

Drought Impact and Household Response in East and West Africa

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Introduction

Progress has been made during the 1980s in understanding the causes of famine and the public action required to prevent it (8; 30). It is now recognized that famines arise from a complex interaction of supply, distribution, and demand factors, not just from disruption of local supplies due to drought. Yet, this conceptual reorientation does not diminish the key role of drought as a trigger for famine. In 1990/91, droughts reduced harvests in most countries bordering the Sahara, contributing to food output shortfalls for 19 million people (9; 10). In 1992, drought again reduced food supplies in much of the region.

Studies of household coping strategies have shown that there is a pattern of behavior associated with drought, from its onset through a sequence of poor harvests leading towards food shortage and destitution (3; 5; 7; 25; 26; 27). However, few studies have differentiated drought impact and responses by household type. For example, most studies have tended to: a) focus on single villages in single agro-ecological zones, thereby producing little information on the differential impact of drought in different agro-ecological zones of the same country; b) focus on one crisis year, rather than to compare crisis and 'normal' years; c) treat rural households as homogeneous, thus overlooking the differential impact of drought over different types of households; and d) catalogue household responses to define general patterns, rather than seek to understand reasons for variability in capacity to cope. Thus, understanding remains limited of how different types of households minimize food insecurity in the face of drought and increase chances for their post-drought rehabilitation.

As a result, there are a number of important data gaps. For example, Torry (28, p. 229) notes that: "quantitative household surveys documenting crisis-induced losses, sacrifices, and adjustments . . . are scarce." (Cutler (6, p. 94) also argues that "research into human response to drought should be an urgent undertaking . . . we need to know why some populations are more vulnerable than others." More recently, Campbell's (2, p. 144) review of 'coping' literature specific to Africa concluded that, "while most studies have described the responses of particular societies to specific crises, they have not analyzed differences within and between groups in ability to cope."

To help fill these gaps, this article brings field survey data from Burkina Faso and Ethiopia to bear on three central questions: (1) how did the major droughts of the 1980s in Burkina Faso and Ethiopia affect households of differing income levels, and in different agro-ecological zones?: (2) how did different types of households in the

different countries and zones respond to the drought to protect their overall incomes and hence food security?; and (3) how do coping strategies or responses to drought-induced harvest shortfalls differ from economic behavior during non-drought ('normal') years?

Answers to these questions are crucial to policymakers concerned with the short-term relief of drought-affected households, as well as with longer-term objectives of enhancing food security in drought-prone regions. Without information on the characteristics and responses of households most affected by drought, few specific conclusions can be reached about the impact of alternate policies and projects.

The paper has six sections: section two describes the survey locations and data; section three examines drought impact on crop and livestock production, income, and other variables; section four considers household strategies for 'coping' with drought; section five assesses the role and effectiveness of food aid in reducing the impact of drought. Section six discusses conclusions and policy implications.

1. Survey Locations, Data Sources, and Sample Stratification

The data derive from questionnaire surveys that detail household behavior during two harvest-years (a crisis year and a 'normal' year), in different agro-ecological zones. Data for Burkina Faso were collected through frequent-visit survey, for a sample of 100 households in 4 villages: 2 in the semi-arid Sahelian zone, and 2 in the Sudanian dry zone¹. Information was collected through multi-visit surveys to cover 1983-84 (a 'normal' year with rainfall only moderately below the long run average) and 1984-85 (a severe drought year).

Data for Ethiopia represent a sample of 400 households in 6 villages, 3 in the semi-arid lowlands (at less than 1500 meters above sea-level), and 3 in the more temperate but still drought-prone, upland (above 1500 meters). The data, collected through frequent-visit surveys, cover 1984/85 (a severe drought year) and 1988/89 (a harvest-year following average rainfall)².

Four characteristics distinguish the study countries: (1) there is greater use of animal traction in Ethiopia, because of heavier soils and more livestock per capita; (2) area cultivated per capita in Burkina (study zone density of 40 and 50 persons per km²) is up to four times greater than in Ethiopia (with study zone densities of 100 to 200 people per km²); (3) although both countries are extremely poor - they were the two poorest countries in the world in 1986 in terms of GNP per capita (32) - income per person in Ethiopia is two-thirds that of Burkina Faso; and (4) upland Ethiopia receives more rainfall than the other three survey zones, and for this reason (*inter alia*) has higher cereal yields.

On the other hand, the semi-arid zones of the two countries are similar in that, (1) long-term average rainfall does not exceed 750 mm per annum (droughts have reduced this by at least 30 % twice in the past two decades); (2) cereal yields in normal years are low - less than 350 kgs. per hectare. With little irrigation and limited fertilizer use, yields are mainly a function of rainfall²; (3) the staple diet is coarse-grain-based.

The sample households per zone were stratified into terciles. The terciles were formed *a posteriori* by calculating total income (per capita for Ethiopia and per adult equivalent for Burkina Faso), and stratifying households into "lower tercile" (relatively poorer), and "middle tercile", and "upper tercile" (relatively richer) groups. Since household membership of income strata remained fairly stable over the study years, it is assumed that households occupy the same tercile over the medium term.

2. Impacts of Droughts

2.1 Drought Impact on Crop Production

In the realm of crop production, drought's primary impact is on yields per hectare. The impact of drought on cereal yields (*vis-à-vis* normal year cropping) is shown in Table 1. The figures show that drought affected different zones and household strata very unequally. In the Sudanian zone of Burkina, as well as in the upland (relatively greater rainfall) zone of Ethiopia, average yields fell by two-thirds during the drought. Yet, upper tercile households not only had higher yields than lower tercile households during the 'normal' rainfall year, but also during the drought. In Burkina's Sudanian zone, drought-year millet yields of upper tercile households were 40 % higher than those attained by lower tercile households. Similarly, in upland Ethiopia, upper tercile households had yields 60 % higher than those of the lowest tercile households even during the drought. In lowland Ethiopia the impact was more extreme: all households show 90 to 100 % yield and harvest failure regardless of income stratum.

Drought impact varied by crop. In terms of yield, sorghum and maize were less affected by drought than millet⁴. Sorghum performed considerably better than millet in Burkina, and out-performed maize in Ethiopia. While drought reduced millet yields on average by 70 % (relative to the 'normal' year) in Burkina's Sahelian zone, sorghum yields by 50 % (on average) in Ethiopia's upland (relatively greater rainfall) zone, sorghum yields fell by only 5 %.

The crop output and income effects of these shortfalls are shown in Table 2. The outcome is mixed. In Sahelian Burkina Faso, cereal output per person during the drought was only 20 % of the normal year level for upper and lower tercile households alike, an outcome that parallels the yield collapse in that zone. Output decline was relatively less in the Sudanian zone, but drought year output was still 50 % less than a normal year. In value terms, such losses were offset by a near doubling of cereal prices. But higher prices eroded the real value of crop income in Burkina's Sudanian

Table 1: Drought impact on cereal yields, crop output and income, by country, zone and income group

	Burkina Faso		Ethiopia	
	Sahelian	Sudanian	Lowland	Upland
Average Cereal Yields (kg/ha)				
Lower tercile				
Drought	114	113	—	389
Normal Year	356	280	230	553
Upper tercile				
Drought	132	199	34	587
Normal Year	459	388	347	905
Output (kg¹)				
Lower tercile				
Drought	57	58	0.3	43
Normal Year	291	105	13	47
Upper tercile				
Drought	128	104	7	95
Normal Year	606	204	88	176
Value of Output (US\$¹)				
Lower tercile				
Drought	14	28	—	5
Normal Year	40	30	4	18
Upper tercile				
Drought	33	42	4	25
Normal Year	79	59	29	60
Grain Equivalents (kg²)				
Lower tercile				
Drought	46	98	—	10
Normal Year	209	157	23	111
Upper tercile				
Drought	109	147	9	51
Normal Year	413	309	166	430

Source: ICRISAT and IFPRI/ILCA survey data.

¹ Local currencies converted into US Dollars in real terms: Per adult equivalent in Burkina Faso, and per capita in Ethiopia.

² Value of output converted to grain according to current local market prices for

zone, such that a conversion of actual harvest for the cheapest alternative cereal would have resulted in only 140 kg of grain per adult equivalent, versus over 200 kg in the 'normal' year. Terms of trade were worse in the Sahelian zone, with the value of output worth only 76 kg per adult equivalent during the drought, compared with 300 kg in the 'normal' year.

Table 2: Sources of income during a 'normal' year, by country, zone and income group

	1983/84 Burkina Faso		1988/89 Ethiopia	
	Sahelian	Sudanian	Lowland	Upland
(percentage of total net income)				
Cropping Income				
Lower tercile	78	88	65	74
Upper tercile	49	50	34	49
Non-cropping income¹ (aggregate)				
Lower tercile	22	12	35	36
Upper tercile	51	50	66	51
Total	100	100	100	100
Total net income (US\$)²				
Lower tercile	58	30	10	37
Upper tercile	174	99	60	112
Source: ICRISAT and IFPRI/ILCA survey data.				
¹ Non-farm labor, trade, craft work, gathering income, public and private transfers and household remittances.				
² US Dollars per adult equivalent in Burkina Faso, and per capita in Ethiopia.				

A similar contrast between zones was found in Ethiopia. Output per person in the upland was 50 % of good year levels. The lowlands, however, achieved only 7 % of

'normal year' output level. Translated into value of output, upper tercile households in the lowlands lost over 80 % of their crop income, while most of the lower tercile households lost 100 % (total crop failure).

2.2 Drought Impact on Livestock Production

Drought does not only compromise crop production. Milk output also declines and livestock die because of a lack of fodder and water. Yet, such impacts are also not equally felt across households. In Ethiopia, cow milk yields obtained by upper tercile households remained at five liters per day in normal and drought years, but lower tercile households saw their yields drop from 4.8 liters in the good year to only one liter per day during the drought. This disparity occurred because wealthier households were able to purchase feed, while the lower tercile were reduced to feeding the thatch off their own roofs to a few selected animals.

Unfortunately, such extreme measures were not always successful. In Ethiopia, average mortality during the drought was as high as 68 % of the herd, compared with a good rainfall year when on average 11 % of the herd dies. However, while the upper tercile households lost as many, if not more, head of cattle (in absolute terms) than the lower tercile, their position after the drought was still stronger. The upper tercile households emerged with an average of three times more livestock alive than did the lower tercile.

In Burkina Faso, Christensen (4) found that disaccumulation of livestock (from sales and deaths) was different in the two zones, with the reduction in total herd value three times higher in the Sahelian zone than in the Sudanian zone. However, the greater reduction in the Sahelian zone is mainly a result of that zone's higher original stocks.

Sections 2.1 and 2.2 have shown that the immediate impact of droughts is felt more severely by the lower tercile households - drought is not the "universal leveler" that it is often thought to be. Lower tercile households not only lose more of their short-term income through drought-related production losses, but they are also forced to compromise longer-term survivability by taking steps to off-set emergency consumption needs. The next section examines some of the measures taken to meet such needs.

3. Household Responses To Drought

Food emergencies associated with drought are neither sudden nor unexpected by those worst affected. In Ethiopia, famine-prone regions are also those most drought-prone. But, there is no close correlation between individual droughts and subsequent famines (31). This is because: (1) households devise long-term strategies to minimize the chance of household collapse following harvest failure; and (2) droughts pose a cumulative threat - isolated occurrences are rarely dangerous. It is when one drought-

affected harvest follows another, straining longer-term coping strategies, that crises become unmanageable (11; 12). Households employ a wide variety of strategies to mitigate the effects of drought on their real incomes and hence their food security and survivability. These are discussed below.

3.1 Income Diversification

One of the major strategies used by African households is to diversify income to protect income against shortfalls in a single sector, such as crop production. Table 3 shows income levels and composition for 'normal' harvest-years, to indicate longer-run tendencies or strategies. The table shows that neither upper tercile nor lower tercile households in these regions are merely 'subsistence' farm units (1; 19). Although farm incomes constitute the primary income source in the normal rainfall year shown in Table 2, other earning activities are still very important. Their average share of non-cropping income in total household income varies from about one-third in Burkina to two-fifths in Ethiopia.

The share of local non-farm activities apart from gathering is more important in Burkina, while gathering (for example, collecting firewood) is much more important in the Ethiopian study zones. Livestock sales are a relatively minor component of non-farm income in all study zones, comprising only about one-tenth of overall income.

There are important differences in the degree of income diversification across zones and income strata. In Burkina Faso, Sahelian zone households have higher and more diversified incomes than those in the Sudanian zone. What is more, the upper tercile households have more diversified incomes than the lower tercile households, laying them less open to the impact of climatic vagaries on their farm income. The lower tercile in Burkina have relatively fewer non-farm earning opportunities because of a lack of capital and credit (18; 22).

The same constraints affect the lower tercile in Ethiopia. Table 3 shows that upper tercile households in the (less drought-prone) highlands have higher non-farm incomes (in absolute terms) than both the upper tercile and the lower tercile in the lowlands. However, in the lowlands, non-farm earnings have actually supplanted cropping earnings as the primary source (in share terms) of income for all households, even in a year of good rainfall.

When drought occurs, the availability of non-farm income becomes crucial to survival. Reardon and Matton (21), Reardon (18), and Reardon *et al.* (19) explored the composition over good and lower harvest years in the Burkina study zones, and the impact on household food security of income diversification. They came to two conclusions. First, that Sahelian zone households had, on average, more diversified incomes (more non-farm income) relative to the Sudanian households during the drought year, and thus were much more able to compensate for drought-related

harvest shortfalls. The consequence was less hunger in the Sahelian zone. By contrast, the income and food security of the Sudanian zone households varied with local cropping incomes.

Table 3: Value of net sales of assets during the drought, by country, study region and income group

	Burkina Faso Sahelian	Sudanian	Ethiopia	
			Lowland	Upland
	(US Dollars) ¹			
Farm Assets				
Lower tercile			0.0	0.10
Upper tercile			0.7	0.02
Overall	-0.05	-1.05		
Livestock Assets				
Lower tercile			0.4	9.7
Upper tercile			8.0	10.0
Overall	40.00	11.00		
Home Assets²				
Lower tercile			0.0	0.2
Upper tercile			0.03	0.1
Overall	0.47	0.59		
Total				
Lower tercile			0.4	9.9
Upper tercile			8.0	10.2
Overall	40.40	10.50		

Source: For Ethiopia, IFPRI/ILCA survey data. For Burkina Faso, only overall figures are available for the study zones, not for the terciles; these data derive from Christensen (4).

¹ Local currency converted to real US Dollars; per adult equivalent in Burkina; per capita in Ethiopia

² Including clothes, tables, crockery, bed frames, door frames, etc.

The second conclusion was that ability to diversify income to compensate for harvest shortfall was not neutral according to income stratum; relatively wealthier households were much more able to do so than the poor. Hence, the Sudanian zone was more dependent on local cropping, and the lower tercile in both zones was more vulnerable to drought via its effects on overall income.

Households unable to protect earned income during drought resort to other measures aimed at short-term survival, even at the expense of long-term productivity. Key measures can be grouped under the headings: i) asset disposal, ii) loans and transfers, and iii) reduced and diversified consumption.

The first and second can be classified as generative of income, but are singled out here to focus on short-run measures that are detrimental in the longer run to income-earning capacity. The third is both a means of 'making ends meet' from reduced food stocks and purchasing power, as well as the outcomes of those occurrences. All three are examined in more detail below.

3.2 Asset Disposal

Where income from farm and non-farm sources has become hard to earn, many households are forced to sell assets - farm equipment, livestock, and household items - to subsist. There are two important features of asset sales in Ethiopia. First, by contrast with the uplands, where lower tercile and upper tercile households received similar incomes from asset sales, upper tercile lowland households obtained much more from asset sales than did lower tercile households. This is because the upper tercile had more to sell in the first place, and were better able to refrain from selling until market conditions appeared most favorable.

Second, most assets disposed of were livestock. Although livestock prices collapsed during the drought, upper tercile households were still able to obtain a greater income than the lower tercile because they owned much larger herds and could therefore sell more animals without necessarily compromising the herd reproductive capacity.

Christensen (4) examined changes in the value and composition of asset holdings in Burkina Faso. It was noted above that there was a disproportionate reduction in livestock herds of the Sahel zone, where cattle serve as important insurance mechanisms. Moreover, there were modest sales of household goods and transport equipment, but together these equalled only 3 % of the value of the livestock herd decline (from sales and deaths) in the Sahelian zone, and netted to less than 1 % in the Sudanian zone. In both zones, there were even small increases in holdings in farm equipment in the drought year.

Hence, in Burkina, asset disposal mainly means livestock sales, and the capacity for sale appears to be dictated by normal year stocking levels. In a 'normal' year, livestock

represent a modest income source, but in drought years they are an important buffer for real income at the margin. In the absence of functioning consumption credit markets or effective 'social safety nets', livestock serve as insurance.

3.3 Loans and Transfers

There is a large literature dealing with the old, but still unresolved, debate concerning the nature and extent of sharing within African communities, during times of stress (7; 24; 26). Part of the debate centers on whether relatives and neighbors share food and capital during drought. It has been argued, for example, that households in Ethiopia survive hardship because community support enables the lower tercile to borrow and share food with wealthier households (16; 17). On the other hand, it is argued that as crises deepen hunger becomes more discriminating (26; 3). Moreover, although drought affects the crop production of households differently, on balance there is substantial covariation in crop outputs over households.

The present findings on the issue are mixed. In Ethiopia there were more private transfers during the drought than during 'normal' years, particularly among wealthier households. In the lowland, 43 % of upper tercile households increased their sharing of meals, farm tools and clothing, compared with only 18 % of poorer households. In the highlands, 34 % of wealthier and 24 % of poorer households also shared more often during the crisis. Such help was given almost exclusively to blood relatives - mainly *within* the upper tercile, rather than between strata. However, actual amounts transferred were very small (absolutely and as a share of income), and served to maintain social bonds rather than significantly improve the income or nutritional levels of the lower tercile.

For the case of Burkina, the share of inter-household gifts in total income is quite low - only 1 to 3 % of household income in all terciles. This may indicate a breakdown of the 'social safety net' traditionally observed in the African villages (14), as well as increased monetization even in relatively remote zones. Reardon *et al.* (20) reviewed evidence for the West African semi-arid tropics concerning shares of inter-household transfers in overall household incomes and found it to vary between 2 and 7 %.

Where food and other resources could not be obtained as a gift, many households in Ethiopia turned to borrowing. There was an increase in loans of both food and cash during the drought, but this varied across zones and income groups. For example, the upper tercile borrowed more food and cash than the lower tercile in both study zones of Ethiopia, which underlines the credit constraints on the lower tercile that make it difficult for them to preserve their assets during crises. In the lowlands (where the crisis was most intense), 34 % of upper tercile households borrowed food and 43 % borrowed cash. This compares with poorer lowland households, of which only 20 % borrowed food and 24 % borrowed cash.

Most of these food and cash loans were among kin: 48 % of crisis loans in the Ethiopian sample were arranged between relatives, while only 11 % came from money-lenders and merchants. Interest rates on loans ranged from 50 to 300 %, but they rarely carried a time limit for repayment where obtained from kin.

Christensen (4) studied credit use in the present study zones in Burkina Faso, and found the share of net borrowing in total income to be only 7 % in the Sahelian zone and 2 % in the Sudanian zone during the drought year - again, very minor sources of income. This includes both in-kind borrowing (food) and cash. This mirrors results from other Sahel countries reviewed in Reardon *et al.* (20).

3.4 Reduced and Diversified Consumption

Calorie consumption in both study countries is a matter of concern, even during non-drought years. In Ethiopia, average per capita consumption at the survey sites in 1989/90 stood at only 1,700 kcal per day (32). In the uplands this ranged from 2,165 kcal per capita per day in upper tercile households, to 1,997 kcal per capita per day in lower tercile households; in the lowlands the upper tercile per capita consumption was 1,909 kcal per day compared to only 1,638 kcal per day for the lower tercile. At the sample mean, 68 % of the upland households and 77 % of lowland households can be classified as malnourished (in terms of calorie intake deficiency), consuming less than 80 % of the internationally recommended 2,300 kcals per day.

In Burkina Faso, the picture is only slightly better. Reardon *et al.* (22) showed that in the normal harvest year (1983/4), 17 % and 48 % of the sample households in the Sahelian and Sudanian zones had inadequate incomes to reach the FAO recommended daily caloric intake of 2280 kcal/AE/day; hence, there was already a problem of hunger in the Sudanian zone in the 'normal' year. The picture was yet more grim in the drought year, when the respective figures were 43 and 56 %. (These both can be contrasted with figures of 4 % in both years for the Guinean zone in the better-watered southwest.)

Reardon and Matlon (21) showed that average kcal/AE/day approximated adequacy in both zones in 1984/5 (with 2500 and 300 kcal/AE/day averages for lower tercile and upper tercile households respectively in the Sahelian zone, and 2300 and 2700 respectively in the Sudanian zone) - but the coefficient of variation was only 22 to 25 % in the Sahelian zone and 34 to 37 % in the Sudanian zone - indicating the presence of substantial numbers of hungry households in the latter zone (about a fifth of the adult equivalents in the lower tercile and almost two-thirds in the middle tercile - both absolutely poor).

Given such low base levels, drought-related food shortages cause much hardship in households with insufficient purchasing power to make up deficiencies in own production with purchases. One outcome of food stress is that households cut back the

number of meals eaten each day. As might be expected, the lower tercile suffer disproportionately in this respect. In Ethiopia, almost 70 % of the lowland lower tercile reduced the number of meals to one (or fewer) per day, compared with 58 % of upper tercile lowland households. Similarly, in the uplands 62 % of lower tercile households ate at most once per day, compared with "only" 39 % of upper tercile households.

A second consumption response to reduced food availability is the gathering and consumption of foods that are only turned to during famine. In Ethiopia, roughly equal proportions of lowland upper tercile and lower tercile households increased their consumption of 'famine' foods, whereas it appears that more upper tercile households in the uplands increased their consumption of famine foods.

For Burkina, Reardon and Matlon (21) show that, although this source was probably under-enumerated, leaves and other local wild plant products constituted 4 % of the lower tercile's total caloric intake in the drought year in the Sahelian zone - an important contribution at the margin given the already-low levels of intake. The figures were insignificant for the other terciles and the Sudanian zone.

4. Food Aid and Drought

Food aid distribution to drought-affected households has become a structural feature of many African countries. In 1991, over 4 million tons of food were required to alleviate drought and war for 30 million Africans in 17 countries - nearly 8 million people in Ethiopia alone (30). There is little doubt that past resource transfers have served an important role in preventing further hardship and loss of life in many regions (13; 23). However, concerns remain about cost-effectiveness, delivery success-rate and targeting of drought-relief.

In countries like Ethiopia and Burkina Faso, food aid will continue to be needed for the foreseeable future, especially where household coping mechanisms (income diversification, asset disposal, borrowing and sharing, and consumption rationing) have proven unable to protect against loss of income and food.

During the Ethiopian drought, aid was relatively well targeted, both by region and by income group⁵. For example, lower tercile lowland households received an average of 102 kg of grain per person, versus 68 kg per person in the upper tercile households. No upland households received as much as the lowland lower tercile households. In most cases, apparent physical need guided most food aid screening.

By contrast, targeting was not effective in Burkina Faso. Using cereal yield and output shortfalls as a targeting criterion, agencies carried most food aid to the Sahelian zone. The Sudanian zone, on the other hand, received minimal aid (10 times less aid per adult equivalent than the Sahelian zone), although Sudanian households had fewer non-farm income sources, lower overall incomes and therefore suffered relatively

more from the drought (21; 22). Moreover, the upper tercile received more food aid than the lower tercile households in the Sahelian zone, indicating a lack of poverty-based or purchasing power targeting.

5. Conclusion and Policy Implications

This article has shown that while a drought affects all households in a locality, its impact is more severe for the lower tercile than for the upper tercile households. Many households in both countries are net cereal purchasers, relying on non-farm income to secure such purchases. Unfortunately, constraints on capital and work opportunities prevent the lower tercile households from diversifying their income, thereby reducing their vulnerability to drought. When protracted drought strains the limited resource base of the poor, the threat of famine becomes real and relief intervention becomes essential.

However, the view of households as homogeneous subsistence units, and of drought-prone areas as homogenous environments, masks important differences in the impact of drought across regions and household types. This reduces the potential for successful targeting. The reliance in Burkina on physical output indicators for the targeting of food aid led to under-allocation of food aid to the Sudanian zone, for households that were in great need of the aid. In Ethiopia, although amounts of aid reaching recipients remained low, greater use of human need indicators (primarily physical), appears to have resulted in a better match between household need and available supply.

Thus, if policies and intervention strategies aimed at drought mitigation and famine relief are to be appropriate and cost-effective they should be carefully targeted not just at the lower tercile, but at the lower tercile in regions where coping mechanisms have been constrained or even collapsed. This remains essential even in countries like Ethiopia and Burkina where every household is poor by world standards.

Summary

This article examines the characteristics and responses of households affected by drought. Drawing on survey data from drought-prone regions of Burkina-Faso and Ethiopia, it asks: How did the droughts of the 1980s affect households of differing income levels and in different agro-ecological zones? It shows that there are important differences in the impact of drought across regions and household types. This underscores the need to consider households characteristics (especially purchasing power and asset holdings) if successful poverty-based targeting is to be achieved.

Zusammenfassung

Der Artikel untersucht Merkmale und Reaktionen von Haushalten, die stark von Trockenheit betroffen sind. Auf der Grundlage von Datenerhebungen in trockenheitsgefährdeten Regionen Burkina Fasos und Ethiopiens werden die folgenden Fragen untersucht: Wie haben sich die großen Hungersnöte der 80er Jahre auf Haushalte unterschiedlichem Einkommensniveaus ausgewirkt, und welche Unterschiede bestehen bezüglich verschiedener agrarökologischer Zonen? Es zeigt sich, daß Trockenheit nach Region und Haushaltskategorie deutlich differenzierte Auswirkungen besitzt. Für eine Verbesserung der Zielgruppenorientierung armutsorientierter Maßnahmen ist es daher erforderlich, verstärkt haushaltsspezifische Kennzeichen (insbesondere Kaufkraft und Besitztum betroffener Haushalte) zu berücksichtigen.

Notes

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1. For details of the sampling and survey methods, see Matlon (15). The survey covered these two zones plus the Guinean zone (with another 50 households); the latter is not examined here because it is not a drought-prone zone. The data were collected by Peter Matlon, now at WARDA, and formerly at the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) when the data were collected.
2. The data were collected by IFPRI in collaboration with the International Livestock Centre for Africa (ILCA) and the Ethiopian Ministry of Central Planning (ONCCP). For details of sampling and survey methodologies see Webb, von Braun and Yohannes (31). The lowland survey sites lie at an average of 1,300 meters above sea level, while the upland sites are at 1,700 masl (the official threshold between lowlands and uplands being 1,500 masl).
3. The results of a simple modeling exercise (designed to assess the relationship in Ethiopia between rainfall, yields and production) explains 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: a 10 percent drop in rainfall results in a 4.2 percent decline in average yields, and a 4.5 percent fall in national cereal production (31).

4. This does not imply that given equal toposequence, moisture and fertility conditions across all sites, maize and sorghum are more drought-resistant than millet. It simply shows that at the surveyed locations the combination of local conditions and agronomic practices favored these crops rather than millet.

5. Although a large variety of aid agencies were involved in food distribution, each following its own screening and targeting criteria, it appears that general norms relating to need (as prescribed by the United Nations, the Relief and Rehabilitation Commission and by key NGOs) were widely adopted.

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Household Responses to Declining Food Entitlement: The Experience in Western Sudan

Testaye Teklu¹

Introduction

Studies that provide insights on household coping behavior during food crises are emerging with key findings (see, for example, [6], [3], [1], and [2]). Household responses are seen as involving substitutions between and within consumption, income, and asset paths, with discrete shifts between these coping paths. Households vary in their emphasis on choices among these paths. In general, households prefer to avoid actions that would endanger their future survival. However, success with coping is unequal across households.

These studies are less conclusive in explaining the ordering of coping strategies (paths) and associated responses. The focus used to be on developing a stylized set of ordered responses, but this is a tenuous exercise, since the choice and timing of responses are time dependent and household-variant. This paper attempts to contribute to an understanding of the process of household coping strategies and responses to declining food entitlements.

Part 1 of this paper reviews the recurrence of droughts and famine outcomes in the area, presents a typology of a household economy, and identifies patterns of coping response in the context of the 1984 - 85 famine. Part 2 surveys the dynamics of recovery in the post-famine period and draws the implications for sustainability of coping capacity. Part 3 discusses the role of public intervention in recovery and protection of coping paths. A famine-prevention strategy for Sudan needs to recognize the time path of the coping process and its associated costs.

1. Coping With Recurrent Droughts

Recent reviews ([4] and [8]) of historical records show that periods of drought have occurred throughout the history of famine in Sudan. For example, the two great famines of 1888 - 89 and 1984 - 85 were triggered by consecutive years of poor rains. Farmers in western Sudan have identified 36 years between 1912 and 1974 as being years of drought (4). Half of these 36 drought years were meteorologically confirmed with rainfall well below average.

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