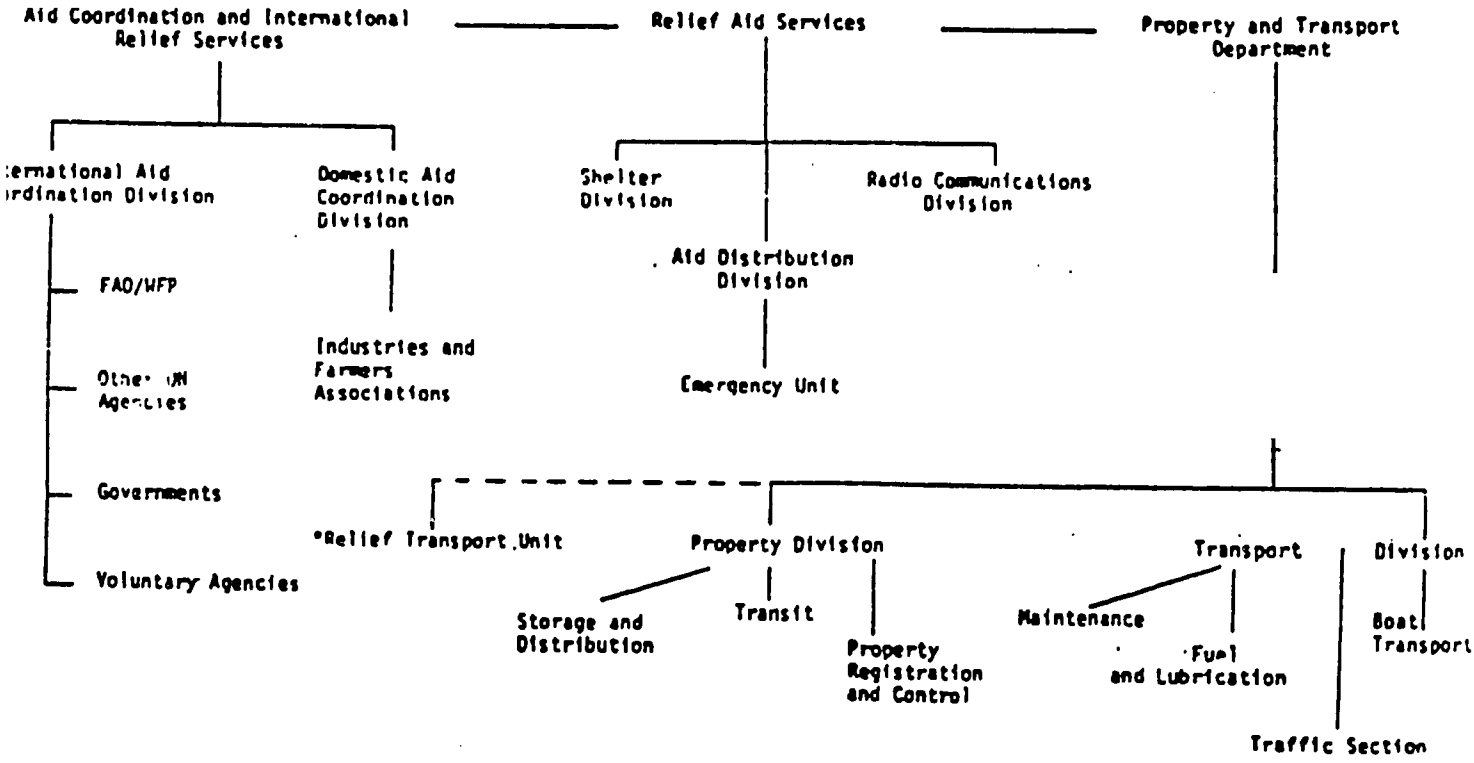


Figure 5.6--RRC departments involved in relief



*Semi-autonomous organization separate from the remainder of the RRC fleet

Early Warning and Planning Service. Eight different government agencies, plus dozens of NGOs, contribute data of varying kinds to the RRC coordinating body. These data range from climatic measurements to crop assessments, and from market prices to anthropometric status (Cutler and Stephenson 1984; Beyene 1988). Such data help guide the governments' own drought relief activities. In 1980/81 the governments' budget line on Drought Relief expenditure stood at 9.2 million Ethiopian Birr. In 1984/85 this had reached almost 65 million, staying at around 60 million during 1985/86 (National Bank of Ethiopia 1989, 52). Such data also assist in the coordination of international appeals.

A Food Information System (FIS) has also been set up to strengthen both the data collection and data analysis capabilities of RRC. The Disaster Prevention and Preparedness Conference hosted by the Office of the National Committee for Central Planning (ONCCP) in December 1988 looked in detail at the operations of RRC, and made many useful recommendations as to further improvements that might be made to the system of identification and collection of early warning indicators.

6. PRICES AND MARKETS DURING FAMINE

It is important in government policymaking to have a comprehensive understanding of the functioning of markets during food shortage situations. An understanding of production-consumption relationships provides a key input into policies regarding interregional food distribution, stockholding/drawdown, and imports (both commercial and food aid). The following assessment of market behavior in Ethiopia during the past two decades draws together some critical facts relevant to informed decisionmaking in the realm of government price policy and market intervention.

Actual policy analysis of these issues is only just beginning. In general, when food prices increase, these increases hit those people the hardest who spend the bulk of their income on food; namely, the poor. It is the poor who have a high propensity for spending income on basic staples, especially cereals. This interpersonal distribution effect of price changes, in which "it is the poor who starve during food crises--not the rich" (Devereux 1988, 271; ICIHI 1985), has been substantiated in a number of countries where data are available. The same relationship has yet to be adequately quantified for Ethiopia's different population groups.

Key questions still needing to be addressed are, therefore: What

happened to local food markets following serious declines in domestic production? Who had access to, and benefited most from, those markets? Did complementary imports, stock drawdown, and food aid substantially dampen the price effects of such production shortfalls at a local level? Is there a close relationship between production, price, and individual nutrition variables? The micro-level household survey work planned under the current IFPRI project is designed to shed further light on these crucial issues.

The focus of the present analysis, however, is simply on presenting factual information on real price development, especially for cereals and, as far as possible, the terms of trade between cereals and livestock. Both are key indicators of (and possibly even advance signals of) the erosion of purchasing power of the poor during food crises. Differences in interregional price variations can hint at the role of improved market integration through higher investment in rural infrastructure. The short-term effects of production and food availability declines on prices and terms of trade can also point towards the critical need for an institutional capability for very rapid mobilization of resources. The latter also underlines the need for programs designed to cope with short-term food security problems of the poor when drought hits.

DEVELOPMENTS IN MARKET INTERVENTION

Prior to 1975, central government intervention in food markets was minimal. The Ethiopian Grain Corporation (EGC) had been established in 1960 as a public corporation with a view to maximizing the export of high quality grains, thereby protecting the country's foreign exchange position and ensuring local price stability in the grain markets. However, problems in the realm of stockholding capacity and working capital prevented this institution from operating effectively. By 1975 it commanded only five percent of the market share of the grain trade (Lirenso 1983, 76; Holmberg 1977, 10). By contrast, private traders (numbering up to 25,000 in the rural areas and 8,000 in the towns) were controlling over 90 percent of all grains in the market system (Holmberg 1977, 9).

It has been estimated that marketed output of gross food crop production during the pre-1975 period stood at between 25 and 30 percent (Ghose 1985, 136; Saith 1985, 160). A large part of this total was derived from rents and crop shares (sometimes up to 50 percent of a smallholder's gross production) that accrued to landlords who controlled considerable tracts of the country. The bulk of the tributes paid to them in kind were destined for the market, where prices for grains were determined by market forces.

The end of share tenancy in 1975 relieved small farmers from the long-established obligation of paying rents and tributes. This change had an effect on the markets: the proportion of domestic production consumed at home rose and apparently the share of marketed production

fell. In 1977/78 it had dropped to around 11 percent (Ghose 1985, 136). This decline in the quantities of grain made available to the market caused urban consumer prices to rise. Table 6.1 shows that the price indices for teff rose from a level of 105 in 1974 (taking 1967 as the base year) to 237 by 1979. The rise for wheat was even more marked. Wheat's index in 1974 was 117, rising to 360 in 1979.

The government's first response to the rising urban prices was to establish the Agricultural Marketing Corporation (AMC), (referred to in Chapter 4). This new agency soon absorbed the functions of the EGC and began operations with a special focus on grain procurement for the public distribution system (examined in the last chapter) and on cereal price stabilization.

Wholesale grain prices were already centrally fixed for many of the main provincial markets by the end of 1976. Between 1977 and 1980, however, uniform national prices gave way to regionally prescribed prices set by numerous grain purchase task forces. Table 6.2 indicates how these prices varied from one region to the next, according to grain availability and differences in the decisions made by the various task forces. Because of their higher production levels, prices in Shewa and Arssi, for example, tended to be lower than prices for the same crops in Wollo.

The regional system was replaced in 1980 by the current nationwide structure that fixes uniform levels for both wholesale and retail prices. Official prices established in 1980 remained largely unchanged until very recently (except for a 2.2 percent increase in

Table 6.1--Index of retail prices for three major cereals in Addis Ababa, 1967 to 1985

Year	Teff		Wheat		Barley	
	Retail Price	Price Index	Retail Price	Price Index	Retail Price	Price Index
1967	41	100	30	100	19	100
1968	...	...	...	...	...	...
1969	44	107	36	120	18	95
1970	52	127	48	160	26	137
1971	...	...	...	...	...	...
1972	50	122	41	137	25	132
1973	45	110	33	110	20	105
1974	43	105	35	117	22	116
1975	...	...	...	...	...	...
1976	52	127	49	163	28	147
1977	69	168	61	203	37	195
1978	61	149	64	213	...	...
1979	97	237	108	360	55	289
1980	105	256	105	350	57	300
1981	...	...	...	...	...	...
1982	127	310	112	373	67	353
1983	120	293	111	370	60	316
1984	141	344	115	383	88	463
1985	219	534	176	587	147	774

Source: Compiled from various CSO statistical abstracts, 1967 to 1986.

Table 6.2--Producer prices fixed by the regional GPTFs in 1979/80 (ETB/quintal)

Type of Grain	Regions					Computed Average	Computed C.V.
	Shewa	Arssi	Gojjam	Wollo	Gondar		
							(percent)
Mixed teff	37	36	30	47-50	47	39.70	17.6
Mixed barley	25	24	21	31-40	35	24.30	46.8
Mixed wheat	33	28	27	49-52	47	37.10	26.4
Maize	20	19	17	28-31	25	22.10	20.5
Sorghum/millet	27	21	22	29-32	33	26.70	17.4
Oats	20	...	17	...	40	25.70	39.7

Source: Data on producer prices fixed by the regional GPTF are based on AMC, A concise report on proposals for grain price reform, unpublished Amharic monograph (Planning and Research Department, August 1985), p. 8.

the producer prices of teff and sorghum in 1982/83). However, extensive negotiations with the World Bank early in 1988 resulted in producer price increases of between 7 and 10 percent. Tables 6.3 and 6.4 indicate the extent of these increases by crop. It is too early yet to stress what impact these price increases will have on the overall level of smallholder production, and on marketed surplus available to the state.

The government's second approach towards securing urban grain supplies was the establishment of the quota delivery system and a parallel curtailment of private grain trading. From 1978 to 1980/81 every peasant association was obliged to deliver a minimum of 100 quintals of its annual produce to AMC. In 1981 this quota was raised to 150 quintals, without a concomitant increase in producer prices. At the same time, licensed private grain traders were required to make at least 50 percent of their purchases available to AMC. In the high production regions of Gojjam, Gondar, Arssi, and parts of Shewa, this requirement covered 100 percent of all privately purchased grain. The private traders were paid ETB 5 per quintal above the official farm-gate purchase price. However, traders failing to fulfil their quota to AMC lost their licence. What is more, interregional trade of cereals by private traders was, and continues to be, strictly regulated.

These moves by AMC have been successful in increasing its share of the national grain market from less than 20 percent in 1976 to over 50 percent in 1985/86 (see Table 6.5). A large portion of AMC's purchases supplies the urban populations of Addis Ababa, Dire Dawa, and

Table 6.3--Comparison of AMC prices to mean retail prices, July 1985-June 1986

Crops	AMC Procurement Prices		Mean Retail Price*		
	Farmgate Price	Wholesale Price	Gojjam	Hararghe	Wollo
Teff	45.0	50.0	76.8	125.6	156.8
Wheat	34.0	39.0	78.8	106.0	117.8
Barley	28.0	32.0	61.4	98.4	105.6
Sorghum	23.0	27.0	55.0	108.4	118.2

Source: Simon Maxwell, Food aid, Ethiopia: Disincentive effects and commercial displacement, IDS discussion paper 226, 1986, p. 48.

* Mean retail prices are computed for the period May 1985-July 1986.

Table 6.4--Comparison of AMC prices to mean retail prices, July 1988

Crops	AMC Procurement Prices		Mean Retail Price*		
	Farmgate Price	Wholesale Price	Gojjam	Hararghe	Wollo
Teff	48.0	53.0	72.0	145.0	129.0
Wheat	36.0	41.0	69.0	86.0	88.0
Barley	30.0	34.0	56.0	68.0	68.0
Sorghum	25.0	29.0	44.0	96.0	85.0

Source: Ministry of Agriculture, Cost data base (Addis Ababa: Project Formulation Department, July 1988).

* Mean retail prices computed from CSO, Average retail prices of goods and services in rural areas, Statistical Bulletin 57 (January 1988).

Table 6.5--Share of AMC in total marketable surplus, 1976/77-1985/86

Year	AMC Local Purchase	AMC Purchases as Percent of Marketable Surplus
	(million quintals)	
1976/77	1.18	18.0
1977/78	1.07	18.0
1978/79	1.49	24.3
1979/80	2.74	28.1
1980/81	4.36	51.2
1981/82	4.59	56.2
1982/83	5.73	56.6
1983/84	4.10	49.8
1984/85	2.31	41.4
1985/86	4.36	55.9

Source: A. Lirenso, Grain marketing and pricing in Ethiopia, IDR (Addis Ababa University, April 1987), p. 76.

Asmara through the Basic Commodities Service Corporation. Table 6.6 shows how the official grain price at the producer level translates into retail prices for the consumer at the Kebele (urban dwellers' associations) level. According to Alemayehu, this pricing structure has been very successful at making large quantities of food available to urban populations at comparatively cheap prices and at a low cost to AMC (Alemayehu 1987). Indeed, AMC plans to expand its national coverage in the next few years, aiming to increase its control of the grain market to about 80 percent by the mid-1990s.

However, the impact of the AMC's pricing and procurement quota policy on the smallholder sector and the evolution of price movements outside of the government system are issues that have as yet received limited attention. Little is known, for example, about the direct effects of procurement policy on smallholder expectations and farming and marketing behavior. 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 rather scarce. There is, for example, limited (consistent) data available on the functioning of key regional and local markets before, during, and after severe food crises. The following section is therefore a preliminary evaluation of price developments in Ethiopia based on information that is currently

Table 6.6--Controlled prices of foodgrains in Ethiopia, 1985/86 (Birr/Quintal)

Type of Grain	(1)	(2)	(3)	(4)	(5)
White teff	45	45	68.05	69.55	73.00
Mixed teff	38	43	60.40	61.90	65.20
Brown teff	34	39	56.05	57.55	60.75
Maize	20	24	42.95	44.45	47.40
White sorghum	27	31	52.60	54.10	57.20
Mixed sorghum	23	27	42.95	44.45	47.35
Millet	23	27	40.75	42.25	45.15
White barley	28	32	48.40	49.90	52.05
Mixed barley	26	30	46.20	47.70	50.70
White wheat	34	39	56.05	57.55	60.75
Mixed wheat	30	35	51.65	53.15	56.25
Black wheat	29	34	50.60	52.10	55.15
White peas	36	40	57.15	58.65	61.85
Mixed peas	32	36	52.75	54.25	57.40
Chick peas	28	32	48.40	49.90	52.95
Horse beans	25	30	46.20	47.70	50.70
Lentils	42	47	64.80	66.30	69.65

Source: AMC and Addis Ababa Basic Commodities Supply Corporation, Addis Ababa. Reproduced in A. Lirenso, Grain marketing and pricing in Ethiopia, p. 50, Research report 28 (Addis; IDR).

Notes:

(1) AMC purchase price from producers.
(2) AMC purchase price from service coops and traders.
(3) AMC selling price to Addis Ababa Basic Commodities Supply Corporation (BCSC).
(4) Addis Ababa BCSC selling price to public (Kebelie) shops.
(5) Kebelie retail price (including 2 percent T.O.T. for consumers in A.A.

available and is mainly focused on the 1980s.[8]

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. The national price index for cereals, computed as the weighted average across all provinces, increased from 100 in 1981 to over 220 in 1985 (Figure 6.1). It rose again, though not nearly so sharply, during 1988.

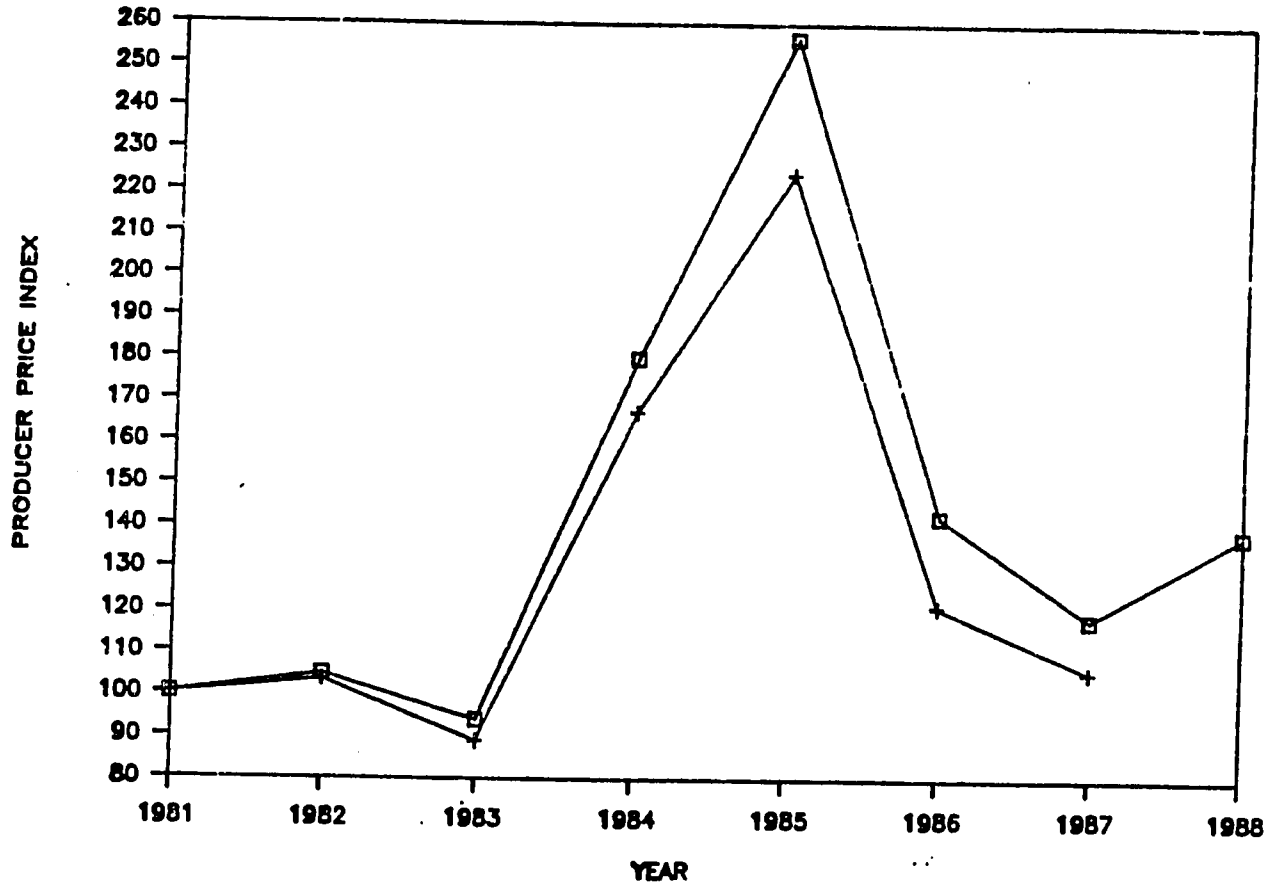
These dramatic price rises were little moderated by stock depletion or by price controls. In effect they appear to have been largely in response to production shortfalls. A simple regression computation at a national level suggests that a 10 percent decline in production results in a 14 percent increase in price.

However, these price increases were not felt uniformly across the country. Firstly, while prices in Shewa, Wollo, and Gojjam increased substantially above the average trend, prices in Hararghe, Arssi, and Sidamo remained substantially below the weighted average price increase for the country as a whole (see Table 6.7).

Secondly, although the general price movement during the food

[8] Current price analyses being carried out by RRC, MOA, and several NGOs will shortly provide further very valuable information that may then be incorporated into the final report.

Figure 6.1--Cereal price index, Ethiopia, 1981-1988



□ Ethiopia cereal price-nominal

\+ Ethiopia cereal price-deflated

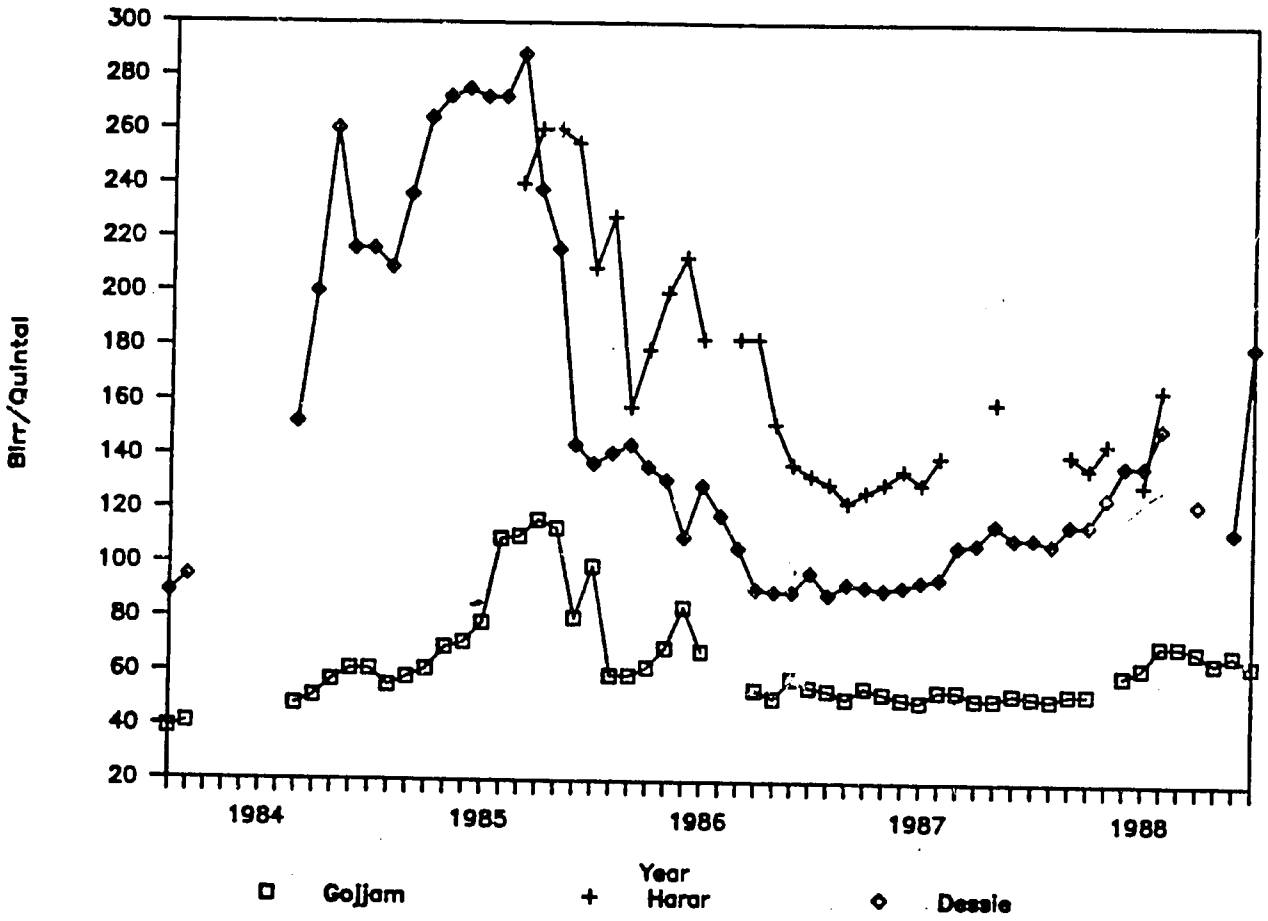
Table 6.7--Regional price index of nominal birr/kilogram (1981=100)

Year	Gojjam	Arssi	Hararghe	Shewa	Sidamo	Wollo	Ethcerlp[a]
1981	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1982	121.23	87.31	83.32	102.93	104.85	107.38	103.31
1983	105.33	79.98	57.63	86.53	84.14	102.62	88.89
1984	154.08	171.89	151.37	157.10	147.27	223.02	167.16
1985	223.75	197.64	161.41	230.34	167.82	291.30	224.10
1986	158.35	104.72	98.40	123.19	95.76	105.39	121.21
1987	149.94	87.17	70.35	104.91	77.33	97.05	105.56

Source: RRC prices deflated by annual World Bank deflator.

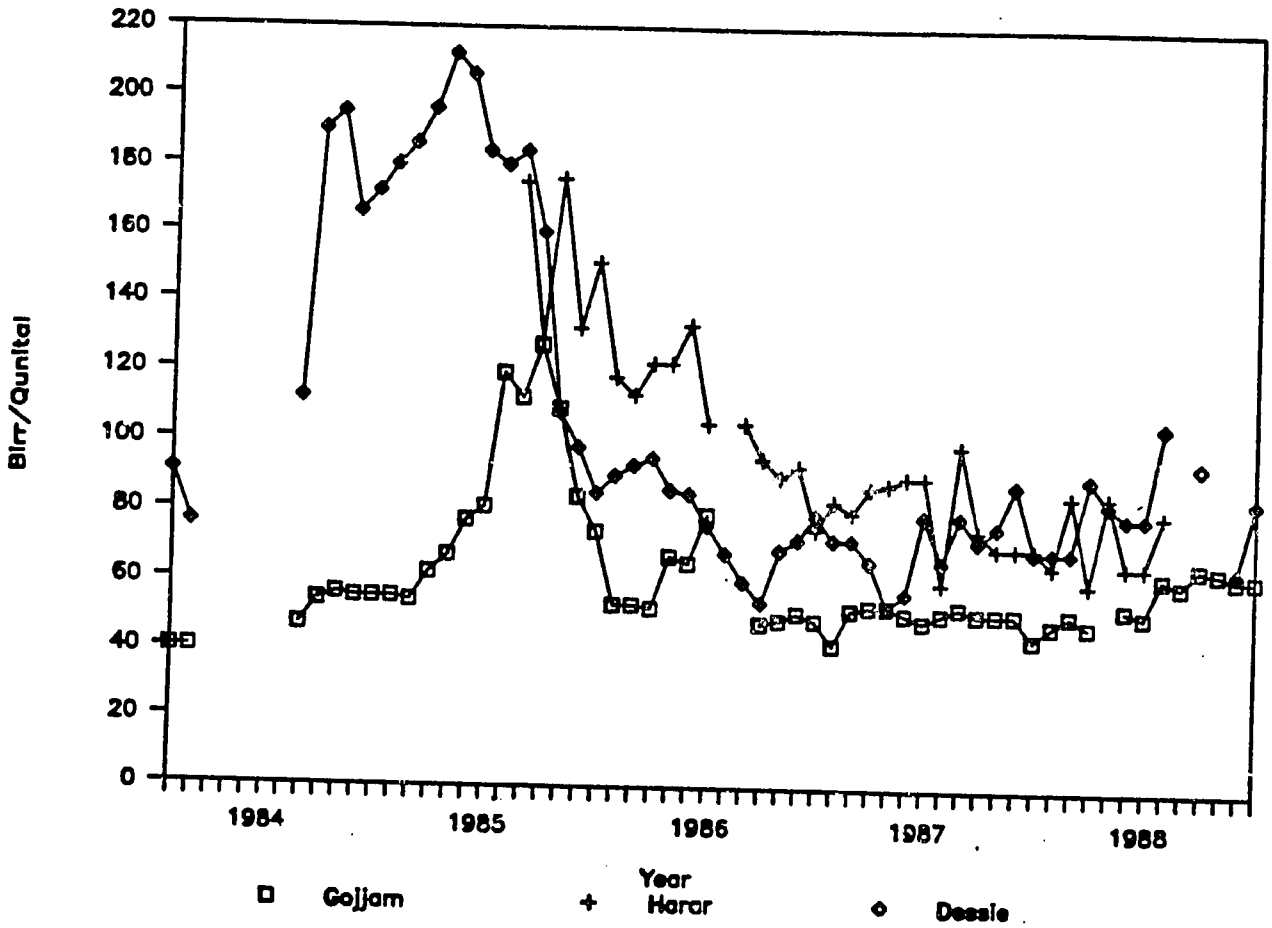
[a] Ethiopia cereal price.

Figures 6.2--Main market price of teff in 3 regions, 1984-1988



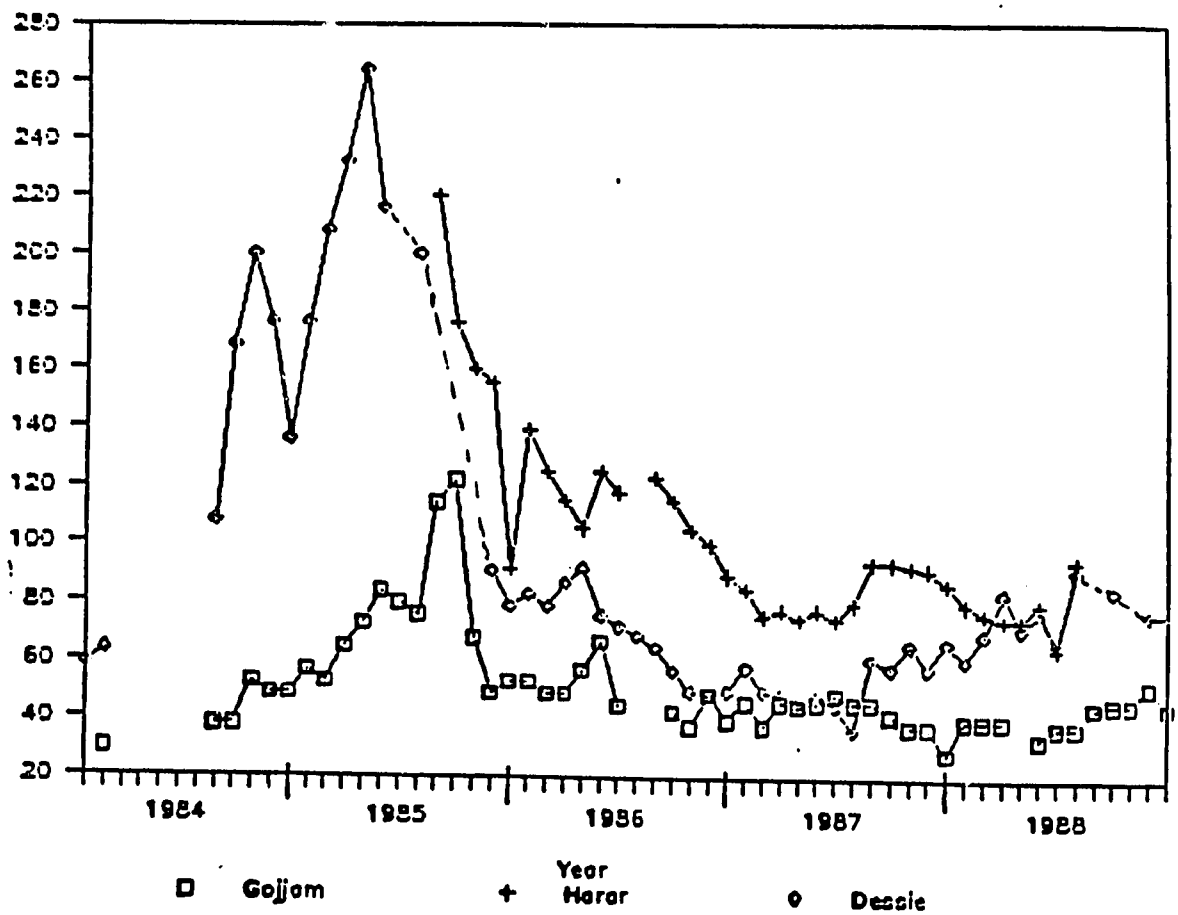
Source: RRC market price data.

Figures 6.3--Market price of wheat in 3 regions, 1984-1988



Source: RRC market price data.

Figure 6.4--Market price of sorghum in 3 regions, 1984-1988



Source: RRC market price data.

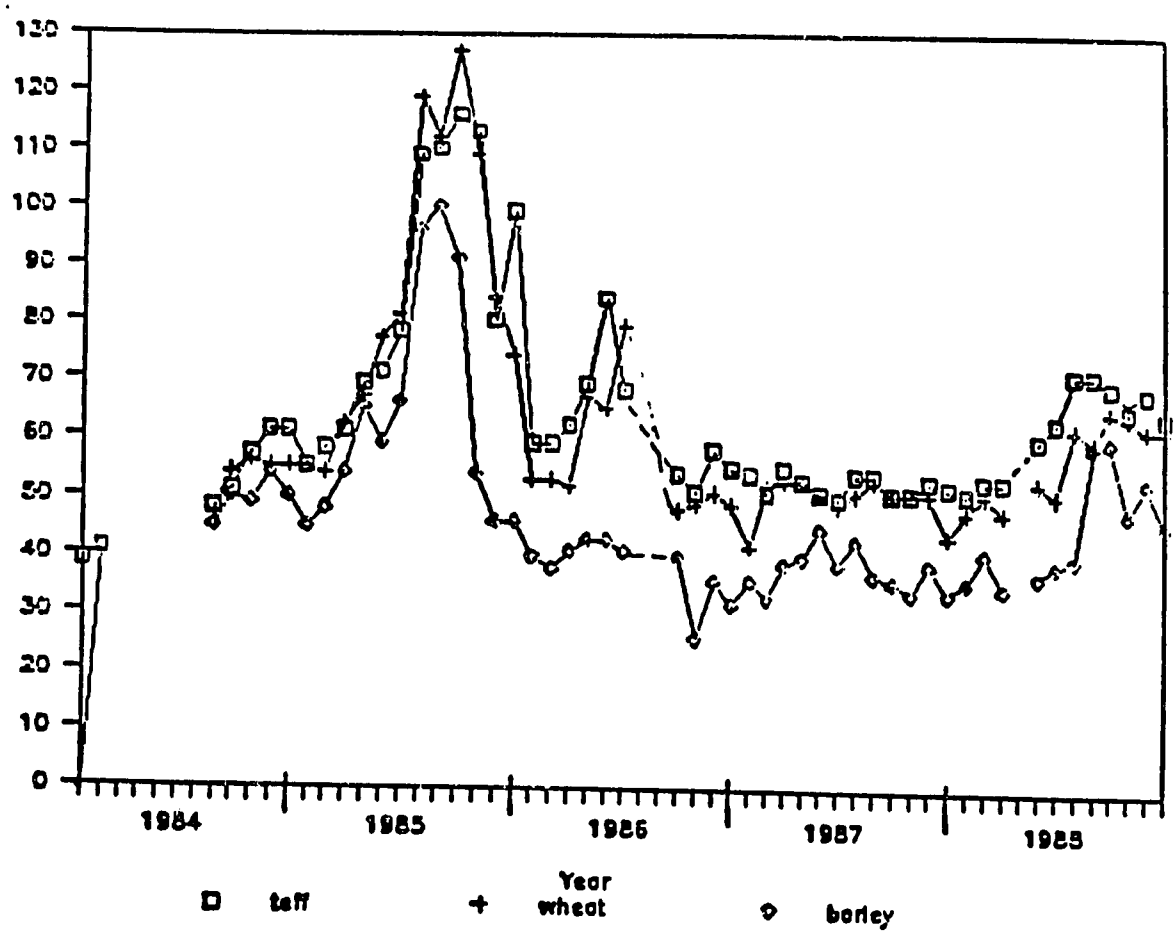
crisis of 1984/85 followed a similar pattern in all regions (illustrating that price fluctuations were transmitted across most of Ethiopia), the absolute movement in price levels across regions was quite different. This is highlighted by the evolution of interregional price differences for teff, wheat, and sorghum. Figure 6.2 shows that throughout the 1980s teff prices in Wollo (Dessie market) have been 30 to 50 percent higher than in the important teff-producing province of Gojjam (Debre Markos market). Price in Hararghe (Harar market) have fallen between the two other regions, although teff prices in Hararghe exceeded those of Wollo in early 1986.

While the picture is a little more confused for wheat and sorghum, similar difference in absolute prices pertain between the regions (Figures 6.3 and 6.4). Wollo and Hararghe almost invariably record higher cereal prices in their main markets than the prices in Gojjam, where cereals have been relatively more abundant, even during the drought years of 1984 and 1985.

Of course, one must remember that cereals hold varying positions of importance within the different regions. In Gojjam, for example, it was the price of wheat which displayed the most extreme rise during the 1984 to 1986 crisis period, with teff and sorghum showing relatively lower levels of price fluctuation (Figure 6.5). In Wollo it is teff that has consistently captured the highest prices of the three grains, and which has shown the greatest degree of fluctuation (Figure 6.6).

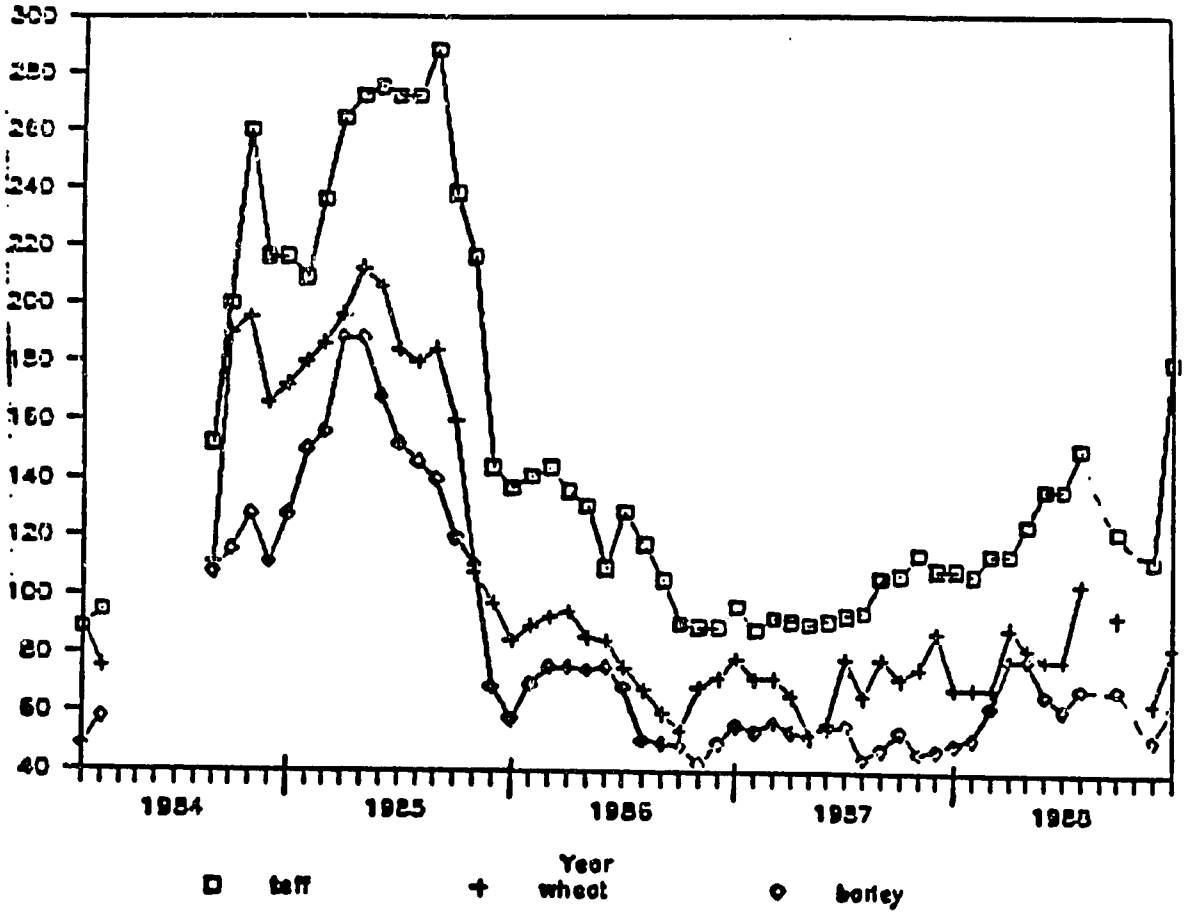
Nevertheless, high differentials in price levels between regions

Figure 6.5--Main market price of 3 grains in Gojjam, 1984-1988



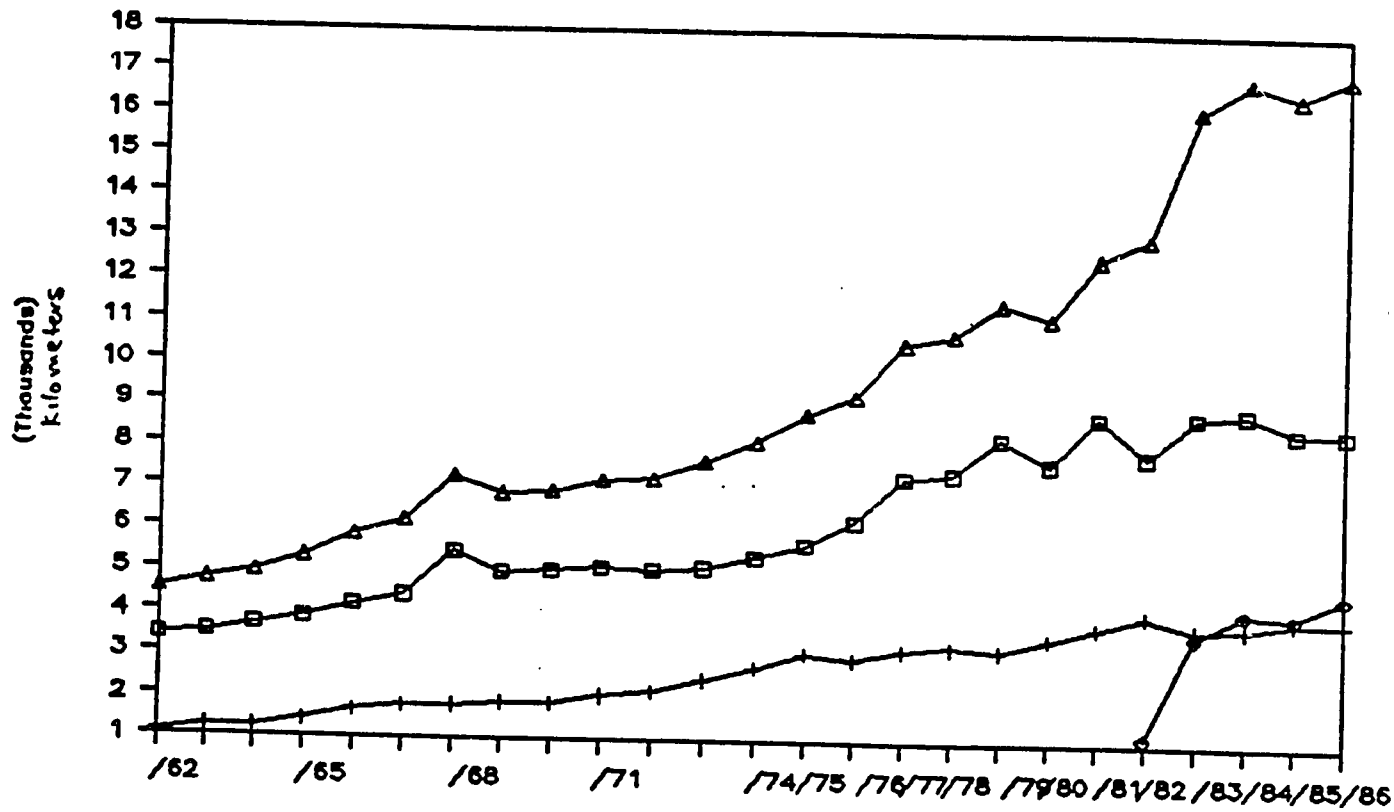
Source: RRC market price data.

Figure 6.6--Main market price of grains in Wollo, 1984-1988



Source: RRC market price data.

Figure 6.7--Length of roads by type, 1961/62-1985/86



+ Gravel roads

<> Rural roads

^ Total roads

[] Asphalt roads

Source: Compiled from CSA statistical abstracts.

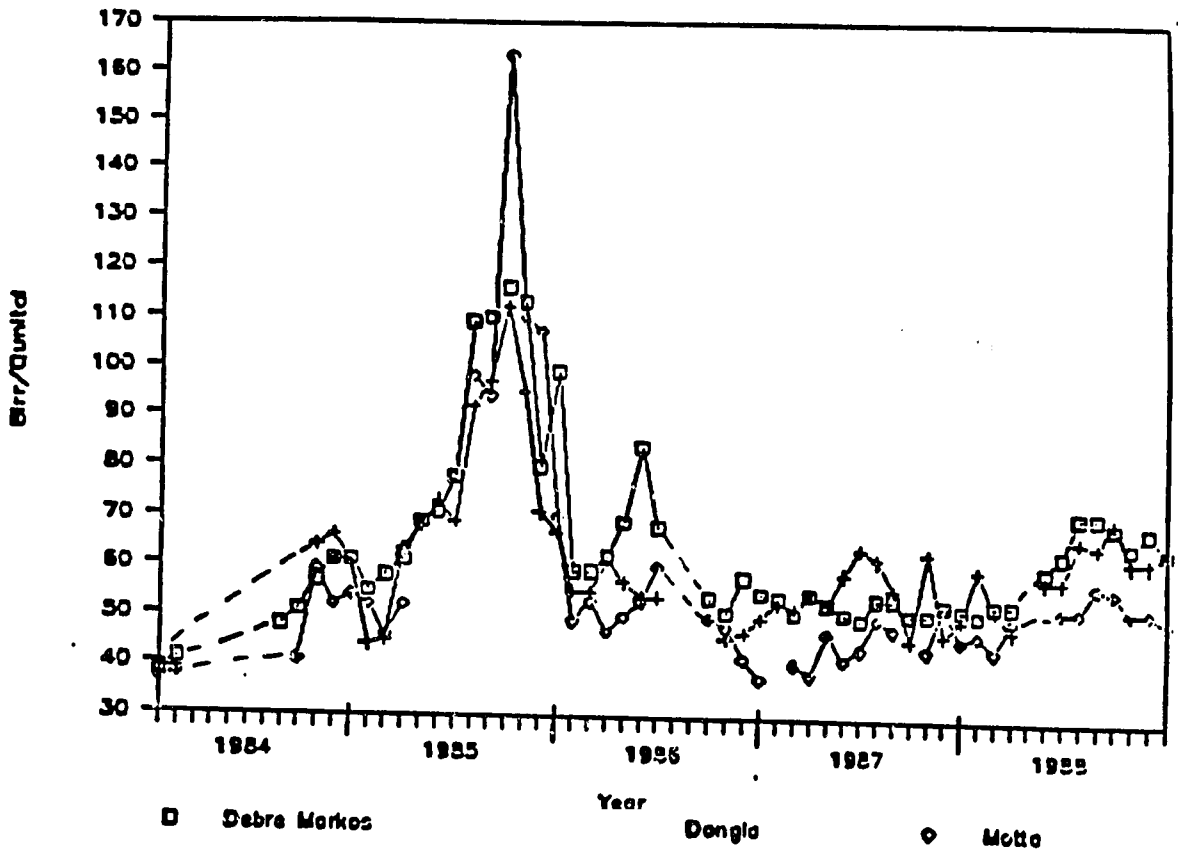
suggest that marketing margins are high due to transportation bottlenecks and infrastructural deficiencies; that is, while markets do appear to be operating and transmitting price signals across regions, market transactions occur at high costs. A lack of adequate infrastructure plus trading controls tend to hinder market integration and a more equal sharing of scarcity and surpluses between localities (James 1989). Figure 6.7 shows that investment in roads in Ethiopia has been steady during the past 25 years, with a boost in road building activity coming in the late 1970s and on into the 1980s.[9] Much of this road laying has been in formerly inaccessible parts of the country. However, the problem of transport remains. In 1984 it was estimated that only 2 percent of Wollo could be reached by all-weather road, making the movement of food to remote markets extremely difficult (OXFAM 1984, 8).

This problem was illustrated by Seaman and Holt's (1980) study of two markets in northern Wollo in the early 1970s. Although only 18 kilometers apart, Korem market lies 700 meters higher up a scarp slope than Alamata market. Despite the short distance separating the two, the physical inaccessibility of Korem to non-local cereals made prices there much higher than the market on the slope below. The same has been shown for Gondar.

These examples suggest that the monitoring of prices in one major

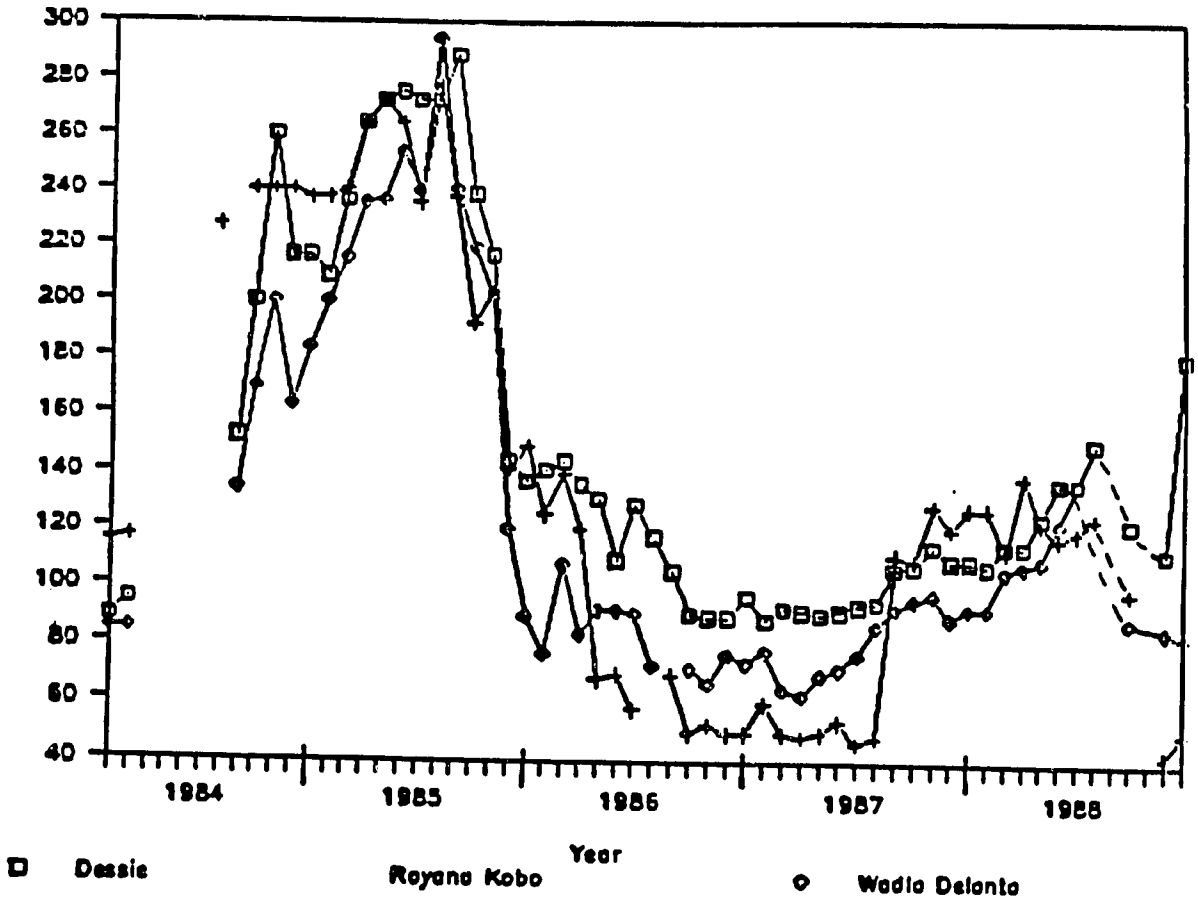
[9] Figure 5.7 shows four years with a decline in total road surface available (1969, 1979, 1981, and 1984). This appears to be due to the removal by the Ministry of Transport of badly deteriorated roads from the record.

Figure 6.8--Teff price in 3 main markets of Gojjam, 1984-1988



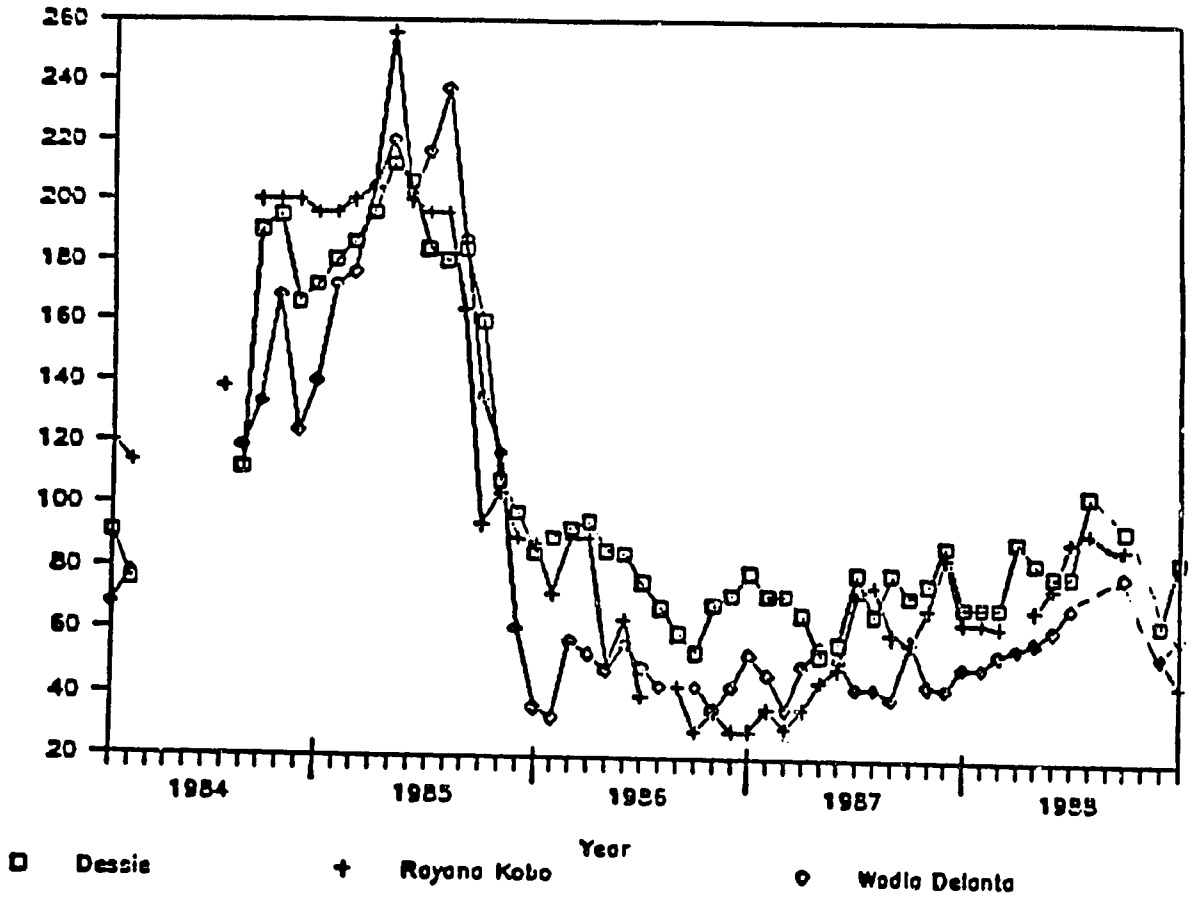
Source: RRC market price data.

Figure 6.9--Teff price in 3 main markets of Wollo, 1984-1988



Source: RRC market price data.

Figure 6.10--Wheat price in 3 main markets of Wollo, 1984-1988



Source: RRC market price data.

market alone may not adequately reflect price movements in other parts of the region which have little access to that central market (Shaw 1976; Cutler 1984; Devereux 1988). It is important, therefore, that we not only consider prices in principal regional markets, such as Dessie or Harar, but also at prices in other secondary market centers.

The data in Figures 6.8, 6.9, and 6.10 support the general argument that prices in different markets of the same region may be very different. While this data should be used cautiously (since there are important gaps in the time series), they show, for example, that teff prices in Gojjam in late 1985 were almost 50 percent higher in Motta than in the main regional market of Debre Markos (see Figure 6.8). Motta is situated some 100 kilometers north of Debre Markos, 100 meters higher in altitude. In mid-1987, however, teff was more costly in Dangla market (250 kilometers northwest of Debre Markos and 300 meters lower in altitude) than in the other two centers. At that time it was cheapest in Motta.[10]

By contrast, Figures 6.9 and 6.10 show that prices in Dessie for both wheat and teff have generally remained higher than in Rayo Kobo (northern Wollo) and Wadla Delanta (west of Dessie). Unfortunately, consistent data for the crucial drought years is not yet available for these markets. This is an area where much important compilation work remains to be done, and where decisions on data requirements and stan-

[10] Minor markets were selected from RRC Early Warning documents according to the availability of data. Many gaps in the time series remain. Some of these gaps will subsequently be filled when RRC, MOA, and a number of NGOs make their computerized price data bases from crop and livestock data available for analysis.

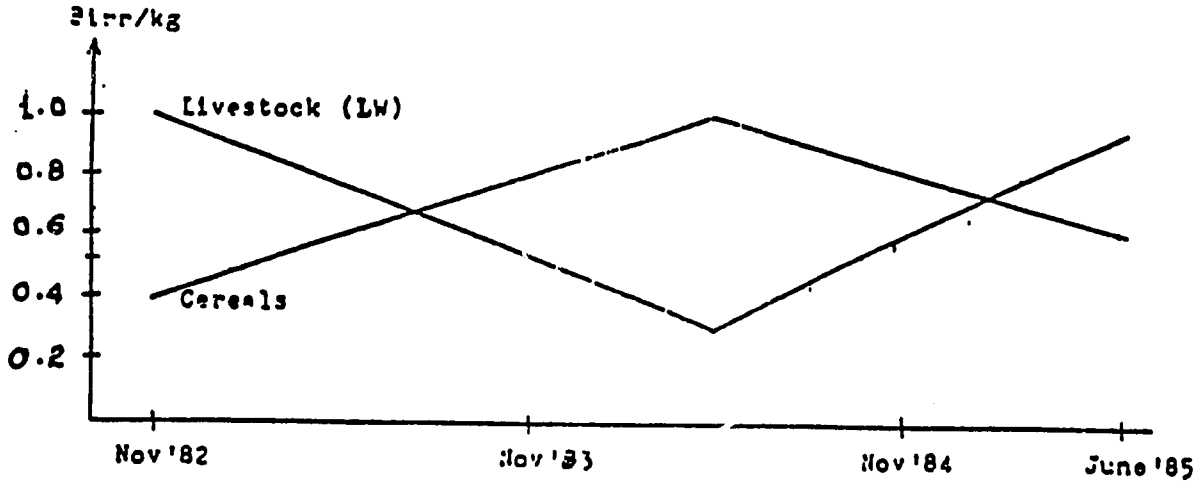
dardization of results need to be reviewed with some urgency.

CHANGING TERMS OF TRADE

The purchasing power of farm households (their ability to acquire staple foods) is much determined by the terms of trade between food prices and farm produce sent to market. The latter may include livestock, coffee, and chat, as well as cereals in high demand. Similarly, for rural wage earners, the ability to acquire food is a function of food price levels versus wage rates. We unfortunately do not yet have time-series data either on rural wage rates nor on income from cash-crops such as coffee and chat. (A certain amount of such information will be available from the microlevel surveys.) The following assessment, therefore, concentrates on the terms of trade between staple foods and livestock.

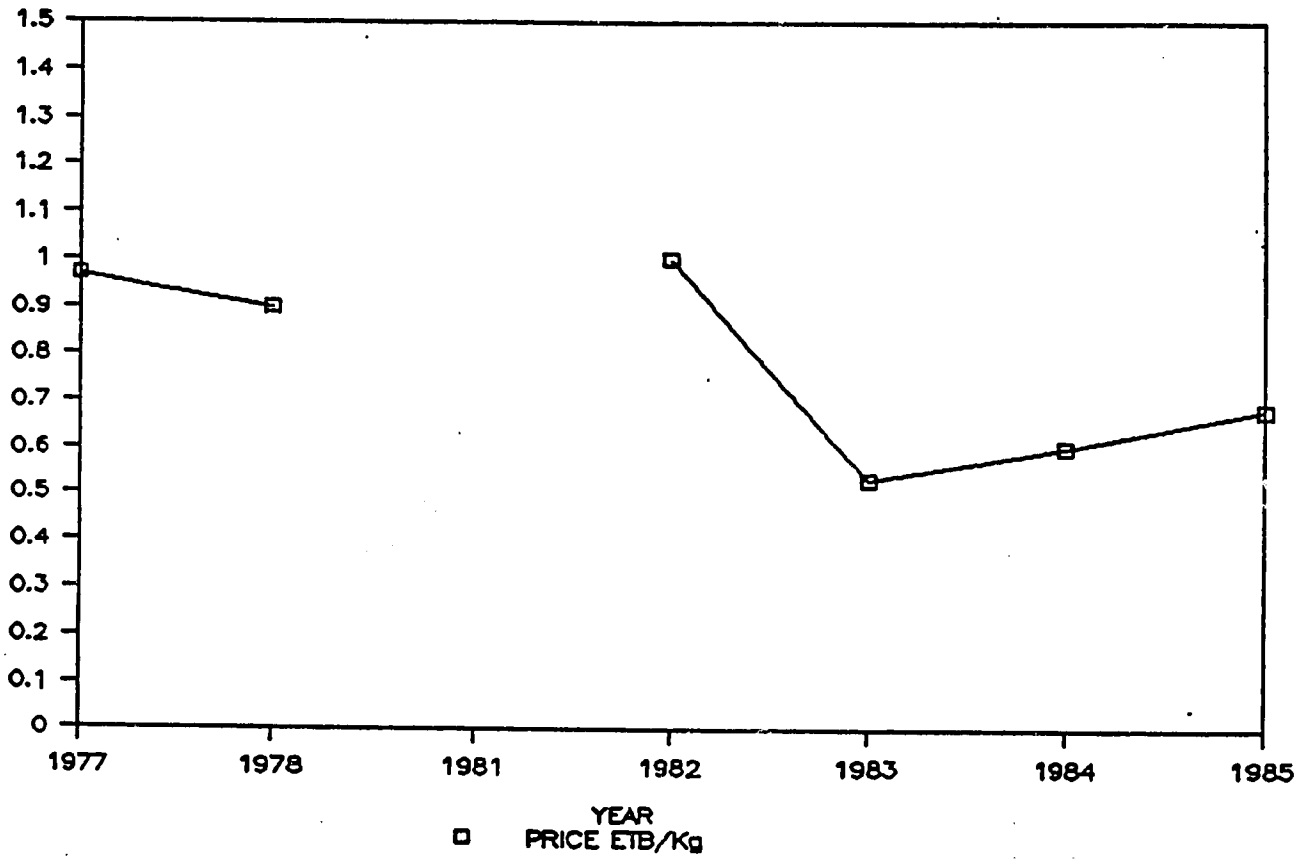
In most years, pastoralists, such as the Afar in Wollo or the Borana in Sidamo, produce sufficient meat and milk over home consumption needs that they may convert these commodities into cereals. During "average" years the Borana enjoy a beneficial exchange rate in terms of energy per Birr (Upton 1986; Donaldson 1986; Cossins and Upton 1987). However, when the drought began in 1982 and 1983, these beneficial terms of exchange were severely eroded; markets became saturated with distress sales of older adult animals and the value of meat consequently fell just as cereal prices began to rise. Figure 6.11 depicts these changing terms of trade for livestock and cereals

Figure 6.11--Relative value of cereal and livestock prices in the southern rangelands



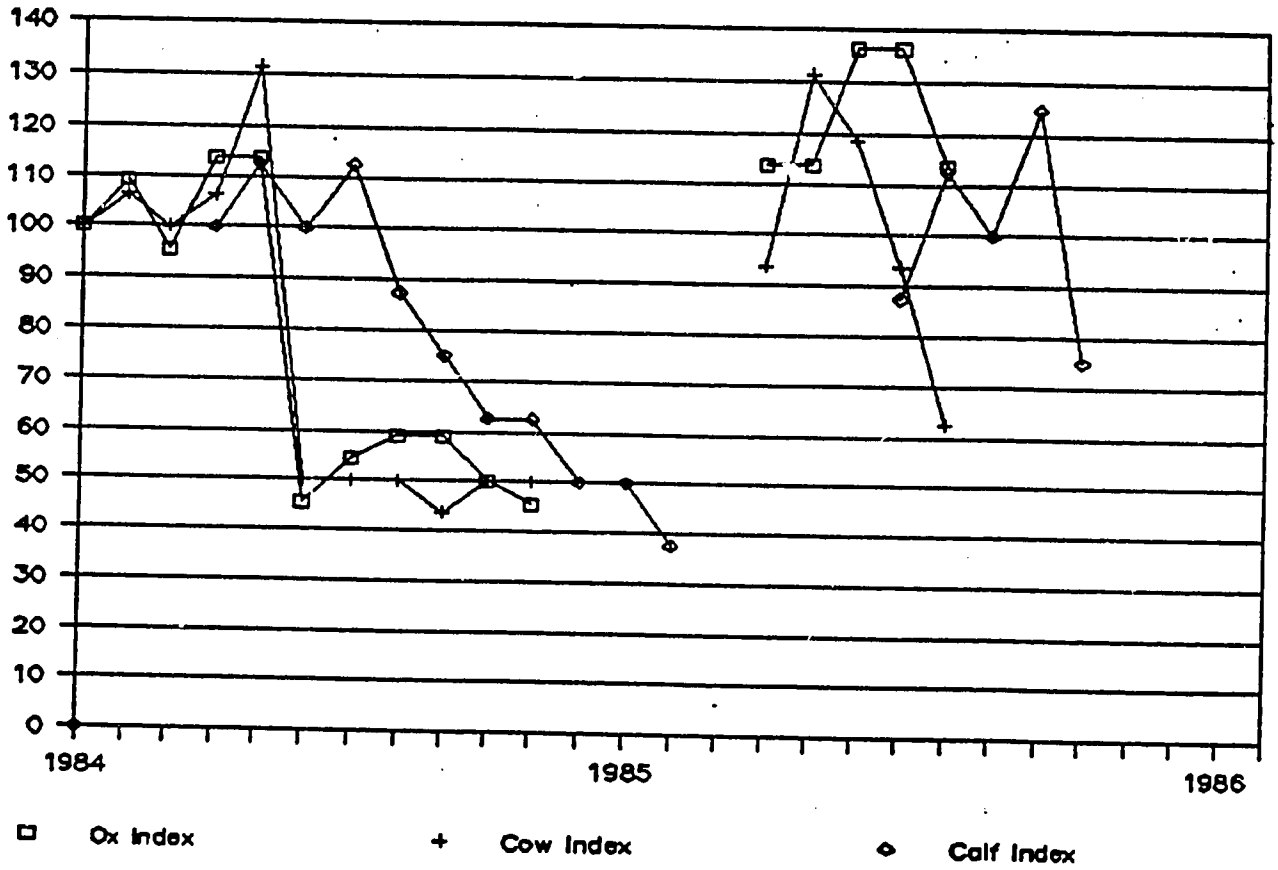
Source: Belete, market studies, unpublished. Cited in T. S. Donaldson, Pastoralism and drought: A case study of the Borena of southern Ethiopia, M. Phil. thesis, University of Reading, p. 50.

Figure 6.12--November prices of oxen in Yabello, 1977-1985



Source: Ministry of Agriculture data, Yabello office.

Figure 6.13--Livestock price indices, 1984-1986



Source: Dessalegn Rahmato, Famine and survival strategies: A case study from northeast Ethiopia (Addis Ababa: Institute of Development Research, 1987), Annex 2A.

from data gathered by ILCA. The figure shows how the value of pastoral assets fell steadily until mid-1983, mirroring the increasing value of cereal grains on the market. This put the herders at a clear disadvantage in the market place just at the worst possible time. Figure 6.12, derived from MOA data for the same part of Sidamo (Yabello), corroborates the story described by ILCA. This figure shows that the price of oxen was at a steady level around ETB 1 per kilogram liveweight from the late 1970s until 1982. The following drought years, however, saw the value of an ox fall by 40 to 50 percent. For Wollo (Ambassel Awraja) a similar pattern is observed.

Figure 6.13 shows how the price index for oxen and cows (average prices for high grade animals) fell from a peak of 130 in May 1984 (the normal seasonal high for draft animal prices, coming as it does just prior to the main rains) to between 40 and 60 in the following months. Prices of both oxen and cows recovered to their former high levels by May/June of 1985 when draft animals were again in demand (in expectation of better rains), but soon started falling when the main rains failed once again.

While the loss of revenue from declining livestock prices is bad enough for herders and mixed farmers, if they do not sell their livestock in time they may face losing everything when their animals die. Wolde Mariam (1984, 62) has shown that almost four times as many livestock died in Wollo in 1974 as were sold. Wollo was hit badly again in 1984/85. Rahmato (1988) shows that in Ambassel alone (which was one of the least drought-affected districts in Wollo), some 65,000 head of livestock (all categories) were reported to have died, the

largest number being oxen.

Such high mortality among livestock holdings is an important policy issue since draft animals play such an important role for recovery of agricultural production after drought, and pastoralists are largely concentrated in high-risk (drought) localities. The potential for improved veterinary coverage, forage crop storage, livestock price stabilization, and herd reconstitution post-drought all need to be carefully assessed in this context.

Further household-level analysis on terms of trade and livestock management will be made possible once Save the Children Fund (UK) and the Fourth Livestock Development Program of MOA complete ongoing computer data-entry exercises with livestock price data from many different parts of the country.

7. MICROLEVEL ASSESSMENT OF ALTERNATIVE INTERVENTIONS

The 1984/85 crisis brought hundreds of emergency projects to life all over Ethiopia. In addition to the government's own relief activities and those of the major international organizations (such as UNICEF, WFP, UNDP), there were at least 43 nongovernmental organizations operating under the auspices of the RRC in May 1985. These employed countless expatriates and Ethiopian staff in a wide variety of activities ranging from life-saving relief measures to more developmental programs. Table 7.1 groups these main NGO/RRC activities according to their numerical weight. The most widespread operations at that time were clearly medical relief operations and feeding programs (intensive feeding, supplementary feeding, dry ration distribution). These activities were followed by operations in the realm of emergency logistics (aid handling, storage facilities, transportation). Long-term rehabilitation programs necessarily had a low priority during the crisis period.

By 1986, when the peak of the crisis had passed in most regions, development workers were faced with the question of where to redirect their efforts. The logical answer was to move from relief work to rehabilitation (Elizabeth 1988). The case of one NGO, Food for the Hungry International (FHI), illustrates the path taken by many of the

Table 7.1--Types and numbers of RRC and NGO activities in Ethiopia in May 1985

Type of Activity	Number of Sites
Medical relief and feeding programs	233
Emergency logistics	124
Construction	9
Institution building and development programs	74

Source : Compiled from RRC, Location of ongoing activities of nongovernmentaln organizations operating in Ethiopia under the auspices of the Commission (Addis Ababa: RRC, 1985).

development organizations working in Ethiopia during the mid-1980s. Officially recognized in the country in 1984, FHI started its famine relief programs in Gondar and Shewa. These programs were continued until early 1986 when it was decided to shift much more into rehabilitation work. During 1986 and 1987 food-for-work projects were started in the same two regions, with an emphasis on soil conservation and terracing, reforestation, water catchment improvement, and road maintenance. For 1989 a credit scheme for smallholder investment is envisaged, thus combining longer-term development goals (ecological preservation) with rural asset creation towards increased production and local food security (UN/EPPG 1988).

The RRC, MOA, and UN agencies have also placed increasing emphasis in their programs on the rehabilitation of drought-affected populations and on attempting to help these people to cope better with food insecurity in the future. There are, however, some areas of the country still requiring a certain amount of short-term relief attention, and in such areas programs of nutritional supplementation and surveillance are continuing. In other words, there exists at present a considerable mix of projects and programs in the field, all of which are working towards similar overall goals (namely, the securing of sustainable nutritional status improvements in vulnerable groups, and protecting and enhancing their productivity and resources), but often by different means, and with different timeframes in mind.

For example, the immediate objective of wet feeding programs has the relatively short-term function of preventing people from slipping into a state of malnutrition. By contrast the goal of various

programs introducing (or replacing) agricultural inputs has been to seek to expand household incomes thereby reducing their vulnerability to famine. And developmental activities in the realm of soil and water conservation focus on long-term asset preservation and enhancement. All three kinds of program are ultimately aimed at increasing the ability of malnourished households to acquire food; yet the timeframes involved and the methods used are quite different.

Figure 7.1 illustrates the time difference element in a diagrammatic form. This figure shows how household food security may be attained by different means over varying periods of time, and at different levels of investment. The intervention with the most immediate impact will of course be the direct distribution of relief food aid. Yet while the investment level of such an intervention may be relatively low, the longer-term impact of this instrument on sustainable food security is negligible. At the other end of the scale, high investment in agricultural development and rehabilitation programs, and in other employment or income-generating projects may have a less immediate impact on food security, but a more profound one.

The key question raised by Figure 7.1 is, what is the most appropriate pattern or mix of intervention types for achieving national and household food security objectives in the most efficient and cost-effective manner? Any number of combinations of projects and programs may be implemented with a view to improving nutritional status and raising household food security. Just a few of the more important types of intervention attempted in Africa with such objectives in mind are listed in Figure 7.2.

Figure 7.1--Diagrammatic outline of project impacts on household food security

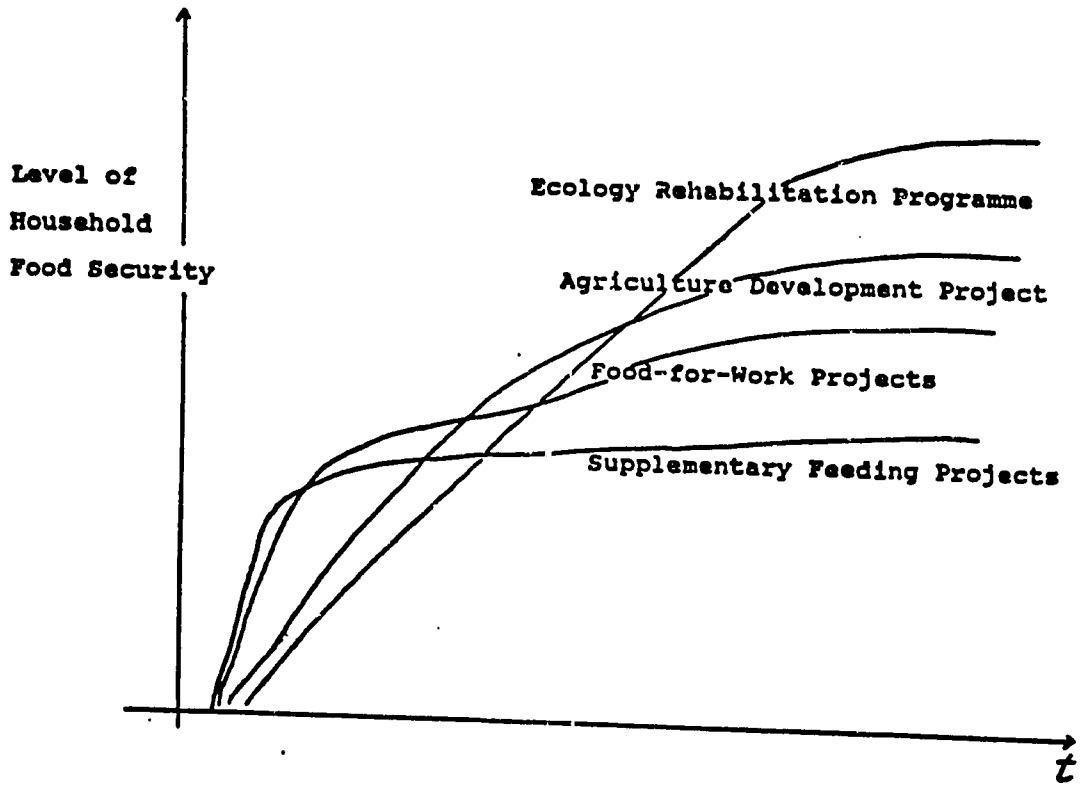


Figure 7.2--Examples of food security and nutrition interventions in Africa and their objectives

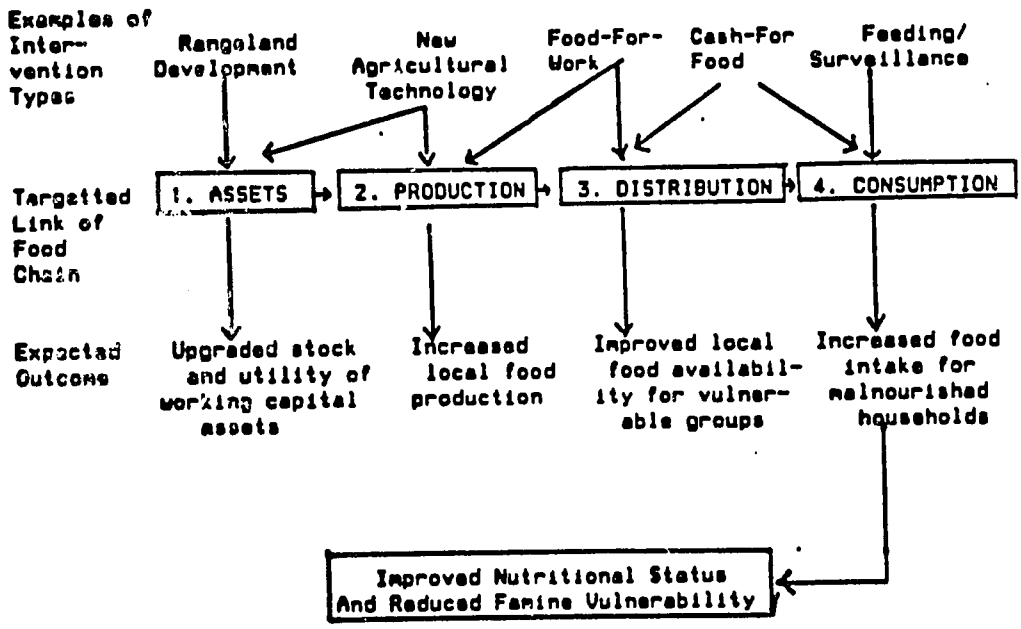
Intervention Type	General Objectives
Urgent/relief	
Wet food distribution	Emergency life saving
Dry food distribution	Nutritional sustenance
Cash-for-food projects	Food intake enhancement/ stimulating food markets
Medium-term rehabilitation/ prevention	
Food subsidies	Opening access to food for the poor
Food fortification	Nutritional improvement
Food-for-work projects or cash-for-work	Food intake enhancement/ asset creation
Restocking projects	Income rehabilitation
Longer-term development	
Nutrition/health education	Improved food water use
Formulated foods projects	Improved food quality
Agricultural projects	Production/asset enhancement

These many intervention types enter the food chain and attempt to influence nutrition in one or more of four principal ways: (a) by protecting and enhancing the resource base upon which most households depend for their livelihood; (b) by affecting a household's ability to produce its food (levels of producing power); (c) by influencing the ability of food-deficit households to acquire food (levels and variability in purchasing power, food supply mechanisms, price intervention); and (d) by affecting the processing and intrahousehold distribution of food.

These four paths are depicted in Figure 7.3. Inevitably, urgency tends to dictate the immediate focus of a planned intervention, and therefore the path by which it means to influence food and nutritional security. During a famine crisis most operations focus on "boxes" 3 and 4 in Figure 7.3; that is, they attempt to directly influence the ability of individual 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 (boxes 1 and 2), or on nutrition and health education, the changing of food behavior patterns, and so on (box 3).

But the question remains: Which of these many types of intervention (most of which have been represented in Ethiopia at some time during the past decade) succeeds best in targeting vulnerable groups? And which do so in optimal economic and human terms? Measurement of the impact and success of interventions is, of course, not straightforward; one of the most difficult problems is one of comparability.

Figure 7.3--The impact path of some food and nutrition interventions in Ethiopia



The varied nature of possible interventions, each with their diverse primary objectives and methodologies, makes an evaluation of projects or policies on common terms difficult. What is more, the processes that determine the nutritional outcome of various projects and policies on individuals are highly complex.

Nevertheless, such questions are crucial to an accurate assessment of the options open to the government in its fight against food intake decline and nutritional status deterioration. In order to decide on the best possible package of interventions and policies, an evaluation must be made of (1) the coverage of the various programs; that is, are the vulnerable target groups adequately reached by its activities, be it directly or indirectly? (2) the efficiency of different activities in terms of cost-effectiveness. Is nutritional improvement and increased food security being achieved at the least possible cost (both fiscal and human)? and (3) the effectiveness of the instruments being employed. Are the activities actually moving the malnourished out of food insecurity towards real security, as opposed to just reaching them as in (1), and at a reasonable cost as in (2)?

At present, intervention evaluations designed to ask these precise questions are few. Some internal evaluations of project components have been undertaken in the past few years by a number of international organizations and NGOs, such as WFP, UNICEF, and Save the Children Fund (UK).

However, few of these evaluations have fully covered the key questions outlined above. The majority of post intervention studies

have constituted general reviews of past activities. These often provide careful descriptions of the areas worked in, estimates of the size and characteristics of populations involved, and a detailed auditing of input disbursements (be they food rations or seeds and tools) and costs (see NORAD 1984; RRC 1985b; Jareg 1987; UNHCR 1988).

Yet few such reviews constitute evaluations of the targeting process nor of the impact of such programs on participating households. According to an International Labour Office report on socio-economic evaluations, 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 poor people within the project area. The crucial point, according to this report, "is to make sure that the share of benefits accruing to target-group beneficiaries in total benefits generated by [the intervention] over a period, is as high as possible (ILO 1982, 31). While most relief and rehabilitation agencies in Ethiopia would probably agree with the latter proposition, few have attempted to generate the information required for this kind of evaluation.

For example, World Food Programme (WFP) has initiated two reviews of its food-for-work (FFW) activities in the past four years (Admassie and Gebre 1985, Admassie and Kenaa 1988). These substantial evaluations of FFW projects have provided much useful information on the success rate of different types of projects (success here being measured in terms of technical feasibility of activities and their sustainability), and even on the use of food rations earned. Never-

theless, these studies started from the assumption that "P.A. members exhibit a certain homogeneity" (Admassie and Gebre 1985, 14), or alternatively, a selection was made of "farmers that are typical for the P.A." (Admassie and Kenaa 1988, 9). This approach limited the information that could be gathered on targeting procedures and on the effect of FFW participation on poorer households versus wealthier ones.

SIDA and CARE have also recently sponsored studies of the impact of FFW operations in Wollo and Hararghe, respectively (Kohlin 1987, CARE 1988). Again, while the results provide excellent information on farmers' views of the advantages and disadvantages of participation in such programs, little data were gathered on the background of the interviewed households, and so assessment could not be made on how the impact of the projects (and thus the views expressed by the participants) might have varied according to different household types. Given that FFW projects are becoming ever more popular with the 60 or more NGOs currently in the country, as well as with the larger international organizations, information about the micro-level impact of this type of intervention is urgently required (Hareide 1986, CRDA 1988).

The lack of disaggregated information about the varied impact of FFW interventions at household level also applies to studies of other kinds of projects. For example, NORAD's (1984) review of their health service improvement projects, and CONCERN's (1986) evaluation of various resettlement activities in Wollega also focus on total numbers of people participating and calculations of total cost. Both evalua-

tions provide useful information of a general nature on the structural achievements of such schemes, as well as recommendations for future improvements. Data on the participants, their backgrounds, their reasons for participation and the impact of the projects on target groups of participants are lacking.

UNICEF's (1988) "quick assessment" of its cash-for-food program also provides a general picture of project activities, including numbers of households receiving cash and other inputs, and estimates of longer-term benefits deriving from the infrastructural improvements generated by the scheme. However, the use made of the free inputs by participant households was not considered in detail (local price effects of large-scale cash injections were not examined, and nutritional benefits claimed to be linked to the scheme had to be gathered second hand from NGO nutritional surveillance activities in the same area. The true impact of the scheme at a household level could not, therefore, be estimated.

Large amounts of nutritional status and health data have been generated during the 1980s by agencies, such as the Ethiopian Red Cross Society, Save the Children Fund (UK and US), World Vision International, and CONCERN (among others), most of which have been operating in cooperation with RRC and ENI. Some of these data have permitted useful assessments of the impact of interventions, such as supplementary feeding programs (Demeke and Wolde-Gabriel 1985), OXFAM's "energy biscuit" feeding program (Young 1986), and emergency refugee feeding camps (UNHCR 1988). However, even with projects that are so narrowly targeted (to the malnourished), it has not been common

to attempt to assess the backgrounds from which the malnourished are coming. Humanitarian constraints and the time demands associated with crisis operations are, of course, paramount under such circumstances. However, the longer-term impact of crisis relief and ex post evaluations of participant characteristics are still rare.

There also remain two unresolved problems with nutritional status data collected in Ethiopia. Firstly, a question mark continues to hang over the suitability of anthropometric data for early warning or impact evaluation purposes if it be collected in isolation from other social and economic indicators relating to regional and household-level livelihood conditions (Torry 1984; De Waal 1988; WHO 1989). As Appleton (1988, 3) has recently pointed out, "it is still not defined in what circumstances, if ever, nutritional status data can provide warning of impending crisis early enough for effective counter measures to be taken."

The second problem relates to a long-standing lack of data standardization, even where it is collection at the micro level. Young (1986, 1), for example, notes that although weight-for-height measures were generally used by OXFAM for admission to selective feeding programs, "the cut-off points varied between programs and also with the stages of the emergency." This view is supported by Muhlhoff (1988, 71) who argues more generally about nutrition surveys in Ethiopia that, "poorly designed survey methodologies and sampling techniques, variation in the use of reference standards, analysis and the presentation of data, make comparisons between different survey results over time and between locations difficult." This problem is

currently being tackled through cooperation between RRC and the many NGOs. But a sound analysis of the success of nutritional surveillance activities and of the impact of various feeding programs on their recipients (with a knowledge of who the recipients really are) is still not available to planners or policymakers.

There do exist a small number of surveys that have examined the impact of agriculture-related projects at a household level, sometimes including a nutritional background component. Unfortunately, many such reports are for "internal use only" (that is, restricted to the implementing agency alone), and the valuable experiences gained by individual agencies are not often shared. This common practice is clearly counter-productive to a well-coordinated and appropriately-designed strategy of activities across the country.

Of the studies that are accessible, some of the best are ILCA studies of their own cross-bred cow and single-oxen plough projects. These project assessments consider how new inputs (some purchased, some distributed free) impacted on household incomes and nutritional status over a number of years (Gryseels et al. 1984 and 1988); Whalen 1984; Wagenaar-Brower 1986). The only major element lacking from these assessments is a true evaluation of the impact of the projects on different types of farm household (by asset base, income level, and income sources) rather than just an evaluation of the impact on two groups: participants versus a random control group. It is not known from these reports whether poorer households (who may be implementing quite a different survival strategy from the wealthier ones) really benefited from such inputs, and whether their food security/nutrition-

al status were genuinely enhanced by income derived from such projects.

The importance of understanding the variety of indigenous survival strategies (and so-called "peasant wisdom") has come increasingly to the fore of current debates about famine's early warning systems and the appropriateness of external interventions (WHO 1989). It is widely argued that farmers themselves might constitute one of the most valuable resources to planners when it comes to understanding the causes of crises, and the best options or approaches to survival during crises (Dreze 1988; Wolde-Marian 1988; Corbett 1988). Unfortunately, there has so far been rather little serious research on household-level coping strategies, not only in Ethiopia but also throughout the developing world. Torry (1984, 229), for example, has shown that "reaction to the policy and theoretical implications of [famine] in terms of empirical research is very limited.... Quantitative household surveys documenting crisis-induced losses, sacrifices, and adjustments resulting from food emergencies are scarce." A number of other writers, such as Currey (1980), Eicher and Baker (1982), and Seeley (1985), have searched fruitlessly through existing literature for evidence of comprehensive field studies that provide detailed analysis of the responses of rural households to famine.

Excellent reports do exist on individual elements of the famine problematic. In Ethiopia, the works of Rahmato (1987, 1988), Dejene (1988), and McCann (1987a, 1987b) are well known. However, these, and countless other (primarily anthropological) works on the issue, tend to be only partial analyses of a vastly complex issue. One learns

from these studies much about family structures, about sequences of household responses to crises (asset stripping, migration, and so on), and a certain amount of insight into family- and community-sharing mechanisms. However, much of this information is purely descriptive, and patterns of linkages between variables usually remain implicit. Few research undertakings have so far attempted to pull together all of the diverse components of the famine problematic--economic, social, climatic, ecological, and political. And fewer still have considered these issues at both the macro and micro levels necessary for an understanding of their temporal and scalar dimensions.

There are, therefore, many gaps in our current understanding of how droughts and food shortages impact on communities at a micro level, and how successful different kinds of intervention may be at alleviating that impact. Such information is crucial to the policy-making and planning process where attempts to improve household food security and to bolster the caloric intake of vulnerable groups are concerned. Data needs have consequently been identified in the following areas:

1) The impact of drought and subsequent interventions on local production systems. Wicks (1987, 14), Mitchelhill (1986), and others have recently argued that "as the planning process concentrates on smaller areas, it is critical that the current situation and problems of the proposed recipients of development plans are understood.... So more detailed and complete studies must be undertaken." As one example, targeted programs, such as food-for-work operations, have been blamed in the past few years for creating "measurable disincen-

tive effects on local agricultural production" (Lofchie and Cummins 1982, 21; Maxwell 1986; and Fitzpatrick and Strong 1988). Yet there are very little data to support such assertions, and much more needs to be known about the impact of such interventions before the discussion can be usefully brought into the policy arena. For instance, is there a more severe conflict of interest in poorer versus wealthier households between the needs of labor on the farm and the requirements of labor time for participation in FFW? What do the poorer versus wealthier households do with their food rations? Does the current mix of ingredients in the food rations have an appreciable impact on the nutritional status of participants? And do the structures created through FFW measurably help participating families to move out of a situation of vulnerability and toward sustainable food security? These are all questions deserving close attention.

2) Food consumption and nutrition. Although ENI and other agencies have carried out a number of useful studies in the past, a recent reviewer of available data has argued that "data on food availability and food consumption at the household level is scarce.... There is a need for ... identification of differences in the kinds of foods consumed seasonally and between different areas and/or socioeconomic groups" (Muhlhoff 1988, 71). A detailed understanding of (a) food sources available to different areas and household types, both during "normal" times and during food crises, and (b) the nutritional impact of food shortages and subsequent interventions for different areas, must form the backbone of policy planning, nutrition strategy development, and project targeting. More information is, therefore, needed

for such planning.

3) Household response to drought and food crises. This is the area currently the least well endowed with sound data. It was already argued above that much more needs to be known about household's response to price changes and farm production crises. This can only be derived on the basis of information about households' asset bases, nonfarm income sources, expenditure patterns, migration histories, and specific drought crisis experiences. Without such data, few specific conclusions may be derived about alternative intervention possibilities, approaches, and relative costs. Several reviewers of the current state of knowledge on these topics have underlined the same information gaps: Goyder (1988, 75), for example, writes that "work on this subject has indicated a number of serious gaps in our understanding about how Ethiopian famines affect individual households and how they cope with famine." Cutler (1985, 94) 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." And many other authors suggest that "in-depth analyses of the needs, resources, and coping mechanisms of vulnerable populations" should become an immediate priority for Ethiopia (Last 1988; Wolde-Mariam 1988; Teferra and Kent 1988; Rahmato 1988).

It is against this background of clearly identified data requirements that IFPRI undertakes to implement a number of field surveys designed to help policymakers and intervention designers in Ethiopia to evaluate the many types of intervention from which they

might choose. The focus of the analysis will be on the household-level impact of various projects. The micro-level information will, however, be fed into an integrative evaluation of quantitative data at a national food policy level. Such an approach will yield valuable data on the effects and costs of alternative combinations of interventions that are aimed at achieving improvements in food security and nutritional status for the vulnerable populations of Ethiopia.

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