Household Food Strategies in Response to Seasonality and Famine

Richard Longhurst

Poor rural families plan for food shortages both seasonally and for unexpected inter-seasonal events. This rather obvious fact of life is not often incorporated into planning of agricultural development activities. Comparatively little is known about the insurance mechanisms which families employ to ensure their household food security: their nature and resilience and how far different types of families use different mechanisms, and how rural development policy might strengthen them. This article will review these issues and also try to assess the effectiveness of means of overcoming regular seasonal contingencies in response to famine conditions. With a few notable exceptions (e.g. Jodha 1975; Campbell and Trechter 1982] there is little empirical evidence on these questions; on the other hand there is sufficient to indicate the diversity of what might be called 'household food strategies'. The evidence is examined with particular reference to northern Nigeria where there has been some research related to these issues [Norman 1974; Matlon 1977; van Apeldoorn 1981; Longhurst 1986; Watts 1983].

A Seasonal Coping Strategies

There have been several attempts to categorise what families do in response to seasonal food shortages. They can be described in two groups relating to production, such as diversification, root crops, exploitation of vertisols (soils with long retention of surface water and incorporation of organic matter from the surface), livestock enterprises and bush collecting; and those which are social adjustments such as reciprocal economic exchange, gender-linked allocation of farming tasks and varying modes of household integration [Moris 1985]. To these might be added the biological 'strategies' of body adaptations: adapting patterns of energy expenditure, drawing on body fat stores and changing the composition of the diet. Generally, in northern Nigeria, as in many other parts of sub-Saharan Africa and in Asia as well, four sets of strategies can be identified which are at the command of rural families. These are choice of cropping pattern, drawing on stores and assets, developing and exploiting social relationships, and diversifying off-farm income opportunities. Each will now be considered in turn, in the context of research carried out in the village of Dayi in Hausaland in northern Nigeria [Longhurst 1984, 1986]. The village is located in the mild sub-arid Wooded Savanna ecological zone which receives 750-1000 mm (24-40 inches) of rainfall distributed over a period of 120-140 days starting at the beginning of May and finishing at the end of September. The main crops grown by area are sorghum, millet, cotton and groundnuts. The agricultural year starts in April, the last month of the dry season when farmers take their compound and latrine waste out to the fields as manure. Thereafter the operations in general are: early ploughing and planting (May), first weeding (June), second weeding (July), late ploughing and harvesting of the early grains of maize and early millet (August), harvesting of groundnuts (September), harvesting of late grains of sorghum and late millet (November-December) and harvesting of cotton (December-January). If the rains have arrived on time and in sufficient quantity the labour peak is that of first and second weeding in June and July. Moslem Hausa women do not normally work on farms, being secluded.

(a) Choice of Cropping Pattern

Farmers generally give priority to the food crops of sorghum and millet in terms of allocation of their labour and better, manured land, which is why efforts to encourage farmers to plant cotton and groundnuts when the rains first come, in order to achieve higher yields, have failed. Millet matures in 90-100 days, compared to the 150-day duration of sorghum, but it is lower yielding (about 2-300 kg/ha compared to 750 kg/ha for sorghum). However, the expected finding that the poor would plant millet because they had more urgent need of harvested food product did not materialise. Many poor farmers planted sorghum and worked as farm labourers to get cash for food before harvest. Indeed, a higher proportion of

IDS Bulletin, 1986, vol 17 no 3, Institute of Development Studies, Sussex

plantings of millet was found among the richer farmers who used it as an intercrop for their cotton. Therefore labouring with sorghum later was regarded as a more effective seasonal food strategy for the poor than early food in the form of millet but nothing to follow.

This leads to the questions: does the poorer farmer intercrop more? Is he 'forced' into adopting a particular cropping pattern which may be low yielding, farmers having to, say, minimise the variance of yields so that there is a spread of harvested material in response to variability in rainfall? Evidence is mixed because the strategy of mixed cropping is rational both in terms of profit maximisation and risk minimisation [Norman 1974]. Again in Dayi there was little difference in the incidence of mixed cropping between rich and poor except at two extremes. The very rich who have access to tractors and oxen with which to weed crops have advantages leading to sole cropping. At the other end some of the poor, the old and the eccentric put larger numbers of crops — seven or more — onto one field. If they are not sure of their capacity to earn cash on off-farm work or farm labouring during the season, but confident ultimately of family support, they will aim for early seasonal food. In particular, for this poor group there is dependence on gathered foods and intercropping of food crop varieties such as pumpkin, green maize and bambara groundnuts that can be consumed direct while working in the field. The poor plant less (non-food) 'cash' crops (in terms of area planted or production per consumption unit) but all socioeconomic groups will grow cotton as part of a broader diversifying strategy of obtaining cash, in addition to labouring and petty trading. However, it is reasonably clear that the incidence of crop mixtures at village level does increase as the length of growing season shortens at more northerly latitudes [Longhurst 1977].

In the area of Nigeria where this research was carried out, root crops had declined as a means of meeting seasonal hunger and only two per cent of the area of the cropped areas of the village under study was devoted to cassava. The use of *fadama* land, which are areas seasonally water-logged or flooded such as low-lying areas adjacent to streams and depressions, is also an important seasonal mechanism where they exist. Mostly, they are in the hands of the richer farmers who use them to grow high value crops such as vegetables for sale in urban areas, or perennial crops such as sugar cane. However, *fadamas* do tend to be neglected in the wet season so that in years of poor rainfall they can be employed as a seasonal mechanism by planting additional crops. At the end of a poor wet season it is

Mike Goldwater/Network

Counter Seasonal Measures: the Shawata Flood-spreading project in Tigray Province, Ethiopia.

often possible to plant a rapidly maturing variety of maize in the *fadamas* [Turner 1984]. They can also be used in the wet season by growing rice.

Secondary crops are also important, providing nutrients in the period before (generally fixed) cereal harvests, in addition to diversifying diets and making them more palatable. They can be divided into four groups of crops, in increasing order both of labour requirements per calorie eaten and of firmness and consistency of intention to harvest [Longhurst and Lipton 1985]. The latter characteristic is important in the analysis of the role of secondary crops as seasonal food crops and as buffers against famine. These groups are:

(a) Gathered crops, including wild vegetables occasionally cultivated, such as species of *Cassia* and *Lorathus*, leaves of the baobob (*Adansonia digitata*). In a seasonal, rather than a famine context, such crops are important as relishes and salads and for non-food products such as medicines, rather than providing sustenance.

(b) Crops mixed into fields of staples such as legumes, pumpkins and melons, and grown partly for soil fertility (especially nitrogen fixation) or canopy effects. In good years they may not be harvested, or snacked in fields. Cowpeas are often planted with sorghum but in Dayi were not harvested; other crops are left for cattle.

(c) Cultivated vegetables in home gardens near the compound, even inside compound walls where they will be tended by secluded Moslem women. Such vegetables, being intensively watered and manured, can mature early and have a seasonal role but generally they supply micronutrient rather than energy sources.

(d) Non-staple root crops grown as a contingency reserve and which do eventually get harvested. Plots of cassava are found in villages of northern Nigeria: labour requirements, including harvesting can be spread during the year. The village-level cultivation of cassava plots was a requirement of the colonial administration in Nigeria [Watts 1983].

In northern Nigeria secondary crops (seeds, nuts and legumes, vegetables and fruits), constituted 5.7 per cent of energy intake year-round in nutrition surveys in Zaria [Simmons 1976] and 7.4 per cent in Malumfashi [Longhurst 1984]. These crops provided 11.2 per vcent and 12.1 per cent of protein intakes respectively. A recalculation of Simmons' data enables the seasonal breakdown which shows that the contribution of these secondary crops to energy intake is at its highest in the (cereal) pre-harvest period of August-September (8.6 per cent) compared with the post-harvest periods of October-November (4.7 per cent) and December-January (6.6 per cent) [Longhurst 1985]. The sample sizes are too small to break them down further in terms of rich and poor. For some these crops will be significant dietary sources.

Farmers in northern Nigeria, as in other parts of the world, are able to exercise a degree of sequential decision-taking: intercropping on the farm, adjusting the amount of time and effort they put into them depending on how the rains progress. For example, millet can be planted as the rains start and farmers can follow up with cowpeas and sorghum according to the distribution of rainfall and their success in off-farm activities. There is an adaptive flexibility in cropping patterns that enables a spreading of risks in response to uncertain rainfall, control of microclimate, maximum use of the growing season, spreading of labour requirements, opportunity to make changes in direction (such as replanting with more drought resistant varieties) and to get cash from crop sale as well as food.

(b) Drawing on Stores and Assets

Families build up stores of assets, livestock, grain and body fat which they run down in the wet season. Research from the Gambia and Ghana shows that adults lose about five to seven per cent of their body weight during the wet season when energy expenditure usually exceeds energy intake [Longhurst and Payne 1981]. Body weight is at its highest when intense farm work begins and declines through the wet season as energy work requirements exceed intake.

Farmer food grain storage in northern Nigeria is very effective, with losses from compound granaries as low as four per cent [Giles 1965]. Also, some research has shown that in good years farmers are not forced back into distress selling of grain post harvest when prices are low. Indeed, farmers can make grain purchases post harvest if they know they do not have enough grain to last until next year and it would be cheaper now than later [Hays 1976; Longhurst 1986]. Grain appearing on the market at this time derives in part from the harvest of one or two years earlier. Hays' study of grain storage and marketing in three villages found that 11 months after harvest, there remained in store on average 18 per cent of the millet and 13.5 per cent of the sorghum. Therefore farmers may have greater flexibility in other parts of the world in timing the seasonal sales of grains. In Dayi, cash from cotton sales could be used to meet tax and similar obligations in December. In common with other parts of Africa, small stock are built up in numbers and then are sold off in years when food is short; it is the women who mostly own and invest in small stock: Watts (1983)

reports that almost half of the small livestock sold during the 1973-74 drought belonged to women. However, running down more durable assets such as jewellery and selling of farms is more characteristic of famine than a normal seasonal phenomenon.

(c) Cultivating Social Relationships

Several complex forms of social relationships exist which can be regarded as an insurance policy against outright poverty. In a Muslim society various redistributive mechanisms already exist, such as the grain tithe (*zakat*) and in all villages there is active giving of food for many reasons, not only to support the poor. Patron-client relationships are common, with men providing regular farm labour for rich farmers in return for wages and food. Patrons will give additional support if food shortages turn into famine. In addition there are complex gift-giving relationships which occur between men and between women. There is a contribution system known as *biki*, in which one person makes a gift of cash to another in the expectation that it will be returned and even doubled at a later date. When contributions reach an impossibly high level they are reduced by mutual consent. Contributions are also made in times of need. Women develop friendships (*kawa*) with other women, usually from very early on in life, with whom a formal gift-giving relationship occurs.

Relationships between families, in addition to those that exist within families (such as the male labour and food sharing institution of *gandu*) are intensified during seasonal shortages.

(d) Diversifying Off-farm and Income Sources

Those who have a seasonal off-farm work are those who are not discomfited by seasonality. Trades such as blacksmith, butcher, provisions trader and carpenter find steady demand for their services. The detailed labour activity surveys carried out by Norman and his co-workers in Zaria showed that time devoted to occupations other than farm work remains constant throughout the year, being 6½ days per month in the cultivating season and 7-9 days in the 'slack' season [Norman 1972]. Of the average number of working days of adult males, 61 per cent were spent on the family farm. There is a great range of secondary occupations in Hausaland and seasonal difficulties are most easily weathered by those who have access to one or several of these. The type of work that men do is in large part inherited, which forms the basis of an occupational class distinction, although most have a 'closed shop' or guild aspect which restricts entry. Therefore the poor have less opportunity than the rich to employ this form of counterseasonal strategy. Women, although secluded, are active entrepreneurs and also contribute by trade and loans to overcoming seasonal shortages of food.

This section has looked at seasonal strategies; in the next section famine-related responses are described and discussed. Many are extensions and diversifications of those described here and it has been on occasion difficult to draw the line between the two. In this context the research by Campbell and Trechter (1982) in North Cameroon proves most pertinent, as one aim of their study was to examine the behavioural differences in coping strategies between expected and unexpected food shortages. They have categorised response mechanisms by seriousness of the shortages, if men or women are involved and by level of nutritional status in the family. Three levels in the development of shortages are proposed: first, the seasonal food shortage period (*soudure*) when actual food supplies are scarce or non existent; then second, when food might be available for purchase, but inaccessible to people for economic reasons; the third type of shortage is famine, usually precipitated by a natural disaster: at the stage of *soudure* (a three-month period from June/July to September/October), slaughter of livestock, especially small stock is the most common response, reported by both men and women. In a better off village the extent of these activities was less than in the two other villages studies. Women appeared to have a greater diversity of responses, suggesting that they are more directly concerned with food shortages in the *soudure*; some of these responses are directly related to the *soudure*, such as reducing meal portions or not eating for a whole day, whereas others would be employed during any period of difficulty, such as buying food or selling labour. It appears that men play a subordinate role to women in coping with food shortages, as the latter reported receiving gifts or loans of food and money from neighbours and relatives. In the poorest village, alteration of eating habits, after selling livestock, was most common. The villagers there did not possess other resources with which to trade. Gifts and loans between families were an important *soudure* mechanism: a sharing of poverty with the knowledge that all families can be vulnerable to food shortages at any time.

The coping mechanisms for the second stage of food shortages — those of an economic and distributional nature characterised by a breakdown in the ability of cooperative efforts and liquidation of capital assets to deal with the deficit — as reported by both men and women were significantly different from stage one (*soudure*) mechanisms. These were family assistance, wild foods, food purchases, migration, selling stock, special planting (of crops planted specifically as an insurance against a bad year) and selling food. Selling livestock and borrowing food or money were less

important. Again women and men might carry out different actions but both are equally involved in combating the deficits. Women plant special foods and use food reserves, while migration was reported by the men. Gathering wild foods and migration are regarded as onerous and unattractive measures. In an effort to identify any behaviour patterns which indicated a transition from *soudure* to stage two, Campbell and Trechter stratified the sample of families by their level of nutrition as measured by calorie intake. The lowest quartile had a mean calorie consumption of 63 per cent of requirements; the highest had a level of 138 per cent of requirements. The families with the lowest intake were regarded as being in a stage two situation and the data indicated that they did behave differently from better nourished households. Women would miss meals for an entire day and men would migrate. Poor families collected wild foods while the better nourished families resorted to borrowing food or money.

Distinguishing between normal seasonal stress and famine therefore has its difficulties, although many would agree with Currey's description that famine is 'like insanity, hard to define, but glaring enough when recognised' [Currey 1978: quoting Taylor] and with Seaman and Holt (1980) that it is 'easily recognised and quite distinct from even the extremes of poverty' (p.284). Seasonal shortages for some produce famine conditions for others, especially the poor. The greatest difficulty is in deciding where the threshold point lies between the two. The next section discusses those strategies used by families in response to these more severe food shortages.

B Famine Coping Strategies

Several definitions of famine have been proposed, both by those who study it and by those who suffer from it. From the former group there are 'widespread food shortages leading to a significant rise in the regional death rates' [Blix, Hofvander and Valquist 1971]; 'The community syndrome which results when social, economic and administrative structures are under stress, and are further triggered by one, or several discrete disruptions which accelerate the incidence of many symptoms, or crisis adjustments, of which one is epidemic malnutrition' [Currey 1978:87] and 'It is an abnormal breakdown in access to food which leads to mass starvation among vulnerable groups or classes of people' [Cutler 1985]. Local cultures in Bangladesh define three types of famine: scarcity is *akal* (when times are bad); famine is *durvichkha* (when alms are scarce) and nationwide famine is *mananthar* (when the epoch changes); in northern Nigeria there are about a dozen terms for different degrees of famine-hunger or *yunwa*. What do these definitions and other observations tell us? A definition based on food shortages [following the work of Sen 1981] is incomplete, may even be wrong and the extent of significant levels of mortality with a famine over and above 'normal' death rates, especially in an impoverished area due to starvation, is subject to difficulties in assessment. Famines are not usually a matter of already bad times getting worse, but apparently lead to changes in community and family structure that cannot easily be reversed. This might be in the form of action taken by communities — mass migration, disintegration of families, sale of assets, even children, or sharp increases in prostitution. In other words these are events which do not normally take place and occur after normal response mechanisms have been exhausted. Chambers' (1981) useful distinction between normal seasonal events as 'screws' which drive people into poverty from which they get temporary (usually dry season) reprieve, and 'rachets' which are circumstances that lead to irrecoverable loss of resources could apply as an analogy between seasonality and famines. However, the ability of people to overcome the effects of famine should not be underestimated. The causes of famine are several, including drought, floods, disease and war all overlaid on poverty. However, in terms of physical phenomena drought is usually associated with most famines, and forms the basis of the discussion here.

Responses to famine start with a diversification and intensification of existing activities. Then there is the following sequence of events [based on Jodha 1975, Watts 1983):

(a) Domestic mutual support; intensification of 'fall back' activities by household members including gathering of foods; restructuring of current farm activities to maximise effective availability of products, including a variety of salvage operations.

(b) Minimisation of current commitments through suspension or cancellation of resource allocation including grain loans and tax relief.

(c) Disposal of inventories of home-produced foods as well as purchased foods stocked for some planned use such as marriage; village charitable relief, grain purchase and patron support.

(d) Sale or mortgage of assets with a sequence based on liquidity and productivity of assets with a preference towards mortgage rather than sale.

(e) Short or long term migration, possibly taking animals.

(f) Famine relief from state or patron assistance.

(g) Possible return, recovery, replanting and reconstitution of reserves.

A second typology of responses relating to social factors has been suggested by Dirks (1980). There are three stages: alarm, resistance and exhaustion, and this typology does provide complementary information to that described above. A famine that begins under cover of expected seasonal fluctuations does not at first generate alarm. Thereafter there is increased activity, even hyperactivity, and intensification of work (which has in some instances converted a food shortage into a famine, especially when hoarding has occurred): markets become glutted with perishable food, movements of people, general irritability, hostility and political unrest occur and the performance of ritual tends to increase. At the stage of resistance, an energy conserving strategy ensues; with sustained undernutrition hypoactivity occurs, social ties erode and social interaction is reduced.

Individuals drop friends and extended kin from food-sharing rituals, restricting reciprocity to close relatives. Competition intensifies and theft increases. Exhaustion is marked by the collapse of the family unit, with the elderly the first to be pushed out; children may forage in gangs. At this stage further adjustment is not possible without external relief.

The stages of (a) to (e) above which are those of household response show a mixture of the normal (in respect of expected fluctuations) and abnormal (in respect of contingencies). Some of the normal are not used by the rich in good seasons; some of the abnormal are used by the poor in every season, so deepening their impoverishment. In this section we pick out three strategies which might be used more in famine conditions rather than average seasons. These are gathering of foods, migration and sale of farm land and other assets. It should be pointed out however, that knowledge in this area is limited. Even in normal times information about sales of assets, transactions between individuals with respect to loans and remittances to and from migrants, is sensitive and difficult to obtain. During a famine there are both ethical and organisational questions to carrying out research, but given the need to obtain solid empirical information to prevent the recurrence of famines, and the costly and usually tardy response of the aid donors, sensitive investigations are very much needed. Such research will require a great deal of rapport between investigator and subjects, suggesting that the research framework should have been in place prior to the onset of famine conditions. This research would require a high level of commitment.

(i) Gathering of Foods

Some foods are specifically designated by local people as 'famine foods'. These are usually foods growing wild: vegetables, nuts, berries and parts of trees. In normal times they are consumed only by the very poor and their consumption is usually a sign of shame. Therefore in the Bangladesh famine of 1974-75 people consumed banana tree, wild arum (*Araceae* spp), plantain saplings (*Musa paradisica*), leaves and rice husk [Currey 1978; Rahaman 1978]. In the Bihar famine of 1965-66 a higher consumption of green leafy vegetables was found in severely affected villages due to extensive use of wild leaves. Wild tubers were consumed in drought-affected parts of Andra Pradesh. In the famine in Karamoja, Uganda during 1980, 41 per cent of the population was subsisting on wild weeds, fruits and seeds collected in the bush, or had consumed no food all day [Biellik and Henderson 1981]. These woody fruits and seeds had little nutritional significance but could temporarily stave off the worst physical effects of hunger. In northern Dafur, Sudan, in 1973 most people collected the seeds of wild growing grasses [Holy 1980].

In northern Nigeria there is a wide range of these 'famine foods', which include those gathered day to day as relishes and supplements to soups. Two crops cultivated in anticipation of drought or famine periods are cassava and bambara groundnut. The response of the household is to diversify food sources. More use is made of tree products such as the African locust bean (*Parkia* spp) and shrubs, especially *Borassus flabellifer, Vitex cienkowshi, Fiens theanengii* and *Maerua angolensis*. Other foods including green leafy vegetables are collected, such as species of *Corathus, Cassia* and *Adansonia digitata*. Trees, with deeper rooting systems, are able to provide food both in dry seasons and during droughts.

There is very little information available in quantitative terms on how important gathered foods become during a famine. In a poor tribal group in India during a normal pre-harvest seasonal shortage, gathered foods contributed 12 per cent of energy intake before harvest compared to two per cent post-harvest [Pingle 1975]. In Mali a berry from the shrub *Boscia senegalensis* becomes the staple food of poor RimaiBe households, making up the evening meal in addition to a midday meal of millet [Martin 1985].

(ii) Migration

The sight of large numbers of people on the move is the major indicator that a famine is occurring. Again, in northern Nigeria these movements are an intensification of the migration of normal times, that of the dry season *cin rani*. Whole families migrate rather than just males. From one village in Niger, the number of able-bodied males migrating increased from 37 per cent in 1969/70 to 75 per cent in the drought year of 1973/74, looking for work in the large Nigerian towns of Lagos and Kano [Faulkingham 1977].

There is a vast array of different classes of migratory movement ranging from 'normal' movement for economic advancement with eventual return, to that of moving for survival to places where free food might be distributed. Cutler (1985) has documented how when outright famine conditions occurred in Ethiopia the flow of people to roadsides, towns and camps increases dramatically over a short period: those crossing the Sudan border rose from 300 per day in September 1984 to 3,000 per day by the end of November. Nevertheless many of these people intended to return with the onset of rains. The effectiveness of migration as a famine strategy depends on the spread and extent of famine (migrants of course can export high food prices and hence food shortages with them) and the effectiveness of relief efforts.

(iii) Sale of Farmland and Assets

Most families will prefer to mortgage rather than sell farmland, although in northern Nigeria the pledging is often the forerunner to outright sale. Among pastoralists, sales of livestock are more common, even inevitable. As more assets come onto the market, prices fall so that the rich, who may not be suffering but even by taking advantage of the poor, can acquire land and animals at advantageous prices. For livestock there is an order of sales, with small stock being sold first followed by older and male animals. Breeding stock are kept until last. Household foods and farming equipment are sold just prior to migration.

This brief review of these response helps us a little in understanding the hierarchy of responses as outlined by Jodha and Watts. Jodha's empirical research in Rajasthan investigated curtailment of commitments and sale of assets, inventories and outmigration as the drought year progressed. Two-thirds of the households had sold assets and over one quarter had outmigrated between the dates of declaration of scarcity and the commencement of relief work (about six months). Curtailment in current consumption (such as reducing family food consumption, non-milking of animals to permit milk for calves) is resorted to in the early phase of the scarcity period, together with sales of inventories such as fuel wood, dung cakes, timbers, ropes, mats and wool. Once these are exhausted, mortgaging and in a few cases (about 8 per cent total) sale of assets begins. This begins with unproductive assets such as ornaments and utensils. Jodha's research shows that relief measures have to be implemented before assets — as sources of future income — are sold, and that such indicators are signs of true distress rather than adaptive responses such as curtailment of consumption, which can return to normal after the famine has passed. Similarly Mortimer (1985) has shown that in northern Nigeria, there is a wide range of adaptive responses similar to curtailing consumption, engaged in by ½-¾ of the population. These activities include labouring, consumption of famine foods and firewood selling. There is then a second group of responses engaged by ¼-⅓ of the population which bite into economic resources i.e. selling property, land, and animals, taking out of loans.

C Conclusions

The descriptive material presented here enables only a partial answer to the questions posed at the beginning of the article. Rural families can extend their normal seasonal mechanisms to meet a drought inspired famine but the poorest of families have to begin early in disposing of their assets and resources. The effect of both severe seasonality and famines is to accentuate income disparities between families. The active role of women in countering drought and famines has been shown; in many parts of the world they are responsible for gathering foods and managing small livestock. The resilience of coping mechanisms has not been well documented but it is obvious that with increasing population pressure, and the erosion of common property resources and cultivatable land, such mechanisms are losing effectiveness. Nonetheless Cutler (1985) has documented how families in Ethiopia survived as many as six years of poor harvests before having to migrate in 1972-74, and about four years prior to the famine of 1983-84.

Measures to improve rural welfare must not undermine the mechanisms that have been described here. Promoting sole cropping at the expense of mixed cropping, removing trees in favour of cultivated crops and neglecting secondary crops, especially cassava in semi arid areas, are all examples of destructive policies. New strategies are required to develop these coping mechanisms with a bias towards those who use them and live by them. This requires strengthening the food crops used in periods of drought by conservation and breeding programmes; a better understanding of the efficiency of household grain storage so that community stores could be established with similar effectiveness to moderate food price rises to provide reserves in times of acute shortage. An essential part of both famine prevention and relief is to develop an early warning system based on household indicators of stress, to provide resources so that families are not forced into disintegration and migration. Finally, a promising area of policy related research concerns the interplay of seasonal organisations [Fortmann 1985] and credit availability to avoid asset sales or assist in reconstitution. This might well be linked to the experimental programmes of international agencies and national governments to provide 'cash-for-food'. Such projects have given cash — sometimes linked to

community development works — to families affected by famine to avoid them disintegrating and to enable them to enter local credit markets. This cash might be obtained from sales of food aid.

What is required is a new approach to thinking about these problems related to rural poverty: not a 'back-to-nature' way which gives excessive weight to traditional mechanisms but one which uses them as the first step in developing more effective ones.

References

Biellik, R., and P. Henderson, 1981, 'Mortality, nutritional status and dietary conditions in a food deficit region: North Teso District, Uganda, December 1980', *Ecology of Food and Nutrition* 11 pp163-70

Blix, G., Y. Hofvander and B. Valquist, 1971, *Famine: A Symposium Dealing with Nutrition and Relief Operations in Times of Disaster*, Amlquist and Wiksells, Uppsala

Campbell, D. J., and D. D. Trechter, 1982, 'Strategies for coping with food consumption shortage in the Mandara Mountains Region of North Cameroon', *Social Science and Medicine*, 16 pp2117-27

Chambers, R., 1981, 'Introduction' in Chambers, Longhurst and Pacey (eds.)

Chambers, R., R. Longhurst and A. Pacey (eds.), 1981, *Seasonal Dimensions to Rural Poverty*, Frances Pinter, London

Currey, B., 1978, 'Famine Symposium Report: the famine syndrome: its definition for relief and rehabilitation in Bangladesh', *Ecology of Food and Nutrition*, 7, pp87-98

Cutler, P., 1985, *The Use of Economic and Social Information in Famine Prediction and Response*, Report to ODA, London

Dirks, R., 1980, 'Social responses during severe food shortages and famine', *Current Anthropology* vol 21 no 1, pp21-44

Faulkingham, R., 1977, 'Ecological constraints and subsistence strategies: the impact of drought in a Hausa village: a case study from Niger' in D. Dalby, R. Harrison Church and F. Bezzaz (eds.), *Drought in Africa* 2, African Environment Special Report 6, IAI, London

Fortmann, L., 1985, 'Seasonal dimensions of rural social organisations', *Journal of Development Studies*, 21, pp377-89

Giles, P. H., 1965, 'The storage of cereals by farmers in northern Nigeria', *Samaru Research Bulletin* 42, Institute for Agricultural Research, Ahmadu Bello University, Zaria

Hays, H. M., 1976, 'The storage of cereal grains in three villages of Zaria province, northern Nigeria', *Samaru Research Bulletin* 269, Institute for Agricultural Research, Ahmadu Bello University, Zaria

Holy, L., 1980, 'Drought and change in a tribal economy: the Berti of Northern Dafur', *Disasters* vol 4 no 1, pp65-71

Jodha, N. S., 1975, 'Famine and famine policies: some empirical evidence', *Economic and Political Weekly*, October, pp1609-23

Longhurst, R., 1977, 'Calorie expenditure and cropping patterns', IDS, Sussex (mimeo)

—1984, 'The Energy Trap: Work, Nutrition and Child Malnutrition in Northern Nigeria', *Cornell International Nutrition Monograph Series No 13*, Ithaca

—1985, *Secondary Crops, Seasonality and Women's Work: Implications for Household Food Security*, Report to FAO, Rome

—1986, *Farm Level Decision Making, Social Structure and the Introduction of a Rural Development Project in Northern Nigeria, Samaru Miscellaneous Paper* 106, Ahmadu Bello University, Zaria

Longhurst, R. and R. Payne, 1981, 'Seasonal aspects of nutrition' in R. Chambers, R. Longhurst and A. Pacey (eds.)

Longhurst, R., and M. Lipton, 1985, 'Secondary food crops and the reduction of seasonal food insecurity: The role of agricultural research' Papere presented at the IFPRI/FAO/AID Workshop on Seasonal Causes of Household Food Insecurity: Policy Implications and Research Needs, Annapolis, Maryland

Martin, M., 1985, 'Design of a food intake study in two Bambara villages in the Segon Region of Mali with preliminary findings', in A. Hill (ed.) *Population, Health and Nutrition in the Sahel*, Routledge and Kegan Paul, London

Matlon, P., 1977, 'The Size Distribution, Structure and Determinants of Personal Income among Farmers in the North of Nigeria', PhD Thesis, Cornell University, Ithaca

Moris, J., 1985, 'Indigenous versus introduced solutions to food stress', Paper presented at the IFPRI/FAO/AID Workshop in Seasonal Causes of Household Food Insecurity, Policy Implications and Research Needs, Annapolis, Maryland

Mortimer, M., 1985, 'Social responses to drought and desertification in West Africa', Seminar at University of Sussex, January 31, 1985

Norman, D. W., 1972, 'An Economic Survey of three villages in Zaria Province, 2. Input-output study: Vol (i) Text', *Samaru Miscellaneous Paper 37*, Ahmadu Bello University, Zaria

Norman, D., 1974, 'Rationalising mixed cropping under indigenous conditions: the example of northern Nigeria', *Journal of Development Studies* vol 11 no 1, pp3-21

Pingle, V., 1975, 'Some studies of two tribal groups of Central India: Part 2: nutritive importance of foods consumed in two different seasons', *Plant Food for Man*, 1, pp195-208

Rahaman, M. Mujibur, 1978, 'The cause and effects of famine in the rural population: a report from Bangladesh' *Ecology of Food and Nutrition* 7, pp99-102

Seaman, J., and J. Holt, 1980, 'Markets and famines in the Third World', *Disasters* vol 4 no 3, pp283-98

Sen, A. K., 1981, *Poverty and Famine: An Essay in Entitlement and Deprivation*, Clarendon Press, Oxford

Simmons, E., 1976, 'Calorie and protein intakes in three villages of Zaria Province, May 1970-June 1971', *Samaru Miscellaneous Paper No 55*, Ahmadu Bello University, Zaria

Turner, B., 1984, 'Changing land-use patterns in the *fadamas* of northern Nigeria', in E. Scott (ed.), *Life Before the Drought*, George Allen & Unwin, Boston

van Apeldoorn, G. J., 1981, *Perspectives on Drought and Famine in Nigeria*, George Allen & Unwin, London

Watts, M., 1983, *Silent Violence: Food, Famine and Peasantry in northern Nigeria*, California University Press, Berkeley