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Agriculture and Food Security in Ethiopia

Nicholas Winer

Food security in Ethiopia is discussed in the context of the repeated famines and the international responses both to them and to the socialist agricultural policies being pursued by Ethiopia. Increasing concern has been expressed by the international donor community regarding the ability of Ethiopia to absorb development funds without a major shift in emphasis in agricultural policy-making. The background to Ethiopia’s present vulnerability is shown both in terms of the size of the vulnerable population and in terms of the poor performance of the agricultural sector in the last decade. The author looks at the present agricultural and marketing policy reforms and questions whether they are sufficient to generate the sort of international response needed to create the level of food security that would be required to avert future famines.

Food security in Ethiopia is a subject of continuing importance given the historical experience of repeated drought and famine. By the 1980s the scale of Ethiopia’s vulnerability to the vagaries of the weather had become a matter of periodic international attention and concern. Government attempts to cover up the extent of the famine in 1973 and 1974 in the northern region of Wollo are felt to have contributed to the downfall of the Imperial regime. Famine and its management had become a political issue. The famines of the 1980s have taken place against a backdrop of continuing civil war and thus they too have their political dimensions.

Although the public’s attention was focussed on the major relief efforts of 1984/5 and 1987/8 there has in fact been a continuing need to provide emergency relief in the form of food. Table 1 shows the breakdown of food aid from 1985 to the projections made by the World Food Programme for 1988, including the importance of imports to the national food picture.

The figure for 1988 is unlikely to be reached due to the problems caused by the civil unrest in the northern parts of Ethiopia. It now appears that around 670,000 mt. is predicted to be distributed during the year as a whole. This is based on a difference of 64% between what was actually distributed in the first quarter of 1988 and the amount that was planned for distribution (WFP, 1988).

This enormous emergency food aid requirement sits on top of the considerable food deficit which exists in years of normal rainfall and food production. For the first half of the 1980s this deficit stood at around 350,000 mt. p.a.. This was based on a five-year average of food production for the normal seasons 1979/80–1983/84 of 6.2 million mt. which, set against consumption needs for the same period of
6.55 million mt., shows an estimated annual deficit of 350,000 mt. (UNEPPG, 1987). This deficit will increase annually as the growth in food production during the 1980s has not been able to keep pace with the 2.9% p.a. population growth.

Thus even under optimum conditions the country itself has a large food import requirement. At the individual household level, food insecurity is manifested in various ways. National food consumption figures (see Figure 1) indicate that a vast number of Ethiopians, although having access to food, do not actually have a bare minimum diet as recommended by the Food and Agricultural Organization of the U.N. (FAO). These people for whom malnutrition is chronic, possibly numbering more than 14 million, comprise the largest single group suffering from food insecurity in Ethiopia. Emergency food aid is not designed to alleviate this problem.

The problem is a structural one, which is best solved through government action supported by adequate levels of development assistance. The problem itself can be broken down into two major parts. Firstly food itself needs to be available whether through local production or importation, and secondly, individuals must be in a position to acquire the necessary food. There are thus problems of both availability and income which need to be addressed.

How any government decides to address these issues can determine the levels of assistance made available. Donors to a programme initiated by a government will look at it in terms of their own policy positions on such issues. For the Ethiopian government, with its avowedly radical Marxist policies, this has resulted in a lower level of external assistance, particularly from the industrialised West, than the Government had been seeking.

The political context of working in Ethiopia therefore dominates all other issues for those interested in the development of the agricultural sector. The framework of government and the policies it pursues provide the boundaries within which work is or is not possible. Despite the complete overthrow of the feudal capitalism of the Imperial regime, the condition of the Ethiopian peasant seems hardly to have changed under the new regime.

Despite its aspirations and rhetoric the post-revolutionary government of Ethiopia has managed to move from a commitment to the poor in general to one in which the
At 2 rates of annual growth in output and with 2 rates of per capita consumption p.a.

- Deficit at 1.0% growth and 185 kg consumption p.a.
- Deficit at 3.25% growth and 185 kg consumption p.a.
- Deficit at 1.0% growth and 140 kg consumption p.a.
- Deficit at 3.25% growth and 140 kg consumption p.a.

Based on 1981–84 production averages of 6.7 m. mt. p.a. [Source: CSO & IBRD]

**FIGURE 1** Ethiopia – Projected Grain Deficits to the year 2000

interests of consumers are favoured over producers. That this is a relatively widespread trend amongst the smaller developing nations has been noted by, amongst others, Colburn (1986) and I.B.R.D. (1986). This has led to the vistas that were opened up in Ethiopia by the radical land reform programme becoming obscured and then compromised by the political need to ensure adequate levels of food availability for the urban centres, the civil service and the armed forces.

Currently the per capita availability of grain is falling as the growth in population outstrips any growth in food production. This trend has been evident for about a decade. USAID estimate that per capita availability of grain has dropped 22% in the last 10 years (Faught, 1987). This will inevitably continue to be the pattern unless net food production, including imports, can rise at faster than the 2.9% p.a. rate of population growth. Recent economic growth, despite surges in periods immediately following drought years, is less than 2% p.a. thus leading to greater and greater levels of impoverishment. A new time series for the 14 years 1974–88 shows zero growth in food production, heavily influenced by the chaotic aftermath of the revolution (1974–78) and by the drought and hostilities from 1983 to 1985 (Payson, 1988).

Investment in agricultural development has continued unabated throughout this period but appears to have made little impact. This is in part due to a bias towards State Farms, export oriented agriculture and capital intensive schemes, as opposed to programmes in support of the small farmer (Payson, 1988). Ambitious planning and food production targets must therefore be seen as out of place at a time when all efforts should be put to ensuring...
that the gap between consumption needs and food availability can be held at the traditionally manageable levels of up to 350,000 mt. a year.

Clearly change of one sort or another is urgently needed. The highlands are overpopulated and more and more land holdings are becoming less and less able to provide even self-sufficiency. A favourable climate, a relative absence of pests, fertile soils, available water and the seasonality of cropping all contribute to a preference for the highlands. The Ethiopian Highlands Reclamation Study funded by the World Bank and executed by the FAO in 1985 estimated that although the highlands of Ethiopia covered 536,000 square kilometres or 44% of the country, they contained 88% of the human population and 66% of the country's estimated 70 million livestock. This densely populated area represents about 95% of the regularly cropped land and 90% of the country's economic activity. The highlands were defined as those areas above 1,500 metres with their associated valleys (FAO, 1986).

Soil erosion rates are so severe that the report claims that "today's children will see one third of the highlands incapable of sustaining cropping while the population trebles in their lifetime" (quoted in UNEPPG, 1987). Such an extrapolation suggests that a tripled population of around 122 million people could eke out a living on such a greatly reduced land area. Under present conditions this is not a tenable view.

The Government has effectively demonstrated that voluntary resettlement is not an option capable of making a significant contribution to the resolution of this problem. Resettlement of one sort or another has been considered as a possibly important component of any solution to the perceived over-population of the Ethiopian highlands. However recent experiences have shown that there is a great reluctance on the part of most of the rural communities to leave lands that they have lived and worked on for generations. The Government has recently commissioned an enquiry into the resettlement programme that is intended to cover the views of those living in the highlands, the means by which the programme has been carried out and its chances of success in the chosen resettlement areas. The report should be of great interest if it is ever published.

The issue of greatest importance remains how to address the problem of the dramatic decline in the per capita availability of food grains. The peasant farmer has little or no encouragement to improve yield per unit area. The farmer's ability to invest in his/her holding is severely curtailed by a bewildering variety of demands on income or grain surpluses such as they may be. It has been estimated that small holders now pay more to government collection agents than they did under Haile Selassie (Cohen and Isaksson, 1987.).

Government revenue from taxation sources rose from 592.7 million birr in 1974/5 to 1,674.5 million birr in 1984/5 (World Bank, 1987). Normal rates of taxation are added to by demands for further sums such as War Tax, Famine Tax, dues to the Peasant Association, contributions to community based services, supply of materials and labour for infrastructural development, lost time attending compulsory meetings and enforced grain or pulse deliveries to official monopoly purchasing agencies, such as the Agricultural Marketing Corporation or the Oilseeds and Pulses Corporation.

For many farmers it would be easy to make the case that there is little reason why they should increase output above that needed for subsistence. The agricultural sector represents 80% of the employment in Ethiopia and its viability is thus crucial to the economic position of the country; more especially as it also
contributes 85% of the export earnings. Yet the entire sector is characterised by:

- Over taxation,
- Low producer pricing for commodities delivered to the Government marketing agency (AMC),
- Enforced quota deliveries,
- Restrictions on grain movements,
- Restrictions on licensing traders, and
- Restrictions to the freedom of traders to sell.

Under these conditions marketed food surpluses and disposable incomes are so low as to lead to chronic under-investment at the farm level. If the farmer can see little reason to invest, it is difficult to see on what grounds aid agencies can encourage investment in the agricultural sector.

The drought of late 1987 came at a time when the agricultural strategy of concentrating all new resources in the 31 awrajas (provinces) designated as surplus producing had only just been unveiled. The current agricultural debate as to whether the Government’s reforms in the fields of agricultural pricing and marketing, announced in December 1987, are meaningful or not needs to be set against the overall targets of the Government. These include self-sufficiency in food production by 1994.

One aspect of the promotion of this strategy was that more fertiliser was distributed for the 1987/88 cropping season than possibly ever before. The returns on this investment during a period of drought were poor indeed. The consequences in terms of access to future credits for ‘input’ supply for farmers who cannot repay these loans may be serious and may also jeopardise the future ‘input’ supply programme as a whole, to the extent that new supplies may only be available to those who have repaid earlier credits. This in turn may create an ever-growing group of increasingly marginalised farmers, who will fall outside the scope of credit-based supply programmes.

The issue of incentives is clearly crucial, yet difficult to assess. It lies at the heart of the debate taking place within and between donors and the Government. There are the normal economic incentives of the market place around which negotiations between the Government, the World Bank and the EEC revolve. There are also the socio-economic conditions created by the revolution and which are equally difficult to assess and discuss as they fall under the ban of being ‘political’.

Under this second group it has been noted in a study of a conservation programme in Hararghe involving terracing and tree planting that “some intensification of labour would be possible if it was in the peasants’ interest” (Galizia, 1986). The gap between what the peasant sees as in his or her interest and what the Government believes is in their interest is widening at this time.

The land is not held by any individual with any security of tenure. Land tenure thus remains the key to peasant motivation. For most people in the rural areas a multiplicity of landlords has simply been replaced by one; the Government. The Government instituted its land reform programme though the creation of Peasant Associations in 1975 under the Rural Land Proclamation. All rural dwellers are now theoretically members of such an association. These associations were set up to “distribute land to former tenants and landless persons for personal cultivation, and to handle the economic and social problems inherent in the radical agrarian-reform programme” (Schwab, 1985).

The size and position of a family’s holding is constantly at risk of change as children grow up to press their claims, and individuals enter or leave a Peasant Association, causing adjustments to be made in the interests of an equitable distribution of land. It is further at risk
whenever a Producer's Cooperative is formed. This demands a contiguous block of land and results in a redistribution of land within the Association in order to hand out land to those who have lost theirs and at the same time to redistribute the holdings of those who have opted for joining the Producer’s Cooperative.

Yet “Secure tenure and rights to resources and adequate livelihoods are prerequisites for good husbandry and sustainable management” (Chambers, 1987). When this is not the case, it is difficult to look at long term strategies requiring not just a commitment to the land on the part of the farmer, but also a commitment to significantly increasing food production.

At the same time, the issue of determining what constitutes effective market incentives is also fraught with difficulties. The food supply requirements which reforms are expected to address can be seen in Figure 1, which shows varying levels of national food deficit at two different rates of economic growth, and assuming two different levels of food consumption. It is worth noting that growth rather than stagnation or decline is presumed, and that the levels of food consumption represent the current national pre-drought average and the much higher FAO-recommended minimum acceptable level.

It is also worth emphasising that problems of low production and of low effective demand pre-date the current Government. They therefore cannot be seen solely in the context of the tenurial problems thrown up by the post-revolutionary Government. In 1973 the Ministry of Agriculture felt that “within the agricultural sector the most significant weakness for development has been the absence of an efficient agricultural marketing system which can stimulate both output and consumption simultaneously”. This in 1973 was further complicated by the imbalance in the relationship between producer prices and consumer prices. In 1973 “low producer prices relative to those charged to consumers in the metropolitan areas” were felt to be the major agricultural marketing problem of the time (IEG/MoA, 1973). The same comments could well be made today.

It is against this background of continuing debate about how to respond to the poor performance of the agricultural production and marketing sectors that the reforms of December 1987 need to be seen. Under them producer prices paid by the AMC are set to rise by an average of 7.7% (Fraught, 1988). This increase will not however catch up with the fall in real incomes since the revolution. A reduction in the number of check points along the roads is also proposed, which should encourage greater movement for commodities. The Ministry of Domestic Trade will also renew private traders’ licenses. This last move should not be taken at this stage as anything other than a return to the status quo ante. The quota for the issuing of licenses has not been fulfilled for a number of years. The World Bank has been given to understand that what is intended is the issuing of licenses up to the previously set limit. These licenses are being issued at the regional level.

The AMC quota will be “scientifically” levied and will not exceed its capacity to market. Traders who receive licenses will also be allowed to appoint five agents each and will not have to pass on their entire purchases as was previously the case. The AMC will require 50% of a trader’s total volume of purchases to be passed to it and the Oilseeds and Pulses Corporation will require 25% of total volume to be passed onto it at fixed prices. The peasant is authorised to sell any surplus on the free market once he has met the AMC quota and within the restrictions imposed on internal travel. A Price Review Institute is also to be set up.

These changes raise a number of immediate questions which would need
to be answered before an assessment of their value can be made. These principally concern the importance that the Government intends to give to:

- Allowing peasant incomes to increase by not increasing current taxation levels,
- Allowing a sufficient number of licenses to be issued to stimulate a regional grain trade,
- Considering the varying supply and demand conditions in different urban and regional markets and their effects on prices, and
- Ensuring that competitive conditions are created or maintained, in order to limit distortions which may arise from abuses of market power by limited groups of licence holders, operating in partnership with local officials.

Despite the uncertainty surrounding these questions, the changes have generally been welcomed internationally as something of a breakthrough. The Government has been keen to unlock considerable EEC and World Bank funds and is considered to have compromised on its earlier positions in order to do so. The World Bank is already committed to releasing $300,000,000 over a two-year period in response, providing that their monitoring conditions can be met. This last is still in some doubt. The EEC and the World Bank whilst going forward with the release of funds are thus also showing considerable caution. Funds are only being made available in installments and it will be two years before Lome IV, the next in the series of conventions which determine EEC aid, will be negotiated.

That this caution has to some extent been justified can be seen by the recent statements issued during the 9th Plenum of the Workers Party of Ethiopia (effectively the Government) held in November, 1988. The meeting, chaired by President Mengistu, offered little that could be interpreted as supporting the early optimism that accompanied these limited policy reforms. Although the collectivised sector was criticised for its poor performance it was once again heralded as the way forward. Priority is, in the future, to be given to collectivising those awrajas designated as surplus producing.

This will directly challenge those donors who have invested in a policy dialogue with the Government in the hope of freeing up on some of the constraints to increased production in the agricultural sector, as well as creating increased requirements for emergency assistance. How the major donors respond to this challenge is likely to have an important impact on the levels of development assistance made available to Ethiopia over the coming years, and possibly also on their willingness to contribute to future relief food needs.

References


FIGURE 2 Republic of Chad. The SAP covers the zones situated over the eleventh parallel.

AREAS COVERED BY THE SAPs

Figures 1 and 2 show the areas covered by the SAPs in both countries. Administrative subdivisions of Chad (total population: 5 million) are called “Préfectures”, “Sous-Préfectures” and “Cantons”. A “Canton” contains an average of 13,000 people and the SAP incorporates 192 of them, covering a population of about 2.5 million people. Administrative subdivisions of Mali (total population: 7.1 million) are called the “Regions”, “Cercles” and “Arrondissements”. An “Arrondissement” contains an average of 26,000 people and the SAP covers 168 of them, which represents about 4.4 million people.
The “Systèmes d’Alerte Précoce” – the SAPs – of Chad and Mali have been in operation since April 1986. Their purpose is to forecast (or more realistically, detect as early as possible) food shortages in the drought-prone areas of each country. They are based on a multidisciplinary strategy, taking into account all relevant phenomena, from meteorology to nutritional status, and are implemented through the governmental networks. The present experience shows that, compared with the devastations due to famine and the cost of emergency food aid, they are not that expensive and they seem sustainable over the long term.

"Faultless" prediction is not yet the rule, but several procedures permit progressive improvement in the ability of the systems to analyse and interpret.

This paper explains the functioning process of the SAPs and presents several operational results. Additionally, it covers innovative concepts that have proved to be successful, such as the “participative information network”.

INTRODUCTION

In 1986, two Sahelian countries – Chad and Mali – decided to install a food and nutrition surveillance system (FNSS) in the drought-prone areas. Like other African countries, both experienced severe famines in 1972–73 and in 1984–85. The FNSS had to respond to three main problems.

First, when food aid is required, it has to reach the affected areas in time. Therefore, prediction, or at least early detection of food shortages, must be possible to ensure that relief operations be launched in time to avoid famine. In 1984–85, food relief arrived late, when famine already prevailed (Pons, 1986). Early detection (or prediction) makes possible early intervention, which is more effective than catch-up operations executed under crisis conditions. Without timely detection, food aid may arrive so late that it is no longer necessary. In October 1985, late-arriving relief grains competed with the local new harvests and contributed to the collapse of cereal prices. Hence, in order to help the recovery of the agricultural sector, a FNSS should be able to determine when food aid should be curtailed (Hervio, 1987; Jost, 1987).

Second, even if the emergency food aid needed is accessible (e.g. security
FIGURE 1 Republic of Mali. The SAP covers the zones situated around and over the fourteenth parallel.

stocks, rapid transportation from abroad), beneficiary communities must be identified and the timing of initial and subsequent distributions arranged. Thus, prediction or early detection must be valid for small-scale geographical entities: which population is going to face food scarcity and when? Detection must also be sensitive to the severity of a food or nutrition problem and able to observe the impact of the interventions.

Third, food shortages are usually met with emergency food aid. More developmentally oriented and community-based alternatives should be attempted in order to lower the vulnerability to food crisis. Furthermore, recurrent food shortages, even when they do not become famines, cause economic hardship and financial losses (e.g. selling cattle at low prices in order to buy cereals which have become expensive). Because they provide critical information in a timely fashion, FNSS may help the identification of more "structural" responses (Anderson and Woodrow, 1988; Mason et al., 1984; Clay and Everitt, 1985). Such responses are impossible when a food crisis is already in process.

In Chad and Mali, the FNSS are called "SAPs" (for Systèmes d’Alerte Précoce). This paper summarizes the operational and methodological lessons learned after two and a half years of project experience in those two countries.¹
AREAS COVERED BY THE SAPs

Figures 1 and 2 show the areas covered by the SAPs in both countries. Administrative subdivisions of Chad (total population: 5 million) are called "Préfectures", "Sous-Préfectures" and "Cantons". A "Canton" contains an average of 13,000 people and the SAP incorporates 192 of them, covering a population of about 2.5 million people. Administrative subdivisions of Mali (total population: 7.1 million) are called the "Regions", "Cercles" and "Arrondissements". An "Arrondissement" contains an average of 26,000 people and the SAP covers 168 of them, which represents about 4.4 million people.
In Mali, the areas covered may be divided into three different zones: the "sudano-sahelian" zone, around the 14th parallel, mainly populated by cultivators; the "sahelian" zone, around the 15th parallel, populated by a mix of cultivators, pastoralists, fishermen and agro-pastoralists; and the "sahelo-saharan" zone, north of the 15th parallel, populated mainly by pastoralists. In Chad, two zones have been defined: the "sudano-sahelian" zone, between the 11th and 13th parallel; and the "sahelian" zone, north of the 13th parallel.

**BASIC ASSUMPTIONS**

The SAPs are based on a concept which we call "rising-risk monitoring". In every population there exist food and nutritional balances. These balances are highly dynamic and depend on many factors, from food production and purchasing power to infectious diseases. A distinction has to be made between food balance, which represents the ratio between food availability and food needs, and nutritional balance, which represents the relation between individual food intake and nutritional status. We say that a "food risk" exists when the food needs of a population are not fulfilled and that a "nutritional risk" exists when the lack of food at the individual level negatively affects the nutritional status. Some important nutritional risk factors are not directly food-related: for instance infectious diseases or family behavior towards the children. A deterioration of the nutritional situation is generally accompanied by a rise in the mortality rates.

We make a further distinction between the factors able to influence food and nutritional balances. Figure 3 shows this distinction. "Aggressive factors" (AF) include the phenomena adversely affecting these balances. "Buffer factors" (BF) include all the possible mechanisms that individuals or families or regions or countries can develop to prevent or counteract
"NORMAL" SITUATION
AF = 0 and/or BF strong
sufficient food availability

SITUATION "UNDER SURVEILLANCE"
AF = † and/or BF fragile
sufficient food availability

SITUATION "AT RISK"
AF = ‡ and/or BF deficient
Food availability in families
still sufficient but with adaptations

"FOOD CRISIS"
AF = ‡‡ and/or BF ineffective
Familial food availability \downarrow
economical losses +

"NUTRITIONAL CRISIS"
Individual food consumption becomes
very deficient and the nutritional
status deteriorates
mortality tends to †

FAMINE
"Outbreak" of malnutrition
and apparition of vicious circles
mortality ‡‡

FIGURE 4  Schematic representation of the
evolution of a food and nutritional situation from
"normal" to "famine" (AF = aggressive factors and
BF = buffer factors).

the effect of the AF. Hence, food and nutritional balances will be influenced by the impact of the AF and the capacity of the BF to maintain the balance. A food or nutritional crisis is more likely to appear if AF are strong and BF are weak. Food price may determine the success or failure of certain BF. Financial resources may become insufficient to buy foodstuffs if their prices rise. Moreover, local perceptions create new realities: certain AF, such as a rainfall deficit, may cause price hikes, even when real food availability remains more or less unchanged.¹

A "food crisis" occurs when food availabilities become inferior to the food needs. Similarly, one will speak about a "nutritional crisis" when the nutritional status of individuals deteriorates. A famine may be considered as an outbreak of malnutrition associated with the occurrence of miscellaneous demographic or economic vicious circles aggravating the situation. An example of the latter are massive displacements of people. A food shortage may force people to move. Significant numbers of hungry people arriving in neighboring villages only marginally better off, quickly deplete available foodstocks and provoke an increase in the food prices. This pressure on food availability in the reception zones may in turn engender a food shortage. Figure 4 summarizes the different stages leading from a "normal" situation to a famine one. The boundaries between the stages are not always clearly defined, but such a classification facilitates our comprehension of the events preceding a famine.

We are conscious that the classification of phenomena into AF and BF is somewhat rudimentary, and that the classification of a specific factor as AF or BF may be arbitrary. Nevertheless, these concepts provide an analytic framework with which to tackle the complex reality of the food and nutritional problem, and many of them have already been suggested
by other authors (Cutler, 1984 and 1985; Dirks, 1980; McCorkle, 1987; Pacey and Payne, 1985; Rivers et al., 1976; Seaman and Holt, 1980; Sen, 1981; Torry, 1984).

To summarize, the “rising-risk monitoring” is a framework to assess and follow up the level of risk to which a group is exposed. Figure 5 graphically represents such an approach. AF and BF may combine, and the subsequent interaction might exacerbate or cancel out their effects. Early detection and forecasting are made possible by the existence of associations between certain phenomena (or pattern-combinations of phenomena) with the occurrence of food or nutritional crisis. Phenomena may occur simultaneously with the crisis and therefore require early detection; or they are early warning signals which facilitate prediction.

Interventions are possible at very different stages of the evolution of food and nutritional conditions and may concern very different aspects. Emergency actions are likely to be designed to combat particularly menacing AF (e.g. grasshoppers) or the nutritional crises (famine relief actions). Development-oriented actions (structural interventions, rehabilitation) are more likely to concentrate on the reinforcement of the BF and the prevention of the AF.

METHODOLOGY

The SAPs are completely integrated within governmental structures and operate through the governmental networks of national technicians and administrators up to the level of the Canton or the Arrondissement.

Indicators

Usually, an FNSS is based on the use of “indicators” related to the fluctuations of the food and nutritional conditions. An abundant literature has evolved about the usefulness of various indicators (Autier and Ronsmans, 1984; Cutler, 1985; Lechat and de Ville de Goyet, 1977; OMS, 1976).

In Chad and Mali, the selection of the indicators has been made according to past project experiences and the existing literature. Because of our “rising-risk monitoring” orientation, the first goal was to gather a set of indicators covering all the important domains concerned with food and nutritional conditions. Each domain did not have to be covered in depth but, as far as possible, all the
relevant aspects within a specific domain had to be appraised in order to achieve a consistent monitoring system. From the beginning, the SAPs have scrutinized the properties of the indicators. Our primary concerns were: 1. relevance (is the indicator related to food or nutritional problems?); 2. usability (can it be easily applied?); and 3. reliability. This permanent evaluation process has led to occasional modifications of the indicators.

**General organization of the SAPs**

The SAPs are organized into three different phases. Phases 1 and 2 involve a continuous but simple monitoring of agronomic, economic and behavioural phenomena at the level of each “Arrondissement” or “Canton”. Phase 3 is a field survey whose purpose is to verify and specify the results of phases 1 and 2.

Phase 1 is focused on the quantitative measure of rainfall and river levels (in Mali), and on the qualitative monitoring of crops and grazing patterns. Crop data are collected through four questionnaires filled in by the administrators and technicians of each Arrondissement or Canton. The first questionnaire is completed by the end of July; the second by the end of August; the third just before the harvests (end of September); and the last one during or just after the harvests (October). Questions vary according to the passage of the rainy season. They are usually qualitative and analogical, for instance: “are the harvests expected in your area better, equal to or worse than last year?” or “does the rainfalls seem sufficient, not quite sufficient or very insufficient for the crops?”, or “how many months of grain needs will this harvest cover?”. Data about rainfalls and river levels are collected in collaboration or through the national meteorology and hydrology services. They are collected daily and synthesized monthly.

Information is also collected about some very important wild cereals or vegetables and about the cultivations starting at the end of the rainy season (rice, vegetables, certain varieties of sorghum).

Phase 2 examines: 1. demography (migrations of men or whole families of cultivators; nomadism); 2. markets (retail prices of cereals, approximate quantities offered, prices of cattle); 3. food habits (unusual changes in the daily food quality and possible consumption of toxic food); and 4. the food reserve levels. The latter is only performed for the stocks of governmental or international organizations, since reliable and accurate assessment of private stocks (commercial and households) on a regular base is impossible (even with ample means).

Data is collected monthly in all the Cantons and Arrondissements by means of questionnaires. These are filled out by the same technicians and administrators as in phase 1. Questions are usually qualitative. Only the market indicators are quantitative. At the level of the Sous-Préfecture or Cercle, market data are collected, in Chad, by a person hired by the SAP, and in Mali, by a member of the governmental administration.

If any deterioration of the food condition is detected (or forecast) by phases 1 and 2, then phase 3 is launched. Phase 3 is a field survey which aims to verify the detections or predictions of phases 1 and 2, evaluate the state of household resources (food stock, incomes, assets such as cattle), and assess the nutritional status of the population. Generally, phase 3 is applied at the level of the Arrondissement or Canton. It is also used to assess the impact of the interventions.¹

Family resources are very important BF but it is very difficult (and even impossible) to estimate them correctly through a surveillance process like phase 2. Socio-economic surveys yield
better information but they are time consuming and often are difficult to interpret. For this reason, we devised a rapid and indirect assessment method for household resources. A family questionnaire is constructed as follows: 1. it begins with a question about what the family members ate the previous day; 2. Among the foodstuffs consumed the previous day, which appeared as the more indispensable for the family?; 3. Where did these indispensable foods come from (family reserves; bought on the market; recent harvest; donation from other people or organizations?); 4. If they were purchased, how did the family get the money (work; commercial activities; sale of a cow; begging?). The amount of income actually earned is never asked. Only the kind and the number of sources of income are surveyed.

The level of acute malnutrition among children from six months to four years of age is used to indicate the nutritional status of a population. Acute malnutrition is defined as a relationship of weight to height less than 80% of the NCHS/CDC/WHO reference median.

During such surveys, other problems may be explored such as suspected avitaminosis A problems, the recent apparition of "camps" of displaced
people, the effects of grasshoppers.

The phase 3 surveys are implemented on samples of 450 children and 210 households. Samples are first degree cluster samples with 30 clusters of seven households and fifteen children.

On average, a phase 3 survey takes two weeks, one for the survey itself and a second for data processing. At the beginning of the projects, the phase 3 surveys were performed by one special team attached to each project. Currently, they are performed by two mobile teams of the Ministry of Health in Chad, and in Mali, by mobile teams of the regional representation of the Ministry of Health and Social Affairs (one team per region). Supervision of the teams is still ensured by the SAPs.

Functioning of the SAPs

To facilitate the explanation, only the case of Mali is described below (that of Chad is very similar). Figure 6 summarizes the flows of information within the system.

Once every month, when data have been collected in the Arrondissements, the questionnaires are sent to the head town of the Region by any possible means.

At Regional level, a first analysis of the data is performed once every month by a regional SAP working group. This group is constituted by all the regional services concerned with food and nutrition problems and by the Regional SAP Representation (RSR). The RSR has to facilitate the functioning of the SAP within a Region and to help at the first analysis and interpretation of the data. A Regional SAP Report is established and sent to the central SAP office of the capital and to the Regional authorities.

In the capital, the SAP headquarters analyze, interpret and synthesize all the information. Information and analysis coming from the governmental services in the capital are taken into account. A draft of the Monthly SAP Bulletin is produced and first distributed to several national services and authorities as well as to some donor agencies or NGOs particularly active in the field of food security or nutrition. Then, these organizations discuss the draft during an official meeting called the National SAP Working Group.

Just after the meeting, the final version of the Monthly SAP Bulletin is printed and sent to all the governmental, national or international organisms as well as to the Regions, Cercles and Arrondissements. A bulletin usually comprises a summary of the most salient events and trends of the past month, the recommendations for action, a view of the food and nutritional conditions prevailing in each Cercle, the phase 3 survey results and any particularly relevant information such as the rainfall levels during the wet season. A bulletin is not a mere sum of facts, and comments or analysis are significantly present. Each month, 450 copies of the bulletin in Mali and 300 in Chad are distributed. The whole operation, from the data collection till the distribution of the bulletins takes a maximum of 3 weeks.

Regular verification of the reliability of the SAP data is ensured by the phase 3 surveys, by the supervision tours of the Regional SAP Representative, by the Regional SAP Working Groups and by the active collaboration of the technical services. From time to time, seminars and meetings facilitate the discussion about how to ameliorate information quality and reliability.

Interpretation of the information

For phase 1 and 2, the analysis process is based on the evolution of the AF and BF. The objective at this point is to assess whether AF tend to accumulate and how BF are behaving. The more a food (and nutritional) crisis approaches, the more
these phenomena tend to combine their effects and appear "unusual".

To assess if a phenomenon is "unusual" one has to compare the current data with:

- baseline data, for instance, the yearly variation of the millet prices or of the population movements. With baseline data, for a given area, it is possible to compare changes from one year to another or to compare the current localized developments with the circumstances of a larger geographical zone;
- information relative to neighbouring areas with the same eco-system;
- structural information; for instance, if phase 1 shows that in a given area the rice harvests have failed but if the structural information proves that rice is usually a minor food resource, then the failure may not be considered as a real threat.

Gathering of baseline and structural information is a continuous process: the SAPs, through their longitudinal and regular collection of information build databases that enable the SAPs progressively to improve analysis and interpretation of data. This process has been called the "progressive refinement of analysis and interpretation".

During the rainy season, judgement about the development of crops and harvest expectations rest on the following considerations:

- the rainfall levels plus (in Mali) the river levels;
- the subjective satisfaction of the technicians and administrators in the Cantons or Arrondissements about the crops' development; the comparison of their current growth with the previous year and with a reference year when harvests were considered as satisfactory; the average number of months of food needs that will be covered by the present harvests. This information takes into account not only the traditional cereals (millet, rice, sorghum) but also some wild foodstuffs (e.g. the "fonio" or the "cram-cram");
- the observation of food prices, mainly for cereals. Usually, if the harvest expectations are optimistic, grain prices tend to diminish before the harvests. Usually also, prices after the harvests decrease. The magnitude and length of the decrease may vary considerably from one area to another according to the actual food reserves of the families after the harvests. Some families, even if they have had good harvests, may have poor food reserves because a great part of the cereals had to be sold in order to pay off previous debts or taxes. On the other hand, poor harvests may be counterbalanced by good food reserves set aside in the previous years and consequently lead to a better food situation than the current harvests would lead us to expect;
- the observation of migration patterns. If harvest expectations are pessimistic, then usually one observes early departures of young men before the harvest. If the short term food situation of the family is threatened by poor harvests (and when concurrently other assets or food reserves of the household are deficient), then the whole family may move prematurely.¹

It is already possible to have an idea of the most "at risk" Arrondissements or Cantons by August. This is accomplished by considering the set of indicators presented above, plus the food conditions that prevailed during the previous year.

Interpretation of phase 3 data will be explained more comprehensively in a further article.¹ For the purpose of this paper, stated simply, the analysis con-
siders the distribution of good incomes (revenue able to feed a whole family) and of food reserves within the sample of households. Attention is paid to the families that have to buy their food and to the number and quality of incomes. The quality of the revenues is determined thanks to studies that estimated the possible income one could gain from a specific activity (e.g. Hesse, 1986; Davies and Thiam, 1987).

In the absence of previous data, the level of 10% of malnourished children in the age group from six months to 4 years 11 months is taken as the cut-off point from which we consider that acute malnutrition becomes a significant problem (UNHCR, 1982). This cut-off point also represents the limit between a food and a nutritional crisis.

Information about "exceptional" facts and phenomena is also taken into account, e.g. the establishment of a "camp" of displaced people.

RESULTS

Operational results

The first result of the SAPs is certainly the "participative information network" they have been able to foster. At each level of the network, information is discussed and opinions exchanged. A "conveyor-belt of information" has been created and it is now possible to compare what is going on in the different areas of a country. Most of the information needed already existed (actually or potentially). The main work was to standardize it, to improve its reliability and usability, to support a network of collection and transmission of data as well as develop analytic procedures and interpretation frames. In 1987, in Chad 94% of the questionnaires of phase 1 and 2 were filled out and in Mali this proportion was 80%. Interestingly, in Mali, the Regions situated one thousand kilometres away from the capital had better collection and transmission records than the one situated nearby the capital.

The constitutions of reference baselines and of structural databases represent another significant result. Many baseline data did not exist before and had to be gathered by the SAPs. The already existing baseline data were related to agrometeorology and several market data, the latter being usually of limited geographical significance. The structural information existed more fully but had to be standardized and completed. Figure 7 shows the comparison between 1986 and 1987 of the harvest results in Mali. These results are simply the computation of answers given by each Arrondissement in phase 1. As in many Sahelian countries, the harvests of 1987 were worst than in 1986. In 1986, less than 11% of the Arrondissements had reported insufficient or very insufficient harvests. In 1987, this proportion rose to 48% (this does not mean that 48% of the Arrondissements actually experienced food problems since other resources existed, mainly the food reserves gathered the previous years).

Figure 8 shows the variations of the average millet prices in the 29 principal markets of the areas under surveillance in Mali. The average prices are lower in the southern producing areas (sudano-sahelian zone) than in the north, where millet production is less prevalent (sahelo-saharan zone). The harvests of 1985 and 1986 were considered to be generally very good and, as a result, the prices declined after November 1986 and stayed at a low level for at least 14 months. In 1987, the rainy season was insufficient in many areas and harvest expectations in September were not as optimistic as in the two previous years. But thanks to the good food reserves accumulated before, the millet prices rose only slightly during
FIGURE 7  Republic of Mali. Number of Arrondissements covered by the SAP, whose harvests, in 1986 and 1987, were considered "good" (with excess of production), "sufficient" (covering the needs of the year), "insufficient" (cover between four months and one year) or "very insufficient" (covering three months or less). The results involve 148 Arrondissements (the Arrondissement of Kidal is not represented) and concern the millet, sorghum, rice and wild "fonio" or "cram-cram".

FIGURE 8  Republic of Mali. Variations in the average millet prices on the main markets of the three zones covered by the SAP, from November 1986 to September 1988. The average prices for Mopti Region are also represented. Prices are indicated in FCFA per kilogram (1 ECU = 343 FCFA).
the rainy season of 1987. After the 1987 harvest, the price diminution observed in November and December was short-lived and from January 1988 on, a steady rise in prices took place and continued up to July. The wet season 1988 was very good, and consequently the prices began to fall before the harvests, in August. Price fluctuations for Mopti Region are also represented in the graph. Mopti experienced the worst crop results in 1987. One can see the prices rising more rapidly in that Region during the 1987 wet season and they even surpassed the average prices for the entire sahelian zone.

Figure 9 represents the monthly evolution of the proportion of Cantons reporting departures of whole cultivator families in Chad. Departures are more likely to occur just after the harvests or before the rainy season. During the rainy season, people prefer to cultivate (when possible) and migrations are rare. Because the harvests of 1987 were worse than in 1986, the level of departures was higher in 1987 as a result of more families moving south in search of food and revenues.

Almost the same characteristics of price and of migration variation have been observed in Chad and Mali.

Results from the surveillance

Figures 10, 11 and 12 concern the Arrondissement of Balle, situated in the Sahelian zone of Mali (Figure 1) and which experienced a food and a nutritional crisis in 1986–87. This was due to the fact that the actions recommended by the SAP were not executed. This situation thus represents a “failure” of the SAP in the sense that, even though the crisis was forecast and detected, actions to prevent it did not take place.

In August 1986, the phase 1 reports showed that the Arrondissement of Balle (about 19,000 inhabitants) was experiencing an invasion of grasshoppers and that it had not rained for 20 days. In September, harvests were predicted to be less than in 1985 and 1985 was already not a good year!

In October, final phase 1 results indicated that families had sufficient food reserves for about three months. Conse-
subsequently, the SAP recommended that a food security stock be established near the Arrondissement before February 1987. In November, the cattle moved south earlier than usual because of the lack of grazing and water.

In December, the SAP performed a phase 3 survey. Figures 10 and 11 show the main results of this survey and of those that followed. By December, many young men had left their families to find work in the southern areas and less than 5% of the families had good incomes. Moreover, wild foodstuffs had disappeared because of the previous drought, the grasshoppers and the over-consumption. Because most of the herds had migrated far away, milk, an important food resource, had become rare. There clearly existed a food crisis but nonetheless, the nutritional situation seemed not to have deteriorated (malnutrition rate of 4.2%). New recommendations were made but only partially implemented, mostly because of logistical problems.

After January 1987, food prices rose significantly (Figure 12) and phase 2 reports consistently showed departures of families.

In June, another phase 3 survey was performed. As one would anticipate, the nutritional situation had deteriorated and a nutritional crisis had taken place (14.2% of malnourished children, comparison with December: p < 0.001). Most of the families had to buy their food (58.6%) while the prices were at their highest level. A significant proportion of the families (34.3%) could not buy food anymore and lived from charity donations (mainly from relatives or neighbours). Household food reserves were gone and one could expect a further worsening of the situation.

Paradoxically, family incomes had increased (24.6% of families with good revenues in June instead of 5.0% in January, p < 0.001). This was mostly attributable to the return of the young men with money and food (29.5% of families with one young man away in June instead of 51.5% in January, p < 0.001). The new rainy season was beginning and with the first rains, some herds were also coming back. All this
should lead to a bettering of the food conditions and the SAP did not make new recommendations.

In August, a last phase 3 survey was conducted just before the new harvests. The malnutrition rate had lowered (10.2%, comparison with June, two sided test: \( p = 0.07 \)) and more families benefited from good revenues than in June (58.0%, comparison with June: \( p < 0.001 \)). Returns of young men and cattle continued and contributed greatly to the general improvement of the situation. Furthermore, the rainy season was excellent and the grasshopper threat under control, so that lots of wild foodstuffs were newly available and the harvests were expected to be good. Figure 12 shows clearly the decline of millet prices that occurred at the end of the wet season.

When looking at the situation before June, one might ask whether, given similar circumstances, the June nutritional situation might have been worse. It is entirely possible. It is worth noting, however, that departures usually involve those families with the worst nutritional situation. Hence, preferential departures of malnourished families tend to lower the malnutrition rate.\(^1\)

ANALYSIS WITH SCORE SYSTEM

The analysis of food conditions is performed using a whole set of indicators. The levels of risk associated with the data values are compared with the baseline data, the structural information and also across similar areas. This process has two main limitations. First, it is difficult to compare between scales. How can one aggregate phenomena which have very different meanings and units of measurement (for example, prices and migrating families)? Second, not all the variables have the same importance, and certain indicators may appear more significant in certain areas than in others.

To cope with these constraints, we have devised a score system that weights the relative importance of the indicators. Of course, in the beginning, most of the weighting procedure rested on empirical considerations. But with the "progressive refinement of analysis and interpretation" process, a constant remodelling of the relative weights has taken place. The
practical procedure for setting up a score has already been discussed in a previous article (Autier, 1988a). Currently, the scoring system is mostly used for phase 2. Figure 13 shows the average scores for the three zones covered by the SAP in Mali. The higher a score, the more likely a crisis may exist. The score of the Cercle of Douentza, which belongs to the sahelo-saharan zone and the Region of Mopti (Figure 1), is also represented. This Cercle experienced bad harvests in 1986 and 1987. Its score increased dramatically at each end of the rainy seasons, mainly because of the displacement of young men and families, the consumption of "exceptional" foodstuffs and the cereal price hikes. During the 1987 wet season, its score rose more rapidly than the rest of the sahelo-saharan zone, indicating that food conditions were worse in this Cercle. The important decreases observed in March–April 1987 and from May–June 1988 are largely due to food aid distributions.

Though being a real application of the "rising-risk monitoring" method, it is essential to note that the scores are used only to aid interpretation. They are not a true diagnostic method and therefore, they are never included in the SAPs monthly bulletins.

RECOMMENDATIONS FOR ACTION

Up to now, most of the recommendations have concerned the targeting of food aid and the management of security stocks. The principal goal pursued by recommendations is to avoid food crises. Targeting of the food aid is usually made at the Arrondissement or Canton level (sometimes, targeting concerns only a part of an Arrondissement or Canton). Estimation of the food aid needs for the following year is possible at the end of the rainy season by summing up the individual needs of each Arrondissement or Canton. From August on, this latter process is based on the quality of the current wet season and the food conditions that prevailed the previous year (see the interpretation of data above). The permanent surveillance performed by the SAPs permits these estimates to be reconsidered throughout the year.

Schematically, to calculate the food aid needs, the following rule of thumb is
used: "number of persons at risk × number of months from the beginning of the food crisis up to the next local food production × 7 Kg of cereal". This amount of grain corresponds roughly to half the minimal monthly needs in cereal for an adult. If unfortunately a nutritional crisis has evolved, then 14 Kg of cereals per person as well as other actions, such as avitaminosis A prophylaxis or immunization against measles, are recommended.

By "food aid", the SAPs do not mean that this has to come from abroad and is intended for "mass distributions". Therefore, decisions must also concern the origin of the food aid (e.g. local purchases in the productive zones, triangular actions, food aid from abroad) and the way they will be implemented (e.g. emergency "mass" distributions, "food for work", market interventions, highly targeted nutritional programs).

Current discussion within the SAPs is aimed at achieving further reductions in emergency food aid and shifting project emphasis to structural actions intended to lessen the vulnerability to food shortages. First, the SAPs are studying the possibility of targeting the emergency food aids more accurately. Up to now, the targeting unit was the Arrondissement or the Canton. Correct targeting at the village (or group of villages) level is not an easy task, but it would represent an improvement in the sense that the most vulnerable population could be better reached with lower emergency food aid quantities. As a result, possible side effects of emergency food aid could also be reduced. Second, the SAPs, with many other national or international organizations, are encouraging research into alternative answers for local food problems. More and more, the basic administrative levels are involved in the decision-making mechanisms when food problems are expected. Third, the SAPs may participate in the identification of development projects which reinforce the BF and monitor their impact at local level. This latter aspect is being debated at present. Several observers think that information systems like the SAPs are not suited for participat-
ing directly in a development process and that they should focus exclusively on the early warning and management of food and nutritional crisis (Lalau-Keraly and Winter, 1988). We rather consider that thanks to the "participative information network" they support, the SAPs could facilitate the identification (not the study!) of structural projects (Autier, 1988b).

FINANCIAL AND OPERATIONAL ASPECTS

The total annual cost of a SAP is estimated at between 170 and 250,000 ECUs. These costs include logistics, production of the monthly bulletins, several salaries, computers, and the material for the collection and transmission of data. The installation costs are higher, although they may vary a lot from one country to another, depending on the territory to be covered and the existing information gathering and processing facilities. One year of SAP functioning in Mali is cheaper than transporting 1,300 tons of food from Europe to Timbuktu, a town situated in the sahelosaharan zone of Mali (European Economic Community costs figures of 1987).

Several of the SAP's procedures lower the costs of this kind of information system: for instance, the organization of the SAPs into sequential procedures limits the application of more expensive methods only to those situations when they are actually necessary. As a result, the phase 3 surveys absorb less than 10% of the total cost of a SAP. Further cost reductions are possible by transferring certain tasks to other technical services.

Currently, financial support of the SAPs tends to originate from "pools" of donors and the governments. For instance, in Mali, funds proceed from an organization constituted by the government and the majority of the international organizations present in the country. This organization is called the "Programme de Restructuration du Marché Céréalier" (PRMC) and its primary goal is to institute an efficient food commercialization system in Mali.

Past experiences showed that rapid transmission of data from the periphery to the capital always represents a vulnerable component of any information system. After two and a half years, the evidence is that sufficiently rapid transmissions are possible without any sophisticated and expensive means. Only a few radios had to be installed in some Cantons or Arrondissements where surface transmissions are impossible during the rainy season.

DISCUSSION

Acceptance of the SAPs

Prevention of food and nutrition crises is not merely a problem of detection or forecasting. It necessitates a good balance between the information, decision-making and action implementation aspects. The SAPs propose actions. But the decisions concerning their application are beyond their scope. The effective application of the SAP's recommendations is a critical issue for the viability of the system. If their information is not taken into account, the data collectors may tend to become discouraged and the system could collapse. The transformation of the recommendations into effective actions was not automatic to start with. Time was required for the decision procedures to adapt to the newly created information environment. Currently, even if the recommendations are not always followed literally as they stand, all decisions about food aid are based on the information provided by the SAPs. The SAPs have made possible a better correspondence between the food aid quantities and the actual needs (Lalau-Keraly, 1988; Lalau-Keraly and Winter, 1988) and they permit earlier interventions than a few
years ago (Hervio, 1987).

FNSS like the SAPs are not simply instruments that facilitate information gathering and analysis. Their significance may lie in the way they foster important transformations within the decision-making processes, and remodel the awareness that national or international officials have of the food or nutrition problems.

Confidence in the SAPs relies upon a widespread perception that their findings are impartial, and upon the reliability of the information they provide. Mechanisms that guarantee reliability are crucial even if they are costly. Therefore, the phase 3 survey plays a central role in the validation of the phase 1 and 2 information, and the feedback of the information towards the periphery motivates the field personnel to keep sending in high-quality information because they see that their work is taken into consideration.

Over time, the acceptance of the SAPs has increased and their position within the national structures been strengthened. Compared with the cost of the food aid and of the devastations due to famines, they are not that expensive. “It is not conceivable any more for the decision-makers to see disappear this instrument the utility of which is recognized by everybody” (Lalau-Keraly and Winter, 1988). Currently, additional assignments for the SAPs are being examined, such as support for the identification of structural projects (that has already been discussed above), or its involvement in the monitoring of the food commercialization processes (Lalau-Keraly, 1988).

**Prediction and early detection**

True causal relationships between phenomena related to food or nutrition conditions are very arduous to establish. A procedure for ascertaining causal relationships should be able to measure the probability of the occurrence of a crisis given the existence of certain previous conditions. Prospective longitudinal studies of the conditions that lead to food or nutritional crisis may lead to understandings which would accelerate the improvement of the SAPs’ prediction capabilities. For ethical reasons, it is impossible to perform such studies directly. It would be ethically inadmissible for projects like the SAPs to observe passively the evolution of a food situation up to the point of a nutritional crisis.

Technical considerations also hamper such studies: how to choose “control situations”, for instance? Many indicators are of interest not because they are related to “causal” events but rather because they provide evidence about the evolution of a situation (e.g. the “stress” indicators). Most phenomena linked to food or nutritional problems have close mutual interrelations. When examining the relationship between two of them, the effects of other phenomena often obscure the “apparent causality” that seems to exist. Because of these reasons, interpretations like the one made for the Arrondissement of Balle are always questionable.

However, valuable insights have been obtained through analysis of the failures of the SAPs. SAPs’ failures fall into three categories: true crises that were actually predicted or detected but where the interventions failed (the example of the Arrondissement of Balle); crises that were predicted or detected, but where no actual crisis occurred when no significant intervention was made (false positive); and crises that were not predicted but occurred (false negative). Fortunately, up to now, there have been no false negatives and situations like the Arrondissement of Balle remain the exception. The most frequent failures are the false positives. False positives may result from
erroneous prediction of crises, or bad prognostication of the severity of an actual crisis. False positives happen mainly at the end of the rainy season, when the SAPs provide estimates about food problems to be encountered during the following year. At that season, many food situations are "borderline". Because the SAPs want to avoid any false negatives, the food aid quantities anticipated in September–October are somewhat overestimated even when they are more realistic than they were before the existence of the SAPs. No information system can avoid such anomalies and false positives are likely to be more frequent when the phenomenon to be observed is uncommon and the observation system sensitive (Bayes' theorem: see Fleiss, 1981). As a result, we take advantage of these failures to examine where and why the system was unsatisfactory.

Other major insights are obtained when confronting the information from phases 1 and 2 with the information from phase 3. In Mali, of 30 phase 3 surveys, 41% invalidated the conclusions drawn from the analysis of the two previous phases. The crucial role played by phase 3 emphasizes the difficulty of maintaining a very sensitive and reliable early warning system based solely on a continuous surveillance process.

In conclusion, given the constraints enumerated above, the SAPs are not yet (and perhaps will never be) perfect predictive systems. Early detection is the rule and accurate forecasting the exception. The prediction and early detection capabilities of the SAPs are to be steadily improved thanks to the "progressive refinement of analysis and interpretation". This continuous mechanism includes the construction of the baseline data, the structural information databases, the analysis of the "failures" and the comparison of the results of the different phases. Two years is a too short period to allow the achievement of a "faultless" SAP, but nonetheless, given the present results, we are optimistic that we shall soon see satisfactory FNSS in the two countries.

Data interpretation will never be automatic, however, and expertise will always be necessary to interpret the complexities revealed by the SAPs. Analysis and interpretation of the data require a good working knowledge of the situations encountered. This represents a major limitation to the use of scoring systems such as the one explained above. Scores actually prove to be of great help, but they are not a diagnostic tool.

**Indicators used**

The SAPs are built on a multidisciplinary approach. They use quantitative and qualitative information. Some information looks fairly subjective. The ability of the subjective information to encapsulate crop development and harvest expectations has been recently supported by studies demonstrating that the subjective judgement of the peasants or local technicians about cereal production may be as valid as the statistical methods used to perform objective measurements of cereal production (Verma et al., 1987).

All the indicators utilized are "proxy" indicators. If used individually, none can provide an unequivocal determination of food conditions. The only one we consider as true "outcome" indicator is the malnutrition rate. Results of its application during the phase 3 survey serve to define whether a nutritional crisis exists or not. Unfortunately, its usefulness is limited by its sensitivity to the departure of malnourished families in time of food scarcity. Furthermore, as already mentioned by several authors, this indicator is late and thus, it is never used for prediction or early detection of food crises (Autier and Ronsmans, 1984; Lechat and
de Ville de Goyet, 1977; Mason et al., 1984). It is also never recommended as a tool for making accurate food aid targeting (Autier, 1988b). The search of “ideal” indicators has never been a priority since we believe that such an indicator simply does not exist (if it does exist, then the conditions needed to “discover” it seem non-existent). By “ideal” indicators, we mean indicators that would be at the same time extremely “sensitive” (ability to predict or detect); very “specific” (ability to avoid erroneous prediction/detection of food crisis); timely, reliable, and easy to use. Theoretically, only two or three indicators of this kind would be necessary to establish a FNSS. We rather prefer to use sets of indicators and combine their respective qualities. As some authors have put it (Beghin et al., 1988) “an indicator may not be good by itself, but may be valuable if it helps to compare groups or regions, or to identify trends – particularly if it has practical and operational uses, and if other indicators complement it”. Moreover, it is often not the indicator by itself that poses problems, but rather the way it is applied: e.g. what is the understanding of the questions by the responders? Is the indicator addressed to the right person? So, for instance, the indicators dealing with incomes would be inapplicable in phase 2 whereas in phase 3, when using an indirect method, it is possible to obtain a reasonably good appreciation of the number and quality of household incomes. The process of “progressive refinement of analysis and interpretation”, and the continuous examination of the quality of the data allows one to improve certain indicators or to decide to eliminate the less interesting ones. But, as a rule, the SAPs must “keep an eye” on every domain implicated in food and nutrition conditions.

Several indicators, usually proposed for FNSS purposes, proved to be irrelevant or difficult to use, for example health related indicators such as mortality rates, birthweight, disease surveillance and level of health activities. Indicators related to livestock (e.g. prices, market demand or supply) are too difficult to interpret and reliable data are hard to obtain. The number of meals per day turned out to be a useless indicator.

**SAPs are complementary to the food balance sheet method**

The SAPs are complementary to information systems concerned with the equilibria between the food needs of a population and the food available. The latter method is generally called the “food balance sheet method” (FAO, 1980). Schematically, food balance sheet (FBS) methods focus mainly on the estimation of food production, food stocks (private, public, family), and food imports and exports in order to evaluate global food availabilities. These food availabilities are then compared with needs, that is, the sum of all the individual food requirements within a population (population × minimal food requirements per capita). If the food balance is negative, then there exists a gap in food availability and decisions have to be taken in order to fill it (increase imports; request food aid; launch alternative food crops?). If it is positive, then an excess of food exists and commercial exportations or creation of long term food stocks may be envisaged. Unfortunately, the FBS method suffers from many deficiencies, such as the lack of precision in the estimation of the food production and reserves. Moreover, accurate demographic data in developing countries are often scarce and “food minimal requirements per capita” are very difficult to determine. As a result, imperfections in the calculation of the food balance may occur easily (Pacey and Payne, 1985). It has been demonstrated that the combina-
tion of all possible errors may lead to contradictory judgments about the state of the food situation in a country (Hervio, 1987). As Figure 3 shows, the SAPs prefer to observe the factors influencing a food balance or that are evidence of its variations. They achieve a kind of short-cut in the direct quantitative apprehension of a food balance. The FBS method exhibits other major limitations: for instance, it is laborious to perform food balance estimations at smaller scale than the entire country, because, for instance, of the need for more accurate (thus more demanding) sampling procedures for the quantitative estimation of crop yields at the local level. Thus, they do not provide information about the distribution of food within the country (Martorell, 1982). Additionally, even if accurate measurements of cereal production could be done at limited geographical scale, it would often be arduous to know the actual significance of such data. For instance, cereal production may appear insufficient in an area while the necessary food needs may be fulfilled by other resources.¹ Hence, the FBS method appears incapable of targeting food aid interventions. They focus mainly on cereals and experience many difficulties in appraising other very important food inputs; they do not take into account incomes and other BF such as migrations and wild foodstuffs; they provide no information about the nutritional and health situation, and are unable to assess the impact of emergency interventions.

On their side, the SAPs also have several significant limitations. First, they are not designed for the quantitative evaluation of food productions and thus may not provide estimates of the amounts of food potentially available in a country. Second, they are not much involved in the specific information needed to improve the cereal or livestock productions (e.g. agrometeorology, management of land occupancy). Third, they cannot observe the level of imports-exports and the effects of international mechanisms on the national food flows. Fourth, gathering data about food commercialization is not a primary goal of the SAPs. They just assess the eventual side effects of the deficiencies in the commercialization processes. Fifth, they do not provide sufficiently detailed information for the surveillance of the grasshopper threat, or the fight against numerous other parasites. All these tasks are generally covered better by the information systems used with the FBS method.

Consequently, the two approaches are complementary and they actually share much common information. Accordingly, G. Hervio (1987) proposes that the former be called "macroFNSS" and the latter "microFNSS". The current prospect for the SAPs is to participate in the strengthening of the information capacities of the "macroFNSS".

Phenomenon of proximity and the limited crisis

Crises like the one described in the Arrondissement of Balle are more frequent than one would expect. Since malnutrition rises to a significant level, these crises must be considered as more serious than the usual seasonal changes of the food and nutritional patterns generally described in the literature. In these limited crises, the neighbouring areas function as BF. Their better food conditions tend to stabilize prices, and families from the threatened area may arrive to find work and food. As other authors have suggested (Cutler, 1984), the occurrence of a real famine is conditional on the emergence of a "critical mass" of distressed areas, so that neighbouring areas do not represent BF for each other any longer.
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NOTES

1. Certain subjects will be covered more broadly in future papers. These are the migrations and their relations with nutritional status, the importance of the subjective perception of food problems by the people, the interpretation of the socio-economical data of the phase 3 surveys and the problems posed by food aid targeting.

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Philippe Autier, Jean-Pierre D'Altilia, Jean-Pierre Delamalle and Vincent Vercruysse

European Association for Health and Development (AEDES)

Rue Joseph II, 34, Brussels 1030 (Belgium)
The Relief Operation in Puno District, Peru, after the 1986 Floods of Lake Titicaca

L. SZTORCH, V. GICQUEL and J. C. DESENCLOS

The 1985–86 rainy season in Peru was disastrous due to very high precipitation. Because of the unusual level of floods in the Lake Titicaca area and the increasing number of affected people, the Peruvian Government established an emergency relief plan and appealed for international aid. At that time the situation was already very critical. The lack of preparedness made the implementation of the relief operation difficult. Our paper describes the intervention of a French N.G.O. (Medecins Sans Frontieres), requested by the Peruvian authorities. The early phase of the relief programme and its methodology are described. Problems within this relief programme and the further long-term development action that should be undertaken are discussed.

Au Pérou, la saison des pluies 85–86 a été catastrophique par l’importance des précipitations. Au cours des premiers mois de l’année 1986, devant l’ampleur inhabituelle des inondations dans la région du lac Titicaca et le nombre sans cesse croissant de sinistrés, le gouvernement péruvien décide de mettre en route un plan national de secours d’urgence en faisant appel à l’aide internationale. Mais la réponse est déjà tardive et le manque de mesures préventives fait que l’organisation des secours se heurte à un grand nombre de difficultés. Notre étude se situe dans le cadre de l’intervention d’une organisation non gouvernementale européenne, sollicitée par le gouvernement péruvien pour une collaboration dans la phase des premiers secours à cette population. Les problèmes posés lors de cette opération et la suite à donner à l’assistance à moyen et à long terme sont discutés.

INTRODUCTION

Peru is a country often subject to natural disasters, which in the short term cause human and material losses, and in the long run lead to a serious slowing down of social, economic and health programmes (Dollfus, 1972). These difficulties are at times compounded by Peru’s geographic isolation. The following is an account of the recent floods caused by the rising of Lake Titicaca in early 1986 in the region of Puno, Peru (Figure 1), as an example of a region that was heavily affected by climatic phenomena. At the same time, it is an account of the relief operation of the French organization “Medecins Sans Frontieres”, in the immediate aftermath of the disaster.
THE 1986 FLOODS IN THE LAKE TITICACA REGION

In early 1986 Lake Titicaca started to overflow, slowly flooding villages and crops as it encroached upon the surrounding countryside. The toll was heavy: on 20 March 1986, the Prefecture of Puno counted as victims some 40,000 families, roughly 20% of the department's total population. This represents approximately 240,000 persons; 180,000 in rural zones and 60,000 in urban zones. It was only then that the Peruvian government realized the extent of the damage, both human and material. Prior to this, the government's unawareness of the situation did not permit an adequate response. The news was disseminated outside the country by UNDRO, and Peru asked for international assistance. The non-governmental organization to which we belong was solicited by the Peruvian Embassy in Paris for logistical aid to the victims, consisting of blankets and tents.

Geographical, Administrative and Demographic Data

The Region of Puno (72,382 square kilometres) is situated in the south-east of Peru and shares a border with Bolivia (Figure 1). It represents a very small part of the "Altiplano Andino". At its lowest point, the altiplano is 3,812 m above sea level, the same altitude as Lake Titicaca. The lake covers an area of about 8,500 square kilometres and lies in the centre of a large basin surrounded by high snow-covered mountains (Dollfus, 1968; Romero, 1971). The region is situated between 14 and 17 degrees south latitude, which places it squarely in the tropical zone (Romero, 1971). The Altiplano has two seasons: the summer, from October to March, has heavy rain (Fig. 2) and higher temperatures; the winter from April to September, has a total lack of precipitation, causing an intense drought sometimes accompanied by very low temperatures (Fig. 2). The existing "micro-
"climate" of Lake Titicaca favours living conditions on the banks of the lake and explains the region's high population density (Romero, 1971) (Figs 3 and 4).

It is impossible to overlook the cyclic pattern of drought and flooding which has long been a part of the Andean climate. But it seems that since 1983, the date of the last serious drought, there has been greater precipitation than normal (Table 1 and Fig. 5). The lake has several important tributaries and has one effluent to the south, towards Bolivia (Romero, 1971).

A mass of lacustrine vegetation, for the most part Totora, is a useful forage

![FIGURE 2 Monthly Precipitation in the Puno Department (in mm) 1985/86](image)

![FIGURE 3 Population per Province* in the Urban and Rural Sector. Puno Department, Peru (1981)](image)
and construction material for houses and boats. This vegetation is utilized for many purposes by the people living on the lake's shores and islands. The vegetation is specific to the high altitude; between 3,800 and 4,800 m the grass steppe “La Puna” spreads, and there are almost no trees growing naturally without human assistance (Pahlen and Reist, 1977).

The population of the region of Puno is about 1,200,000 inhabitants distributed throughout 10 provinces; 70% of the population is rural (Fig. 3) (National Institute of Statistics, 1981). The town of Puno (3,827 m altitude) with 70,000 inhabitants, is the administrative capital. This is the seat of organizations promoting regional development. Juliaca, however, with 60,000 inhabitants, is the economic centre: it is located at the crossing of important roads and railways, and has a national airport. Half of the region’s population lives on the shores of the lake, making the population density more than 100 inhabitants per square kilometre (Dollfus, 1972).

The rural population, comprising Quechua and Aymara people, is organized in small communities, their social organization is inherited from the Incas and from even more ancient cultural groups (Dollfus, 1972). The region’s productive sector is of a primary type, predominantly agro-pastoral (Dollfus, 1972). Fifty-eight percent of the gross national product comes from the primary sector, 11% from the secondary sector and 31% from the tertiary sector (Cortazar, 1984). Of the 7,238,244 hectares in the entire region, only 3.4% of the land is agricultural, while 45.6% is used for raising livestock. The reason for this low agricultural activity is that the ground is of poor quality, and difficult to work. Only the land bordering the lake, which is rich in alluvium deposits, allows a good agricultural production. The region of Puno leads the nation in raising livestock, which consists of sheep (36%), cows (11%), alpacas (56%) and lamas (28%) (Cortazar, 1984). Although the profits from agriculture and livestock are minimal, it is remarkable that an agro-pastoral life subsists at an altitude of 4,000 m.

The Floods of 1986
Table 1 shows that the precipitation which began in November 1985 was much higher than the average recorded during
TABLE 1
Monthly precipitation level (in mm) for 1985-1986, compared with the expected level (precipitation mean of the last 10 years) of Puno, Moho and Desaguadero districts

<table>
<thead>
<tr>
<th></th>
<th>Puno</th>
<th>Moho</th>
<th>Desaguadero</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1985-86</td>
<td>1985</td>
<td>1985</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>Expected</td>
<td>Monthly</td>
</tr>
<tr>
<td>Level</td>
<td>Level</td>
<td></td>
<td>Level</td>
</tr>
<tr>
<td>Sep. 85</td>
<td>40.1</td>
<td>41.6</td>
<td>115.5</td>
</tr>
<tr>
<td>Oct. 85</td>
<td>33.7</td>
<td>44.4</td>
<td>42.3</td>
</tr>
<tr>
<td>Nov. 85</td>
<td>123.5</td>
<td>60.7</td>
<td>254.4</td>
</tr>
<tr>
<td>Dec. 85</td>
<td>136.6</td>
<td>92.1</td>
<td>224.5</td>
</tr>
<tr>
<td>Jan. 86</td>
<td>145.1</td>
<td>125.1</td>
<td>...</td>
</tr>
<tr>
<td>Feb. 86</td>
<td>251.0</td>
<td>137.0</td>
<td>...</td>
</tr>
</tbody>
</table>

... No data available

Source: CORPUNO (1986)

the preceding years. This pattern continued into the early months of 1986. The inevitable result was a rise in the lake's water level, shown in Figures 5 and 6. This was a slow process, 1 to 2 cm per day, but by 28 February 1986, the water had risen 1.73 m over the normal level (Ministry of Agriculture, 1986).

By overflowing its basin, the lake caused more and more floods, resulting in extensive and serious consequences.

The most seriously affected zones were those on the lake's shores, primarily agricultural land. The situation was all the more serious because these zones were also densely populated. The town of Puno and other important urban centres were among these zones; the surroundings of these towns were affected the most. The three rivers, Ramis, Coata and Ilave, also overflowed, creating difficult situations along their shores; the rural provinces which were most seriously touched (measured by the number of families affected) were the provinces of Chucuito (40%), Huancane (22%), Puno (20%) and Azangaro (10%). Among the urban areas, those of Puno (40%), San Roman (28%) and Huancane (10%) were the hardest hit (CORPUNO, 1986).

On 28 February 1986 some 47,000 hectares of cultivated land were flooded, as shown in Table 2. Included in the flooded areas is 38% of the land planted for the 1985/86 season, and more than 80% of the total arable land (Ministry of Agriculture, 1986).

The consequences of the floods were more heavily felt by the rural population, which lost housing and had to take refuge in more elevated areas. The precarious housing, made of earth, could not long resist the advancing waters. The cultivated ground was flooded and the next crop was lost, creating a food shortage for the following year among the population, which had no habit of storing large quantities of provisions. The livestock suffered from the absence of grazing-land and was also forced to follow the exodus.
The resettlement of families, even if only provisional, created problems, such as choice of an adequate area, shelters, share of construction materials, water and food supplies. The severe climate made the situation more difficult, especially in rural zones where resources were scarce.

THE PERUVIAN “FIGHT-PLAN”

During the first few months, when the flooding began, no local or government action was taken to control the situation. Slight flooding is frequent in the region and nobody imagined its potential severity. It was only in February, when the lake’s water level was not dropping and the number of victims was increasing, that the decision for national action was taken. The region of Puno was declared a “disaster zone”, and an emergency relief plan was begun, organized and administered by the National Civil Defense (Civil Defense of Peru, 1986).

The Civil Defense was responsible for coordinating the different sectors affected by the disaster (housing, health, agriculture, food, etc. . .). They did not have enough funds for an efficient transportation system, so they had to depend upon the assistance of all the available institutions. The Peruvian government appealed
in March 1986 for international aid. Any help from outside was also to be managed by the Civil Defense. At the national level, a multisector commission was created in Lima, the capital of Peru. This commission was comprised of representatives from the Civil Defense, from the Ministry of the Presidency, Ministry of Health, Ministry of Agriculture and others. The commission had the responsibility for centralizing information, studying the situation and coordinating actions among all the sectors affected by the disaster (Fig. 7). At the regional level, the Civil Defense Committee, headed by the prefect of Puno, was in charge of the relief aid operations in the field. The Committee organized the formation of survey commissions, including also representatives from each institution. The goal of these commissions was to evaluate periodically the extent of the catastrophe:

the number of victims, the material damage, the health and food situation, the condition of livestock, the loss of crops, etc. . . Periodic repetition of these surveys allowed for continual monitoring of the situation and setting of priorities, which could be modified when needed. The strategy of the Peruvian emergency aid was therefore a strategy of priorities with immediate and secondary objectives. Along with the coordination of efforts, each institution retained its own share of responsibility for its undertakings.

The first objective was to provide immediate care for the rural and urban population affected by the flood. This had to be done by evacuating inundated zones and by resettling the population and livestock in nearby temporary settlements. The first task was accomplished through the collaborative efforts of CORDES (Governmental organisation in

### TABLE 2

<table>
<thead>
<tr>
<th>Cultivations</th>
<th>Number of Sowed Hectares</th>
<th>Affected Area Hectares</th>
<th>% of Total</th>
<th>Total Lost Cultivations (Flooded) Hectares</th>
<th>% of Total</th>
<th>Value in Intis (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potatoes</td>
<td>40,410</td>
<td>14,140</td>
<td>35</td>
<td>6,800</td>
<td>17</td>
<td>134,640,000</td>
</tr>
<tr>
<td>Quinoa</td>
<td>17,375</td>
<td>6,950</td>
<td>40</td>
<td>4,700</td>
<td>27</td>
<td>29,962,500</td>
</tr>
<tr>
<td>Barley</td>
<td>24,300</td>
<td>14,580</td>
<td>60</td>
<td>5,300</td>
<td>22</td>
<td>14,310,000</td>
</tr>
<tr>
<td>Beans</td>
<td>5,423</td>
<td>1,900</td>
<td>35</td>
<td>710</td>
<td>13</td>
<td>5,325,000</td>
</tr>
<tr>
<td>Canihua</td>
<td>4,455</td>
<td>890</td>
<td>20</td>
<td>1,190</td>
<td>27</td>
<td>1,904,000</td>
</tr>
<tr>
<td>Corn</td>
<td>691</td>
<td>350</td>
<td>50</td>
<td>50</td>
<td>7</td>
<td>166,250</td>
</tr>
<tr>
<td>Green forage</td>
<td>25,000</td>
<td>6,250</td>
<td>25</td>
<td>3,650</td>
<td>15</td>
<td>27,838,550</td>
</tr>
<tr>
<td>Olluco</td>
<td>665</td>
<td>130</td>
<td>20</td>
<td>30</td>
<td>5</td>
<td>492,000</td>
</tr>
<tr>
<td>Others</td>
<td>6,000</td>
<td>1,500</td>
<td>25</td>
<td>500</td>
<td>8</td>
<td>2,500,000</td>
</tr>
<tr>
<td>Total</td>
<td>124,319</td>
<td>46,690</td>
<td>38</td>
<td>22,930</td>
<td>18</td>
<td>217,138,300</td>
</tr>
</tbody>
</table>

(*) 1 intis = 0.058 U.S. $ (01.05.86)

Source: Ministry of Agriculture (1986)
charge of rural development), Civil Defense and the Ministry of Housing (CORPUNO, 1986). Boats or trucks were used for the evacuation; land was lent to evacuees for a pre-determined length of time; construction material was distributed to build temporary housing. The second goal was to provide acceptable living conditions for the population, through the distribution of shelters, blankets and clothes to protect against the cold and damp, food in sufficient quantity and water for basic needs.

At the same time Civil Defense and CORDES undertook fuel distributions. The branch of the national office for nutritional aid (O.N.A.A.) in Puno started immediate food distributions in February (milk, sugar, rice, oil, and salt) based on the need and the surveys made regularly in the field. The food (national and international donations) was stocked in Puno in warehouses of the O.N.A.A., which was in charge of its distribution management.

On the health level a new primary health infrastructure was set up, oriented principally towards epidemiological surveillance of the victims, since no medical emergency existed at the time (Ministry of Health, 1986). The departmental Committee of the Ministry of Health organised the establishment of mobile health teams to undertake this surveillance and to supply basic medicines for each rural health centre.

One of the priorities was also the rehabilitation of the damaged communication lines and the protection of those at risk of being damaged, so that communications would not be interrupted. The local authorities, aware of the problem, took rapid steps and arrangements were begun during the month of March.

"Médecins Sans Frontières" was involved in this first stage of the relief plan. Based on the information collected during the field surveys, it was decided to help the population of the region by providing material and logistical services, but not medical assistance. The materials provided were immediately necessary items, such as tents, blankets, plastic sheets, plastic receptacles for food and cooking stoves.

The relief assistance was carried out in several stages: (1) The safe delivery and registration of the material in Lima; (2)
The transport and storage of materials to the affected region; (3) The establishment of a work-plan with quantitative data in collaboration with the local authorities; and (4) Only then was the distribution begun, starting with the most seriously affected areas.

So far as possible, distribution of materials was made directly in each community, so that intermediaries could be avoided. The distribution was accompanied by the signing of a donation act by the local lieutenant-governor and by a public reading of this act.

At the end of the relief supplies distribution, evaluation visits were carried out at random. Collaboration with Civil Defense was constant throughout the operation. Finally, a detailed and quantitative report was written, including summary tables of the distributions. These reports were distributed to the Peruvian authorities and to the “Médecins Sans Frontières” headquarters in Paris.

DISCUSSION

History shows clearly that the disaster was not unpredictable. This region has regular periods of drought and flooding. Since the last drought in 1983, there has been an increasing trend towards heavy rains during the rainy season, according to meteorological studies carried out in different sites of the region (CORPUNO, 1986), although this is too short a period of observation to be necessarily indicative of a climatic change. Nevertheless, it seems that insufficient attention was paid to the findings of these studies. They remain as simple observations without the establishment of any sort of threshold alarm. Could the cause for this be the lack of coordination between the different services?

Because of the lack of preparedness, there was no immediate response to the situation. One of the reasons seems to be that this inclement weather was viewed as “normal”. It was not the first time that people living around Lake Titicaca organized themselves and the government did not intervene, expecting as usual that the problem would resolve itself.

The situation had to become very critical at the end of February, before the emergency assistance began. The region of Puno is difficult to reach because of its geographical situation. This inaccessibility leads to a certain isolation of the region from Lima, and consequently from governmental decisions. When the situation was considered severe enough at the national level for intervention, the plan of action was quickly elaborated. The plan, which seemed logical and coherent, was difficult to implement. The coordination between the national authorities and the local representatives was inadequate. The local staff and the different services involved were not prepared and they operated without organization. Up to the time of the catastrophe, the population would evacuate the flooded area itself, looking with some difficulty for a place prepared to welcome them. However, such “wild” exodus soon becomes problematic and produces conflicts. Providing relief assistance, be it domestic or foreign, was difficult, not only for financial but also for technical and logistical reasons. The programme lacked truly competent and responsible officers. There was no preparation for the reception of international aid (problems concerning the clearance of goods for example). All these problems impaired the relief process. Therefore, it seems that an established preparedness plan, with the same measures, could efficiently avoid most of the problems mentioned (PAHO, 1982).

Many international and national organizations (both governmental and non-governmental) were present in this region of the Andes. There are more than 70 altogether, but they are exclusively
involved in local development projects and not in emergency situations. At the time of the operation, surveys done by OXFAM, United Nations and the E.E.C. were going on. Financial, material and food donations from other countries started to arrive after Peru's appeal. This raises the question of the international help and of the participation that a governmental or non-governmental organization such as "Médecins Sans Frontières" can have in an assistance operation of this kind.

It appears that financial, material and human assistance was necessary. The human presence allowed for collaboration in the field. But the control of financial and material assistance was more complicated. How was this aid to be managed in such affected areas? Would it go where it was expected to go? Was this help adapted to the situation?

It is also possible to imagine the role of an efficient organization with an international focus, in future intervening at all levels of a national emergency assistance plan and under its coordination (such as Pan American Health Organization). At the time when preparedness plans are made, it could lend its human and material collaboration to elaborate a plan, to educate the local staff and to inform the population. In the second stage during and just after the disaster, the organization could participate with logistical and health assistance by providing staff and basic materials. In the rehabilitation phase, it could take charge of the rehabilitation of the sanitary system in a defined area or it could collaborate with the Ministry of Health in a more general way. It could also participate in a programme of environmental health and hygiene. The participation in the rehabilitation phase after a natural catastrophe of this type has to be considered in the long term on three levels: funding, materials and personal assistance. Thus, it emphasizes the need for a solid project with defined objectives.

The Region of Puno is one of the poorest in the country. The Indian population (80%) lives in very difficult conditions: harsh weather, high altitude and rugged topography (Cortozar, 1984). An emergency relief plan should involve the possibility of drought and flood, making operations more complicated and expensive. Peru is experiencing a difficult political and economic period and the effects can also be felt in this region of the Andes. As regards flooding problems, it should be remembered that the best ground for livestock and agriculture is situated by the shores of the lake, where the population density is the highest. These grounds are the only wealth of the Andean farmers. Losing them would leave them completely dependent on outside aid. In the case described here, returning to their homes and land is excluded for most of the victims. The experts do not envisage the return of the lake to its normal limits for at least the next three years (CORPUNO, 1986; Ministry of Agriculture, 1986). The lost ground is therefore not recoverable for a long time. This raises the problem of the permanent resettlement of the population with all its implications: the total restructuring of its economic, social and political life. Is Peru able to deal effectively with such a situation? Would the early implementation of a preparedness plan have lessened the gravity of the problem?

There are certainly three possible attitudes (Collin-Delavaud, 1983): the first consists of doing nothing, leaving things as are they are and continuing to utilize the fertile grounds near the lake, accepting the eventual human and material sacrifices. The second attitude is the complete abandonment of this fertile ground, prohibiting urbanization on the lake shores, and resettling the population in another area. This means accepting the consequences of a great economic and social
upheaval with the respective costs at all levels. Finally, the last attitude, which seems the most reasonable, lies not in the abandonment of the land, but in trying to protect the land, reaping benefits from the water through the construction of levees, dams and irrigation channels, allowing safe development of agricultural activities for the population. This hypothesis fits with a more general preventive approach. Does Peru, a developing country, have the human and economic resources to consider such a project? International assistance should invest in this preventive and developing plan, rather than have to respond, belatedly, as did the Médecins Sans Frontières, to purely short-term needs created by a new flood in the future.

Acknowledgements

We would like to thank all the individuals who contributed to the relief programme and to this paper. Among them we are particularly grateful to: Mr. Mujica Alvarez Calderon (Presidency Minister), Mr. Ahumada Vasque (General Director of National Development), Dr. Delgado (Ministry of Health), Mr. Rose (Cultural Attaché, French Embassy), Mr. Uribola Garrido, Mr. Duenas Peralta, Mr. Lescano (Director of CORPUNO), Mr. Mercado (Director of Microfision Juliaca), M. Langlois (M.S.F.), G. Massis (M.S.F.), Dr. A. Crouan (M.S.F.), Dr. A. Destexhe (M.S.F.), Mr. C. Dupont (M.S.F.), to Miss E. Arnold who translated the manuscript, and to Miss N. Cochard who typed it and to Dr. G. Desvè for computer assistance.

References

The Role of Socio-Economic Data in Food Needs Assessment and Monitoring

JEREMY SHOHAM and EDWARD CLAY

This paper reviews six case studies examined as part of a project to review targeting methodologies employed by non-government organisations in Africa during the 1984–6 food crisis. Most agencies have not yet fully evaluated the role of data in informing policy decisions during their respective emergency programmes. The case studies presented reflect a wide variety of approaches to targeting emergency food aid that are based largely on the use of 'socio-economic' data. The recent emergency relief operations in Africa seem to indicate a change in relief agencies' approaches to the assessment and monitoring of needs of the affected populations. Earlier dependance on nutritional data has given way to an increasing reliance on the use of socio-economic indicators. There was a wide variation in the case studies of the type of indicators collected and utilised in needs assessment and monitoring. There were those who relied almost exclusively on nutritional data to target resources during the 1984–86 African crisis, and others whose experiences during that period lead them to attach more weight to socio-economic data. Other agencies appear to have recognised the problems of relying solely on nutritional data to target food aid during their 1984–86 emergency programmes, and thus more or less abandoned classical anthropometric surveys in their needs assessment and monitoring methodologies during this period. Thus nutritional data has a less significant role in the decision making process than previously had been the case.

INTRODUCTION

Context: learning from recent NGO experience in Sub-Saharan Africa

Reports and assessments of relief operations during the African emergency indicate a change of approach by relief agencies assessing and monitoring the needs of affected populations. The earlier dependence on nutritional data has given way to increasing reliance on an array of "socio-economic" indicators. In this paper we illustrate these developments and seek to draw provisional conclusions from the analysis of selected NGO (non-governmental organisation) experiences during 1984–1986 in drought-affected regions of Sub-Saharan Africa. These experiences were examined as part of a project to review targeting methodologies employed by NGOs, during the African emergency. Most agencies have not yet fully evaluated the role of data in informing policy decisions in their emergency operations. Furthermore, the project on
targetting is at a preliminary stage, so there may be information gaps even for the six cases included in this review.

The case experiences of relief organisations operating in drought-affected Chad, Ethiopia and Sudan show the variety of approaches to assessment and monitoring, even when these are based on what are described in this paper as "socio-economic" data. There was a wide variation in agency practice in terms of the type of indicators collected and used. Some organisations relied almost exclusively, and seemingly uncritically, on nutritional data to target resources during the 1984–86 African crisis (Morris-Peel, 1986). There were others whose operational experiences and changed circumstances during the emergency led them to attach more weight to socio-economic data (Jareg, 1987). Other agencies appear to have perceived shortcomings in relying solely on nutritional data to target relief food, and practically abandoned classical anthropometric surveys during this period (Autier, 1988). Nutritional data were becoming less significant in the decision making process than had previously been the case, or at least the idea, in relief assessment practice.

The preliminary analysis of these experiences also raises several issues relevant to current professional discussions, and indicates certain guidelines that may be useful for future operational practices.

Types of socio-economic data collected and used in food needs assessment and the monitoring of relief food operations

The choice made in terms of types of data collected and used by agencies reflects their implicit or explicit adoption of specific models of the processes of, and responses to, food crisis. The conventional reliance on food production and nutritional data implies a deficit model of food requirements. In this, the scale of the crisis is measurable at the macro (i.e. regional or national) level by shortfalls or deficits in the supply of basic food stuffs (harvest data) in relation to aggregate requirements. The crisis at micro-level is expected to manifest itself in terms of malnutrition or undernutrition. The extent and severity of these conditions will be revealed by data on the nutritional status of potentially vulnerable groups, especially children under five. In this biological model of the processes within the food system supply deficits are translated directly into a decline in nutritional status. Both the deficits and the prevalence of malnutrition give snap shots of the food crisis. Crude macro balance sheets provide the information for the scale of resources required. Micro data identify the target groups as well as the types and scale of interventions needed.

The use of other "socio-economic" data implies a different model of food crisis and famine. The types of data used vary between agencies, as well as, understandably, with location and population group. However, there are specific, more commonly used indicators:

- staple produce (harvest) and grain storage
- income earning opportunities (including production and sales of cash crops),
- livestock holdings and sales
- food staple, possibly cash crop, and livestock prices.

Some agencies have used other types of data including:

- collection/consumption of famine foods
- number of displaced people in a population group
- causes of displacement
- type of person displaced and homogeneity of families.

The use of these types of data implies
an underlying model of the food crisis/famine as a socio-economic process. Such models recognise the effects of behavioural responses and coping mechanisms in food crises. They are explicitly or implicitly based on Keynesian concepts of effective demand and the entitlement approach of Sen (1981) who is widely cited as a source of conceptual support. Social anthropological observations of the sequence of response by vulnerable populations to economic stress, including the impact of unfavourable environmental and man-made conditions on their way of life, are also integrated specifically into such approaches.

Many relief agencies react spontaneously and under considerable operational pressure, so there is little time to draw up a conceptual basis for collecting and using needs assessment data. Consequently, the models characterised in this paper are drawing out the implicit assumptions, the unanalysed constructs, on which their action was based. Indeed, it is probable that, more often than not, logistics and resource constraints were important determinants of the types of data eventually collected and used by agencies. Furthermore, common needs assessment takes place in a political context in which the responding agencies are often subject to pressures which confound their attempts to assess needs objectively. The effect of political constraint is difficult to quantify and varies from case to case. Consequently, this paper focuses only on the technical constraints which affect agencies' monitoring and assessment. They must expect to face the political factors pragmatically in future operations.

To describe the different models of food crisis and identify the indicators that reflect them, it is useful to distinguish the basic types of indicator that are in use. The first approach, the measurement of nutritional status, may be characterised as describing and quantifying the current situation. The status of affected groups and the aggregate food supply provide the data for intervention. Reassessment of status is required to modify the level and type of intervention. The second approach, effective demand or entitlement based, calls for socio-economic indicators of stress in terms of command over food or loss of entitlements. It requires the measurement of resource reserves (stocks) and resource flows through time as well as the causal factors that determine the process. If a relief intervention goes beyond the immediate needs of population groups and takes account of the evolving socio-economic situation, the second type of indicators, which reflects social processes of adaptation and response, has a potentially important role. Decisions can then be taken about which local responses should be encouraged or discouraged. These different indicators are useful at different stages of an intervention. Their ability to reflect changes over time is one advantage of using socio-economic data in place of, or to complement, nutritional data on needs assessment.

**Potential advantages of socio-economic over nutritional data**

A critical weakness of the simple nutritional data approach is that it gives little indication of the aggregate food needs of an affected population or of its need relative to other population groups. For example, the fact that 18 percent of the under-fives in a community are malnourished, does not tell us much about the quantity of food that community needs nor about its relative need compared to a community with a 25 percent incidence of under-five malnutrition. Furthermore, there are no formulae to indicate when and whether a community with a certain level of children malnutrition will suffer large scale child mortality. The data that exist on the association between nutritional status and
risk can only be applied correctly at individual level when weight is being carefully monitored. These relationships are also highly location specific (Chen et al., 1980, Kasongoa Project Team, 1983). In addition there are confounding factors, such as disease, which can adversely affect nutritional status yet which should not necessarily be taken into account when assessing the need for relief food. It may be argued that a comparison of nutritional survey data with baseline data indicates the extent of any deterioration in a population’s nutritional status; but in reality baseline data are rarely available for regions prone to food crisis. Some agencies with a long term commitment to particular drought-prone regions are recognising the potential advantages of having nutritional baseline data and are beginning to collect them in advance of emergency programmes. However, for reasons already outlined, they can at best only be used for monitoring changes and not for assessing and quantifying need.

In contrast, socio-economic data can be used to indicate the actual need of population groups in terms of food deficits and therefore how much relief food is required and for how long. Although the application of these data varies between agencies, implied in each method is a notion of subsistence requirement and the extent to which each potential target population can fulfill its requirement without relief food.

Another potential advantage of socio-economic indicators is that costly and difficult sampling procedures and measurement may be avoided. The collection of nutritional data from which inferences can be derived requires rigorous sampling methods to ensure statistical validity and credibility. Reliable socio-economic indicators from potential target populations, by contrast, can be identified and monitored without painstaking and costly data collection. The rationale is that the values of the indicators are unlikely to vary greatly within a population and data can therefore be collected from a handful of sample points. Examples of potential stress indicators are the market price of cereals and livestock, participation in food works programmes, income earning opportunities, and types of famine food being consumed. The rapid rural appraisal methods employed by agencies to collect socio-economic data (discussed in detail below) were seen to confer advantages and overcome a number of the obstacles normally encountered in classical anthropometric surveys. These rapid survey procedures were expected to save considerable time and therefore allowed coverage of greater areas and more locations.

Médecins Sans Frontières (MSF) Belgium, which conducted anthropometric surveys and rapid rural appraisals at 28 sites (Autier, 1988), found that a sample of 4500 families was required for the anthropometric assessment, whereas a sample of only 1200 families provided sufficient data for the socio-economic/clinical nutrition indicator they were using. In Kordofan, Sudan, the Catholic Fund for Overseas Development (CAFOD) found that, by the time sufficient nutritional data had been collected and analysed to demonstrate the present and past needs of specific rural councils, there had been an aggregate improvement in the food situation, the level of prices, the availability of food and the other indicators of socio-economic distress in the whole area, which led to a decision to close down their programme (Sudan Aid, 1986). Before this, all rural councils had received equal priority in terms of per capita rations. But subsequent reports indicated that had the nutritional status data been available earlier, some attempt at targeting would have been appropriate.

Rapid appraisal techniques could also obviate the major problem of having to...
provide a reliable sample frame. Reliable population data are rarely available for regions likely to be affected by food crises. A related problem of the anthropometric approach, the requirement that a minimum number of children in each survey site be measured, when such numbers may not always be easy to locate, is also avoided. For example, this problem was reported in the initial assessments by Oxfam in the Red Sea Province in Sudan, where even the prerequisite sample size of 30 children per village was not always attainable. However there is, so far as we are aware, no published evidence to support the view that certain types of socio-economic data obtained through a non-random procedure, can legitimately be seen as statistically representative of larger population groups. Assertions to this effect often prove to be based on subjective and intuitive understanding of local conditions and experiences, and, as such, cannot be accepted uncritically. Nevertheless these techniques are potentially precious and deserve further immediate research to establish whether such methodologies are acceptable.

There are other alleged advantages of basing assessments on socio-economic indicators, and drawbacks of the anthropometric approach. First, indicators such as harvest prospects or income earning opportunities are seen as likely to be more static over a short period of time than nutritional status measurements, and their use, therefore, requires less frequent monitoring. However, such claims, particularly about harvest prospects or price behaviour, are not supported, for example, by recent experience in Ethiopia since 1984/1985. Second, where baseline survey data are absent, some quantification of baseline values can be attempted from recall of the previous season-year’s harvest, or of a “normal” one. But the reliability of such retrospective analysis is in dispute; and such procedures could not be used to ascertain credible baseline values of nutritional status. Third, nutritional status indicators are seen as unable to provide unambiguous evidence of the need for intervention. For example, reports of emergency programmes note that nutritional data are more difficult to interpret if no account is taken of infant mortality rates (MacLean, 1985a). However, similar problems of interpretation may also arise with socio-economic data. For example, if the poorest or most vulnerable families in a community have been forced to migrate, then survey findings can provide a misleading assessment of the need within the community.

A scrutiny of actual experience reveals the difficulties of standardising methods of collection and interpretation of both nutritional and socio-economic indicators. For example, the choice of cut-off levels with mid-upper-arm circumference (MUAC) measurements can lead to over-estimation of the implied levels of malnutrition (Taylor, 1986). But without weighed intake measurements, how can quantities of famine foods be assessed and compared between communities? The sensitive collection and use of socio-economic data in practice requires a high level of professional skills no less than anthropometric surveys (Hale, 1986a). There are also advantages of employing nutritional status data rather than socio-economic data for needs assessment. Perhaps the most important is the emotive value and power of apparently objective evidence of the incidence of malnutrition. This evidence is more likely to trigger donor reaction and public sympathy than reporting the subsistence resources available to a community. Indeed an explicit reason for establishing a nutritional survey programme may be to arouse or maintain donor interest (Hale, 1986a).

The conventional nutritional data focus attention on children, who physiologically
are undoubtedly the most vulnerable section of a population in a food crisis. This has been the rationale for the choice made by some agencies (Jareg, 1985). Of course, it could be argued that the focus of nutritional assessment on children results in underestimating the problems of adolescents and adults. A technical advantage claimed for indicators derived from anthropometric measurement in contrast to qualitative socio-economic indicators is that they are less affected by inter-observer variation. The potential range for indications of malnutrition can be roughly anticipated from earlier experience. Thus it may be easier to determine minimum appropriate sample sizes for an anthropometric survey than for a socio-economic one.

Perhaps one conclusion to be drawn from this list of the potential advantages and disadvantages of each approach is that, where resources permit, it is desirable to employ both nutritional surveillance and the socio-economic methods of assessment. Indeed, a number of agencies have tried to use both types of data in a complementary way. A more detailed review of recent agency experience provides insights into the problems that must be confronted in a practical way under pressure in an emergency situation. There are potentially some lessons for improving future practice.

DATA COLLECTION: THEORY AND PRACTICE

Sampling methods used to obtain socio-economic data

The six case studies examined reveal a variety of practices. Some agencies conducted socio-economic surveys without using classical sampling techniques. This was done to save time because human and other resources were too limited to allow rigorous sampling, given the urgent need to implement a programme. Certain agencies were responsible for very large areas where poor infrastructure made programme coverage even more problematic and time-consuming. Some agencies in fact made no attempt to sample while others tried to minimise bias by conducting some form of random selection and stratification in the survey process. Others followed rigorous sampling procedures but, as will be discussed, found that this presented difficulties. A brief description of each case study illustrates the variety of approaches and associated problems.

The Redd Barna programme currently operating in Northern Shoah, Ethiopia, is using data from a combined socio-economic and health survey based on interviews in a non-random selected group of households. Redd Barna acknowledge that the survey therefore failed to include many of the most vulnerable families, who may have been unable to get to the place of interview (Jareg, 1987).

MSF (Belgium) in Chad: Assessment was based on the work of mobile survey teams. Many socio-economic indicators were incorporated in their nutritional scoring system which was used to assess needs between 1985 and 1986 (Autier, 1988). During the acute phase of the famine the mobile teams concentrated on locations where they suspected more severe nutritional problems. Later their evaluations were conducted more systematically, following the geographical and administrative boundaries of the country. Normally the team took a random sample of 30 families from each population unit regardless of size. As the basic data were converted into scores subjectively, problems of assigning confidence intervals, and therefore the related question of sample sizes in relation to sample frames, were bypassed. The resulting data are assumed, based on the judgement of the evaluators, to represent the population groups from which they had been ob-
tained. MSF demonstrated that this system would obtain results more rapidly than the classical anthropometric approach. But as discussed below, this advantage of speed may have been gained at the expense of desirable levels of accuracy.

Care: who were responsible for food distribution in Kordofan, Sudan between 1985 and 1986, collected socio-economic data for needs assessment and monitoring through their monitoring teams. They report that:

"Random sampling of monitoring sites was not adopted, in the main because the extreme urgency of the situation in many areas demanded a trouble shooting approach to feed back the critical information to El Obeid to take remedial action. The region was divided into eight zones to correspond to the eight monitoring teams, with one team monitoring each zone every month". "To complement the action oriented style of the one time visit monitoring, a secondary plan for longer term plotting of trends was included by randomly selecting four sentinel sites in each zone to be monitored every month. In order to assess a community's status as accurately as possible, the monitors were to first conduct the questionnaire in ten private households before meeting the community in an open gathering and reconciling the comments made in the seclusion of their homes with the sheikh's and committee's public statements." (CARE-Sudan, 1986).

This method implied that inferences from data could be made only up to rural council level, and that with some caution, but not to village or village council level, thus limiting the usefulness of the information for targeting purposes. CARE did make some attempt to minimise bias caused by non-random selection by selecting villages which were perceived to represent a cross section of ecological zones, while within these selected villages households in good and bad states of repair were purposively selected.

Oxfam in Kordofan, Sudan: also conducted a form of needs assessment and monitoring, but it was not responsible for food distribution, in contrast to the Red Sea Hills area (discussed next). The focus of this programme was therefore far more on monitoring the evolving situation than on needs assessment. Survey sites were selected by a weighted systematic random sampling procedure using the 1983 population census as a sampling frame. Interval random sampling ensured some form of stratification without counteracting the population weighting, and therefore allowed wider geographical coverage (MacLean and Williams, 1986). The number of planned village survey sites was increased over the three monitoring cycles eventually rising to 150, including 20 nomadic groups (MacLean, 1985b). One purpose of increasing the number of survey sites was to increase the potential usefulness of the surveys to other agencies involved in targeting relief. The socio-economic data were collected from village meetings as well as through household and farmer questionnaires. Unfortunately, difficulty in locating nomadic groups reduced the number of planned nomadic survey sites that could be sampled, leading to a probable under-representation of these important groups.

Even with the increased number of survey sites in the later surveys it was recognised that great care had to be taken in applying the data to large areas, as the variation within an area could be enormous. This was borne out by examples of discrepancy between Oxfam and CARE data from the same rural councils, which showed that it is not always appropriate to extrapolate data to administrative units which take little account of environmental gradients (MacLean, 1985b). However, it should be noted that generally Oxfam Kordofan and CARE Kordofan data, where extrapolated to rural council level, were in agreement, in spite of the fact that only the
former employed classical sampling techniques.

Oxfam's needs assessment and monitoring programme in the Red Sea Hills of Sudan underwent modifications over time with concomitant changes in sampling methodology (Hale, 1986a). Initially, Oxfam used field monitoring teams (FMT) who were gradually able to visit all villages to draw up lists of inhabitants, collect socio-economic data and conduct a nutrition survey. The RSP (200,000 sq.km) is considerably smaller in area than Kordofan or Darfour (445,000 sq.km). The socio-economic data were obtained from public meetings for men and by questionnaires administered to women. As the programme evolved, more quantifiable data were obtained. Attempts were also made to ensure that data were obtained from settlements as well as central villages. As the intention was that all villages would eventually be surveyed, it was felt that the initial selection of villages could be non-random. Later, Oxfam employed another survey team, the nutrition survey team (NST), which as well as collecting nutrition data obtained data on the contribution of all sources of food and income to a family's nutritional needs in all seven districts. These data were translated into district averages (means). In each district, between 6-14 randomly selected villages were visited and interviews were conducted by female nutrition workers with village women selected randomly wherever possible (Hale, 1986b). As initial surveys showed that minor food and income sources made only a small contribution to food intake, the district mean values could be applied to all villages. To summarise, it appears that the socio-economic data initially obtained by the FMTs could not be used or extrapolated beyond village level as the choice of villages had been non-random. While with the exception of minor food and income sources, the later NST socio-economic data could only be used to obtain estimated values at district level because of large confidence intervals associated with the small sample size per village.

Save the Children Fund, (UK) in Darfour: the NGO responsible for logistics and distribution in that region adopted a complex set of sampling procedures. An SCF report states that "given the need for quick results to allow targeted food aid allocations to be made it was decided to stratify the area councils of Darfour into agro/socio/economic zones" (Buckley, 1987). It was assumed that a relatively small survey sample within any zone would be representative of the entire zonal population. SCF field officers living in each area defined zones with local help. One hundred and sixteen zones were identified in 11 rural areas. Six village councils per zone were randomly selected with probability of selection proportional to population size. Within each village council the associated villages were weighted for population and one was randomly selected by the enumerators as a survey site. At each survey site two clusters of five households were interviewed. A minimum of thirty households in three villages per zone were then interviewed.

In parallel to this system SCF employed field officers who tried to visit 30 villages per month collecting general socio-economic data at village meetings. The intention was that the household survey data would be applied to zonal level for targeting purposes and that targeting decisions within zones would be taken by field officers. However, government unfamiliarity with the concept of zones and the large volume of work involved in collecting and analysing data from 116 zones, led SCF eventually to aggregate the data to the larger rural council level for targeting purposes. Also, in several instances, the aggregate zonal estimates were found to be inconsistent with the
observations of field officers. These differences disappeared only when the data were further aggregated to rural council level. A number of SCF staff, when interviewed, felt retrospectively that trained land use specialists should have been used to delineate the zones in terms of agro-ecological and socio-economic characteristics, and that simple random sampling techniques, rather than cluster sampling at village level, would have provided more representative data. The SCF survey teams also reported that some villagers became reluctant to answer questions because of the frequency and number of questions: three surveys were undertaken in five months.

To summarise, the methods of sampling used by agencies varied enormously as did the degree to which the data were statistically representative and were found to be useful for the purposes of extrapolation or inference.

**Sampling issues**

These case experiences suggest a few tentative lessons for information gathering as part of a relief operation and in circumstances where the existing data do not provide a benchmark for needs assessment.

First, the choice of survey design and sampling should be carefully based on an assessment of the time and human and other resources available and how these could be employed to strengthen other aspects of the emergency operation. The size of area and geographical distribution of the population to be covered in the needs assessment are critical considerations.

Second, any potential bias introduced into data by the use of improper or compromise sampling procedures (e.g. small sample sizes) can be reduced by stratified non-random features of survey design. Such a design may only be suitable for collecting data for selected indicators and is likely to be location-specific. A rapid reconnaissance or pilot study is needed to determine the feasibility of such an approach.

Third, initial surveying should try to determine whether some socio-economic food-related activities may contribute little to overall food consumption or vary marginally in scale. If this is found to be so then estimated mean values obtained for a few locations within a large area may be safely applied to the smaller sub-population within these areas, thereby obviating the need for further data collection on these variables.

Fourth, and similarly, if specific indicators can be identified which are unlikely to vary greatly in value within small sub-population units, data collection can be restricted to a few respondents or to a consensus at village meetings. Again pilot studies can establish whether rapid rural appraisal methods of data collection are appropriate for some indicators.

Fifth, where there is initially very limited information on population characteristics and the nutritional situation, a sequential approach to survey design involving pilot studies that draw on qualitative knowledge of agro-ecology and the socio-economic situation will be the most cost-effective.

**USING SOCIO-ECONOMIC DATA**

**Food needs assessment**

The experiences of the six agencies discussed above illustrate the diversity of practice in actually using socio-economic data in needs assessment. The least complex methodology is that currently used by Redd Barna in Ethiopia. Food-for-work interventions are located on the basis of food production estimates derived from survey data, and expressed as a percentage of “normal” harvest for three ecological zones, highland, midland and lowland.
As a result of these estimates, projects were started in the lowland and midland areas of Redd Barna operations as soon as it was administratively possible, so as to pre-empt further deterioration in the food situation. As this programme continued Redd Barna also planned, for monitoring purposes, to collect data on grain stocks and cattle and grain prices (Jareg, 1987). This simple method of assessment did not take account of indigenous coping mechanisms, or allow for variations in deficit at peasant association level, but the form of intervention (food for work) was thought of as less likely to distort the local economy and coping mechanisms than gratuitous relief.

CARE, Kordofan, Sudan: data were collected on livestock numbers and deaths during the previous six months, current sources of family income, and local prices of durra (white sorghum) and other staple foods. However, apparently only food production data were used in estimating the need for relief food. The need assessments for each rural council area involved estimating how long stocks from the previous harvest could sustain consumption at required levels. Recommendations for food assistance were made equivalent to the residual "deficit". Part of the rationale for this was that traditional farmers would require continual aid during 1986 to avoid indebtedness and to allow sufficient reserved seed for planting (CARE, 1986).

Oxfam in Kordofan were also collecting, at the same time, a variety of socio-economic and nutritional data: food production as a percentage of subsistence requirement, cash crop production levels, family livestock holdings, local cereal prices and data on nutritional status. Some data indicated appalling conditions amongst specific nomadic groups, eg. the returnee nomads from Omdurman. However, as with CARE, Oxfam only appear to have utilised the data on harvested food output to assess need. The mean harvested output for a village site was estimated and extrapolated to the group of surrounding villages. The derived produce levels were deducted from estimated subsistence requirements and these deficits were aggregated at rural council level (MacLean, 1985b). The time period of deficit (in months) and the total shortfall (in tons of grain) were taken as the period for and the quantity of relief food requirement. Both CARE and Oxfam employed, at a disaggregate level, the conventional food balance sheet approach. Their assessments for rural councils were also similar. Only Oxfam were somewhat circumspect in their recommendations for providing relief food aid (MacLean 1985b). Amongst the reasons why both CARE Kordofan and Oxfam Kordofan failed to utilise the majority of their collected socio-economic data for estimating food needs were:

- lack of time to analyse the data,
- lack of an agreed methodology for analysing the data sets that were not used,
- lack of confidence in the accuracy of the data,
- subjective attribution of more importance to production data in needs assessment.

A narrow food balance approach involves the risk of overestimating needs if other resources are not taken into account. This possibility was highlighted by the Oxfam experience in the Red Sea Hills Province of Sudan. Two cycles of NST tours successively estimated average household income and food sources combined in the province as 34 percent and 59 percent of subsistence needs, largely due to a fall in cereal prices in the intervening period (Hale, 1986b, Hazerjian, 1986).

OXFAM Red Sea Hills Project, Sudan: The type of data collected, methods of collection and use were substantially modified over the life of the relief programme. Data
initially collected on food availability, livestock, the state of housing and child health were found to be of little value for assessment purposes. There were problems of unsatisfactory survey design and inadequately trained survey team members. Selection of houses surveyed was not random, some data were not quantifiable and those from different villages were often not comparable. In a second phase the team began to collect quantitative data on pre-drought and current stocks of major foods and sources of income. These data were then used for medium-term assessment of ration requirements based on stocks and income. Assessment of relief for a village was based on the cost to a family at current prices of one sack of sorghum per month. If the mean family purchasing capacity was only half that level the deficit was set at half a sack per household. A comparison of stock levels and sources of earnings made it possible to distinguish the marginally better-off villages, allowing differential rations to be set.

Data on nutritional status were also used in this model to determine short-term decisions on distribution. If malnutrition rates (moderate and severe) for under-fives exceeded 20 percent, full ration levels would be set for the forthcoming distribution, without regard to other socio-economic indicators. Where malnutrition levels were in the range 10–19 percent, a half ration was set. Where these practices implied large differences between the estimate of immediate need and required medium-term ration levels a policy of gradual reduction was adopted (Hale, 1986a).

The eventual need to distinguish different socio-economic categories of people in the village was also recognised. With the availability of NST data in late 1985 a new approach to needs assessment emerged. As discussed above, the NST's findings were used to estimate mean household stocks of major and minor sources of food and income by district. District mean values were subsequently used in estimating income from minor sources to simplify the tasks of the FMTs. The "full ration" for a village was then assessed on the basis of the average village stock holding and major sources of food and income, recorded by FMTs, and the minor sources of income and food, evaluated by NSTs. It was assumed that 75 percent of family income would be spent on durra. Within villages there was further discrimination between the pauperised nomadic pastoralists (full rations), those with subsistence incomes (half rations), and merchants and public sector employees (no rations).

SCF in Darfour: During this large scale relief operation socio-economic data were obtained predominantly by household survey. They included production of sorghum and millet, production of other crops, livestock holdings, availability of wild foods, and income-generating activities. The aggregated production data were then converted into grain equivalent food availability at a rural council level. If the food balance equation (food availability less estimated population times the level of per capita subsistence requirement) indicated at least a 40 percent deficit, the rural council would be allocated food equivalent to that deficit. The cut-off point for a food allocation to a rural council was set at a seasonally adjusted level ranging from a 20 percent to 35 percent deficit, on the assumption that below this level vulnerable groups would find sufficient support within the community. Livestock were not assessed in terms of their capital value, but as part of a herd providing income to the owner at a sustainable offtake level, based on assumptions about reproductive rate, life expectancy and infant mortality for each type of livestock (Buckley, 1987). Parallel with this comparatively sophisticated
household data gathering system, field officers with responsibility for area councils collected more general socio-economic data from village meetings. These officers made targeting decisions within zones or rural council areas based on first-hand knowledge of villages and village councils that allowed them to cross check the household data.

Only SCF, in their analysis of livestock data, and to some extent Oxfam Red Sea Province, appear to have recognised explicitly the need to restock. This represents a significant and desirable improvement in assessment methodology for nomadic and agro-pastoral communities. There are potential situations in which livestock numbers indicate a need to destock before relief food is provided if intervention is to address the cycles of self-perpetuating land degradation. But, in none of these cases, with the exception of Oxfam in the Red Sea Province, was there an explicit attempt to consider such longer-term issues.

MSF in Chad: the needs assessment and monitoring methodology adopted was perhaps the most innovative of the six case experiences. The socio-economic data included:

- numbers of displaced people in each population unit
- cause of displacement
- type of persons displaced
- homogeneity of families
- type of foods consumed
- family food reserves and the ability to buy food.

Clinical nutritional and approximate mortality data, as well as data on the existence of avitaminosis, were also collected. Each indicator was then given a subjective risk value based on field staff experience in the country. For example, if the seasonal displacement was habitual but occurring earlier than usual, the indicator would score two points. But, if the displacement was of cultivators who normally do not migrate then a score of three points was assigned. The differing predictiveness of indicators as a measure of nutritional stress was taken into account by ranking them according to four criteria:

- their ability to detect nutritional problems
- the degree to which they could indicate a specific nutritional outcome
- ease of measurement, e.g. their accuracy
- acceptability to decision makers.

Each indicator was weighted according to the foregoing criteria and overall scores were adjusted accordingly. It was found that this nutritional surveillance scoring system correlated well with an independent anthropometric survey: a score of 30 approximated to 13 percent incidence of severe malnutrition amongst under fives. Using UNHCR (1982) guidelines of 10 percent incidence of severe malnutrition as a possible threshold for intervention, and where no baseline data were available, a score of 30 was set as the threshold for intervention. Although a majority of the indicators used by MSF were “socio-economic” as defined in this paper, approximately half of the potential overall score was contributed by the purely nutritional ones. Thus the MSF methodology inte-
grated currently observable indicators of nutritional status with monitoring of the underlying social process. Five categories of intervention were consequently established, ranging from full dry ration feeding, in conjunction with supplementary feeding including Vitamin A prophylaxis, to continued surveillance to see how conditions changed. MSF in an initial evaluation of their methodology for needs assessment concluding that the choice of indicator and attribution of risk values will be highly location-specific. The system, it was concluded, must also be validated by anthropometric survey on a more selective basis.

These conclusions underscore possible limitations on potential use of and risks inherent in the MSF approach. Agencies without a longstanding involvement in an area often begin to operate on a task basis in response to an emergency request, as in the case studies in three regions of Sudan. In these circumstances, the scope for initially using a subjective approach to needs assessment is limited. There is also need for caution in regarding validation by anthropometry as providing an objective yardstick. Measurements of nutritional status may be confounded by many factors, such as incidence of disease or high infant mortality rates not related directly to levels of food intake. Interobserver variability (errors of observation) and the subjectivity in assessing scores for each indicator, may make the use of qualitative indicators less accurate than methods involving quantified assessments of resource availability. The great attraction of the MSF approach is that it provides a rigorous framework for systematizing the informal, subjective knowledge. For in practice many decisions were unavoidably made on the basis of such knowledge.

To summarise, this innovative approach is not a variant of the balance sheet method. It breaks new ground by integrating nutritional and socio-economic information.

Some issues raised by agency practice

The agency experiences reviewed, in quite diverse situations, suggest a number of lessons for ways in which socio-economic information can be used to assess need. The assessment of needs should be sensitive to indicators quantifying and accounting for the resources besides food production available to the affected population. This will help to dampen the effect of relief intervention on indigenous coping mechanisms and possible disruption of the local economy. The resources upon which people draw are likely to be considerable even following repeated harvest failures.

To take account of requirements in the medium-term rehabilitation and reconstruction phase, a more refined assessment of some needs, beyond a food balance sheet calculation and a crude assessment of sources of purchasing power, is required, especially for agro-pastoral and nomadic groups. For example, the desirable destocking/restocking of livestock should be considered. Similarly, it may be necessary to discourage certain types of coping mechanism if these are not thought to be in the long term interest of communities (e.g. charcoal production).

Relief agencies should not be overambitious about survey design and the volume of data they collect. The more significant indicators should be identified where possible, initially through a pilot survey or rapid appraisal, and then careful consideration given to selecting only those for which the agency has time and resources to collect and analyse the data. More forethought should be given to ways in which the data will be employed, and to the survey costs, before selecting the indicators.

Where a needs assessment methodology aims to account for all major household resources, data on all potentially significant contributors to income and
food must be collected as these are not always positively correlated. Proxy indicators cannot be used for those for which data are not collected.

A rapidly implementable parallel data system involving collection of more subjective data should be considered as an adjunct and a cross check for quantitative nutritional status and socio-economic surveys.

Before deciding to make an assessment based only on qualitative/subjective socio-economic data, there should be careful consideration of the agency staff’s experience in the affected regions and of whether geographical problems and the agency’s resource constraints and other responsibilities oblige it to adopt that approach.

Socio-economic assessment and targeting sub-populations within the survey region

In four of the case study operations the agencies only used socio-economic data to determine overall levels of relief requirements and to make targeting decisions for relatively large spatial units, e.g. rural councils in Sudan. The exceptions, MSF in Chad and Oxfam in the Red Sea Province, were able to survey a large number of sub-populations. On the basis of this more disaggregated data, Oxfam attempted to target in the Red Sea Province within villages by categorising three types of recipient.2

The potential of using socio-economic data to inform targeting programmes within communities requires further consideration. There are practical constraints and also doubts about the reliability of data for such discriminating practice (CARE, 1986).

The case study experiences suggest that an agency task force which becomes involved in a large scale emergency will find it difficult to undertake socio-economic assessment for targeting purposes at village or village council level, because it would mean surveying too many locations and households.

Monitoring in relief programme management

Monitoring a relief operation may involve socio-economic surveying:

- to re-assess the need for relief as circumstances change
- to minimise potential negative side-effects of relief aid, e.g. disincentives to agriculture
- to indicate when interventions should be made.

The six case studies agencies monitored in different ways and to different effect. In Kordofan, Oxfam conducted three monitoring tours collecting nutrition and socio-economic data over a period of one year. CARE also monitored periodically in Kordofan, collecting data on socio-economic conditions as well as on per capita food receipts and population numbers (CARE-E1 Obeid, 1985, 1986). However, this appears to have been cost-ineffective, since only production data were used for subsequent re-assessment. SCF appears to have undertaken the most intensive monitoring, conducting three surveys in Darfour within five months in order to re-assess needs at each allocation point within the relief operation. In the Red Sea Province, Oxfam initially planned for field monitoring teams to visit the villages every 45 days, but in practice it was only feasible to monitor villages every six months. It was, however, observed that the socio-economic indicators monitored changed little over the first three 45-day food allocation cycles which thus provided justification for less frequent monitoring. The NSTs established later conducted three monitoring tours collecting socio-economic and nutritional
data. MSF carried out a single needs assessment and restricted subsequent monitoring to communities with scores just below the threshold for intervention or reportedly experiencing deteriorating conditions.

The role of monitoring in assessing needs

Some agencies found it impractical to undertake regular socio-economic monitoring to re-assess needs during each cycle of relief aid allocation, while others made no attempt to do so. Perhaps a practical compromise would be a combination of the continuous monitoring of only selected socio-economic indicators and less frequent intensive monitoring. For example, Oxfam's Red Sea Province NSTs conducted only three tours over a year and these provided enough data to re-assess needs as the programme proceeded. Decisions on how intensively to monitor should reflect the resources available to an agency, what is known about the stability of the environment, and the scale of the intervention. Continuous monitoring of a few selected variables chosen on the basis of the initial socio-economic assessment because they reflect local conditions, is always desirable.

"Phase-Out": The role of socio-economic data in terminating relief operations

The reports on the six relief operations are not explicit on what data were used to inform phase-out decisions. However, in each case it is implicit that harvest prospects in conjunction with supportive socio-economic evidence were the main determinants of programme closure.

Two agencies report that nutritional data were used to support their decisions, Oxfam Red Sea Province and CAFOD in Kordofan. There are, however, reasons not to base programme closure decisions solely on nutritional data. Indicators of nutritional status can change quickly but, unless supported by consistent socio-economic evidence, can be misleading. For example, even following a relatively poor harvest the short-term post-harvest improvement in food availability may be reflected in measured nutritional status. Food and livestock prices may be better indicators as they reflect market knowledge of impending food shortage.

Monitoring potentially negative effects of emergency food aid

None of the six agencies whose experience is reviewed apparently addressed the issue of disincentive effects directly. Oxfam and SCF, monitoring conditions in Darfour, did report on a dramatic price-lowering effect of relief food. SCF also reported potential negative effects, such as a reduction in food production in the following season as farmers responded by altering production patterns away from food grains. The inflationary effect on certain agricultural wages of cheap food, which reduced incentives to work and created labour scarcity, were also recognised effects. Monitoring of future emergency programmes should watch for potential disincentive effects to allow for mitigation and avoidance of these.

Further research is required both during continuing emergency operations and through the retrospective analysis of data from previous ones, to establish whether guidelines can be provided for identifying and monitoring indications of potentially negative effects.

Acknowledgements

The authors would like to acknowledge the help of the NGOs whose experience is considered in this paper for providing documentation on their operations during the African emergency. The paper benefitted from the comments during discussions both at the out-
line and draft stage of a small working group including Professor Philip Payne, Dr. John Rivers, Ms. Wendy McLean of the Department of Human Nutrition, London School of Hygiene and Tropical Medicine and Dr. John Seaman, SCF (UK). The paper draws on findings from a project to review targeting methodology supported by a grant from the British Overseas Development Administration. The paper has its origins in discussions with the late Martin Forman whose interests and commitment to nutrition policy is much missed.

Notes

1 Oxfam purposely neglected to account for resources generated by charcoal production in the Red Sea Province, in the hope that by “over-providing” food aid, this potentially land-degrading coping mechanism would be discouraged.

2 The outcome of this attempt at intra-village targeting is not known. However one report states that most “responsible men” (individuals charged with responsibility for village level distribution) felt unable to exclude anyone from relief distribution on the grounds of wealth. This is despite an Oxfam survey finding that amongst the Beja of the RSP, perception of the vulnerable households were much the same as Western perceptions, i.e. large families, families with no livestock (Alfred, 1986).

References


protocol for nutritional surveillance in N. Sudan. Oxfam, Darfour, Sudan.


Jeremy Shoham
and
Edward Clay
Relief and Development Institute
1 Ferdinand Place
London NW1 8EE, UK
Diet and Nutrition during Drought – An Indian Experience

N. PRALHAD RAO

In 1987 India experienced one of the century’s worst droughts with two-thirds of its sown area receiving ‘scanty’ or ‘deficient’ rainfall. Delayed rains in some parts, though to some extent they relieved the water scarcity, did not brighten the prospects of agricultural production. In order to assess the diet and nutritional situation of the vulnerable population in the severely affected areas, rapid surveys were undertaken by the National Institute of Nutrition, Hyderabad, in five States of the country, namely Andhra Pradesh, Tamil Nadu, Karnataka, Orissa and Gujarat, during the months of October-December 1987. Results obtained during the current surveys are compared with the dietary situation observed in earlier droughts in the 1960s and 1970s, and it is concluded that the widespread hunger and its consequences encountered in earlier droughts could be averted, due mainly to the better food security and distribution mechanisms now available in the country.

INTRODUCTION

In 1987 India experienced what was labelled the century’s worst drought, both in terms of intensity and geographical spread. As many as 15 states and six union territories were declared to be drought effected. Two hundred and fifty two districts (out of 412) in the country received either ‘deficient’ or ‘scanty’ rainfall, heralding grim prospects of agricultural production (Surpal, 1987).

The adverse impact of such a drought on the country’s economy in terms of a drop in agricultural and industrial output, reduced purchasing power, and concomitant rise in unemployment, particularly of the rural labour force, can well be understood.

The National Institute of Nutrition, Hyderabad, therefore under took a rapid survey to assess the diet and nutritional situation in the drought-affected areas in several states, following the recommendations of the Indian Council of Medical Research Expert Group. The survey was carried out between October and December 1987.

SAMPLING METHODOLOGY

The survey was carried out in the states of Andhra Pradesh, Karnataka, Orissa, Gujarat and Tamil Nadu (see Fig. 1). As the survey was intended to be carried out in the worst drought-hit areas, the local officials concerned were consulted over the selection of one or two districts in each state and one or two blocks/taluks/mandals in each of these districts. At block/taluk level, a list was obtained of severely affected villages and the relief
FIGURE 1 Areas Surveyed for Drought Survey 1987–88
TABLE 1
Population covered in different states for the drought survey

<table>
<thead>
<tr>
<th>State</th>
<th>No. of districts</th>
<th>No. of blocks/ taluks</th>
<th>No. of villages</th>
<th>No. of children</th>
<th>No. of adults</th>
<th>Total No. of individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>1</td>
<td>5</td>
<td>13</td>
<td>788</td>
<td>710</td>
<td>1498</td>
</tr>
<tr>
<td>Orissa</td>
<td>4</td>
<td>8</td>
<td>67</td>
<td>1160</td>
<td>1919</td>
<td>3079</td>
</tr>
<tr>
<td>Gujarat</td>
<td>2</td>
<td>4</td>
<td>34</td>
<td>2059</td>
<td>1952</td>
<td>4011</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>4</td>
<td>8</td>
<td>16</td>
<td>739</td>
<td>1449</td>
<td>2188</td>
</tr>
<tr>
<td>Karnataka</td>
<td>5</td>
<td>14</td>
<td>32</td>
<td>1153</td>
<td>1911</td>
<td>3064</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>16</strong></td>
<td><strong>39</strong></td>
<td><strong>162</strong></td>
<td><strong>5899</strong></td>
<td><strong>7941</strong></td>
<td><strong>13840</strong></td>
</tr>
</tbody>
</table>

“Workspots” (wherever these were in operation) with particulars of the population. Four to five villages per block/taluk were randomly selected for the survey. The following method was followed for ensuring that the survey sample included the vulnerable population of landless labour, small/marginal farmers etc.

- Information was sought on whether any relief works were in progress in the village or its neighbourhood.
- All the workers participating in the relief work were examined on the spot for nutritional status.
- Every fifth person examined was questioned on (i) the wages he received and (ii) the number of his family members engaged in relief work.

In addition, the surrounding villages from where the relief workers were drawn were visited, to cover their children and other members of their households. Food consumption at household level was assessed, using a family diet survey questionnaire on a subsample of households (every 10th household covered by the study), and results were compared with the food/nutrient intakes observed in labourers’ households during the pre-drought (non-drought) period reported by the National Nutrition Monitoring Bureau of India. In areas where no relief works were in progress, surveys were conducted in villages taking care to include landless and poor communities.

INVESTIGATIONS

The survey consisted of the following investigations: General conditions in the area; assessment of dietary intake by the family diet questionnaire; assessment of clinical and anthropometric status (body weight and height) using standard procedures; and ongoing rehabilitation measures.

RESULTS

Coverage

A total of 5,899 pre-school children and 7,941 adults were examined for nutritional status, and 1,035 households covered for dietary assessment from 162 villages, distributed over 39 blocks and 16 districts of the five states (Table 1 and Fig. 1).
TABLE 2
Average consumption of foodstuffs (g/cu/day) in the drought affected areas (1987)

<table>
<thead>
<tr>
<th>Drought affected areas</th>
<th>Cereal and millets</th>
<th>Pulses</th>
<th>Green leafy vegetables</th>
<th>Other vegetables</th>
<th>Roots and tubers</th>
<th>Milk</th>
<th>Fats and oils</th>
<th>Sugar and jaggery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>505</td>
<td>12</td>
<td>13</td>
<td>58</td>
<td>10</td>
<td>17</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Orissa</td>
<td>488</td>
<td>28</td>
<td>23</td>
<td>55</td>
<td>29</td>
<td>7</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Gujarat</td>
<td>494</td>
<td>17</td>
<td>0</td>
<td>38</td>
<td>57</td>
<td>55</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>475</td>
<td>25</td>
<td>12</td>
<td>63</td>
<td>8</td>
<td>5</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Karnataka</td>
<td>550</td>
<td>27</td>
<td>10</td>
<td>54</td>
<td>20</td>
<td>23</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>RDI*</td>
<td>460</td>
<td>40</td>
<td>40</td>
<td>60</td>
<td>50</td>
<td>150</td>
<td>40</td>
<td>30</td>
</tr>
</tbody>
</table>

*RDI – Recommended Dietary Intakes for Indians (ICMR, 1981)

General Conditions

Many of the districts covered in different states were areas where drought conditions of varying degrees were known to prevail even under 'normal' rainfall seasons. In some of the areas surveyed, the drought conditions were stated to have prevailed for the preceding three years, as in Mahaboobnagar district of Andhra Pradesh and Kutch district of Gujarat; and with low yields of dry crops and high prevalence of under-employment, migration of labour to neighbouring areas was reported. The cumulative effect of drought in these areas was visible in the drying up of water sources for crops, including dug wells and canals and acute shortage even of drinking water. Scarcity of fodder was very acute in Gujarat in the districts of Kutch and Banaskantha, resulting in the mass movement of cattle to the nearby cattle camps where fodder was supplied on a nominal payment.

In some parts of Mahaboobnagar (Andhra Pradesh) and Orissa, the belated onset of rains had delayed agricultural operations. In Karnataka, relief works initiated in the months of July–August 1987 had been discontinued at the time of the survey, as the labour force had returned to their habitual farm work due to premonsoon showers (though delayed).

The district of Kutch, which included a sizeable pastoral population (like Rabaris), was hard hit, as the livestock had either perished or found refuge in specially established cattle camps. Fodder was transported by rail and road from Haryana and Uttar Pradesh. Scarcity of drinking water was acute, mainly in the districts of Gujarat, though deep tube wells and water supplies transported by lorries and camel carts brought some relief.

Dietary situation

The levels of food consumed by the households during the drought are given in Table 2. They have been compared with those reported by the National Nutrition Monitoring Bureau (NNMB) representing the 'normal' (non-drought) and Recommended Dietary Intake (RDI) levels (ICMR, 1981) (Fig. 2). The following observations can be made:

- Both during drought and non-drought conditions, most food items, except staple cereals and millets, were being consumed much below the recommended level of intake (RDI).
were lower than the weights during non-drought periods, except in the case of females in Karnataka, where the weights tended to be similar.

Anthropometric data of pre-school children (1-5 years) on growth retardation, defined in terms of weight-for-age deficits (Gomez et al., 1956) are given in Figure 4. The prevalence of severe grades of undernutrition (weight deficit of more than 40% of healthy normal children) was about three times higher in Mahaboobnagar (Andhra Pradesh) during the present drought. Such drastic change was not, however, found in the other areas.

Drought Relief Measures

Relief Works. Public works like road construction, earth embanking, excavation of tanks and canals, provided employment to the landless labourers, marginal farmers and other affected persons in and around their habitat. This measure, which minimised their migration to neighbouring urban and semi-urban areas, was most visible in Gujarat and Karnataka. The size of the labour force (50 to 500 or more) employed per "workspot" depended on the type of nature of the work. One or two members from each family were given employment and in Gujarat, at the time of team's visit, a maximum of three members per family were reportedly allowed to work. On an average each worker received about Rs. 11 per day. In Karnataka, the workers reported that their wages were Rs. 9-50 per head, part of it paid in the form of foodgrains. Other developmental programmes like National Rural Employment Programme (NREP), Rural Landless Employment Generation
- During the drought, consumption levels of almost all food items in all the states were lower than non-drought levels. In Gujarat, a slight rise in cereal consumption was noted during the drought. A drastic reduction in the levels of consumption of milk, pulses, sugar and jaggery was observed in some of the areas surveyed, e.g. milk in Andhra Pradesh, Gujarat and Tamil Nadu; and pulses in Andhra Pradesh, Gujarat and Karnataka.

- It is noteworthy that large-scale consumption of wild leaves and tubers (famine foods) eaten in distress conditions, was not noticed during the present survey.

**Nutrient intake**

The average nutrient intakes, presented in Figure 3 (a-c), reveal clearly that the diets were deficient in energy and vitamin A in all the states. Protein intake, which otherwise was normal during the non-drought period (NNMB), was also deficient in three of the five states surveyed.

A study of the frequency distribution of the households by energy intake showed that not a single household in Gujarat or Andhra Pradesh was subsisting on very low levels of energy ('Starvation Diet' – less than 500 Kcal per consumption unit per day). The percentages of such families were only 0.7%, 1.0% and 1.5% in the states of Tamil Nadu, Orissa and Karnataka respectively. Surveys previously conducted in severely drought-affected areas of Andhra Pradesh (Swaminathan *et al.*, 1967), Bihar (Swaminathan *et al.*, 1969) and Maharashtra (Krishnamachari and Pralhad Rao, 1974), indicated that the percentages of families subsisting on such 'starvation' diets were 47%, 8.2% and 3.8% respectively.

**Nutritional Deficiency Signs**

Nutritional deficiency signs encountered were of Protein Energy Malnutrition (PEM) among young children and vitamin A and B complex deficiencies and anaemia in other age groups. Prevalence rates of these signs were not much different from those observed during non-drought periods (NNMB surveys, 1976–78).

**Anthropometry**

Body weight is known to respond even to short-term changes in food intake. The average body weights of adult men and women are given in Table 3. It was only in Gujarat that the body weights of both men and women were higher by about 1 Kg. In the other states, current weights

---

**TABLE 3**

<table>
<thead>
<tr>
<th>Drought affected areas</th>
<th>Males Present study</th>
<th>NNMB 1974–79</th>
<th>Females Present study</th>
<th>NNMB 1974–79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>46.9</td>
<td>50.6</td>
<td>41.3</td>
<td>43.2</td>
</tr>
<tr>
<td>Orissa</td>
<td>48.7</td>
<td>50.5</td>
<td>40.0</td>
<td>41.6</td>
</tr>
<tr>
<td>Gujarat</td>
<td>51.2</td>
<td>50.0</td>
<td>44.8</td>
<td>43.9</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td>49.9</td>
<td>50.3</td>
<td>42.3</td>
<td>44.2</td>
</tr>
<tr>
<td>Karnataka</td>
<td>48.6</td>
<td>50.0</td>
<td>42.3</td>
<td>42.5</td>
</tr>
</tbody>
</table>
FIGURE 3  Average Consumption of Nutrients (cu/day) during Drought and Non-Drought Periods
were lower than the weights during non-drought periods, except in the case of females in Karnataka, where the weights tended to be similar.

Anthropometric data of pre-school children (1-5 years) on growth retardation, defined in terms of weight-for-age deficits (Gomez et al., 1956) are given in Figure 4. The prevalence of severe grades of undernutrition (weight deficit of more than 40% of healthy normal children) was about three times higher in Mahaboobnagar (Andhra Pradesh) during the present drought. Such drastic change was not, however, found in the other areas.

**Drought Relief Measures**

*Relief Works.* Public works like road construction, earth embanking, excavation of tanks and canals, provided employment to the landless labourers, marginal farmers and other affected persons in and around their habitat. This measure, which minimised their migration to neighbouring urban and semi-urban areas, was most visible in Gujarat and Karnataka. The size of the labour force (50 to 500 or more) employed per “workspot” depended on the type of nature of the work. One or two members from each family were given employment and in Gujarat, at the time of team’s visit, a maximum of three members per family were reportedly allowed to work. On an average each worker received about Rs. 11 per day. In Karnataka, the workers reported that their wages were Rs. 9-50 per head, part of it paid in the form of foodgrains. Other developmental programmes like National Rural Employment Programme (NREP), Rural Landless Employment Generation...
Programme (RLEGP), etc., were in operation with additional emphasis in the affected areas.

Supplementary Feeding. In Orissa, special emergency feeding programmes were being operated, based on rice and pulses for young children and women. Each pre-school child received cooked food consisting of 80 g. rice and 20 g. pulses, while adult women (pregnant and lactating) and the elderly received about 160 g. rice and 40 g. pulses. In the district of Kutch (Gujarat), distribution of ‘Sukhadi’, a centrally processed ‘ready-to-eat’ preparation based on wheat, jaggery and oil, had just then been started by a voluntary agency – Bansali Trust. Each pre-school child received 80 g. of Sukhadi (340 calories and 6 g. protein) and pregnant and lactating women received double that quantity. A school meal programme providing about 500 calories and 10-12 g. of protein per head, was operating in Gujarat for children of 6-11 years. Tamil Nadu had feeding programmes, in which pre-school and school children were receiving a cereal-pulses-vegetable supplement. In other states the ongoing Integrated Child Development Services Scheme (ICDS), Special Nutrition Programme (SNP) and Mid-Day Meal Programme (MDMP), provided Supplementary Feeding.

COMMENTS AND CONCLUSIONS

Drought conditions invariably develop when the monsoon fails to materialise. Their severity, usually measured in terms of crop failure, depends on the decline in quantity and/or regularity of rainfall. Drop in agricultural production (farm income) and industrial output, and the enforced idleness of the labour force are some of the adverse economic effects of drought. However, there are no clear-cut and reliable nutrition or health indicators which could be considered to reflect the impact of drought. The reason for this is the difficulty of separating the direct effect of drought on health from the effects of associated factors, such as migration, the break-down of the social frame-work, and other conditions of insecurity (Prost, 1988).

The primary effect of drought is on agriculture; hence its worst victims, from the stand-point of nutritional health, are rural landless labourers and marginal and small-scale farmers. Dietary surveys have shown that even in ‘normal’ times i.e. when the rains are normal, their diets are deficient in important nutrients like energy, vitamins and minerals. That drought imposes additional stress on the already deficient food intakes, needs no emphasis.

In the present study the consumption of almost all the food items showed a decrease. In the case of protective foods – pulses, vegetables and milk – the drop was more distinct than that seen in the staple food (cereal/millet). So also the levels of consumption of oils, fats and sugar were much reduced. Hence, the adverse impact was thus found more on dietary quality (vitamins and protein) rather than on quantity (energy content). In most areas the energy content of the diet tended to remain at former consumption levels, despite the widespread drought. Strictly speaking, comparison of dietary and nutritional conditions of the current drought with those obtained during the droughts of the sixties and early seventies may not be valid, because of the changed circumstances. However, a comparison of the experiences of the past droughts with the current one can be expected to highlight differences in food availability and the management strategies adopted. The results indicate that during the current drought:

- the average energy intakes of landless and other labourer households in general has been found closer to the former (non-drought) level of about 2000 Kcal, reported by NNMB surveys,
- the households subsisting on starvation diets (/500 Kcal/cu/day) (less than 2%) have been far fewer than in the earlier droughts, and there was a virtual absence of households subsisting on wild leaves and tubers (famine foods), such as was seen in the drought of 1965–66.

These observations if anything speak of the better availability and supply position of food grains, which in turn would indicate the better infrastructure facilities, food distribution machinery, and above all management strategy now prevailing in the country for meeting such a crisis.

It is pertinent to mention here that towards the beginning of 1987 the country had food grain stocks of about 23 million tonnes, (of which 3 million tonnes were stated to be unfit for human consumption) and these stocks have been built up over the years. By the middle of 1988, the stocks were reduced to eight million tonnes. Given the fact that a transfer of food from surplus to deficit areas does not happen automatically, but needs political and economic discipline (Hay, 1986), the brisk movement of food grains from the Food Corporation of India (FCI)s warehouses to distribution outlets in areas of scarcity, reflected the awareness and commitment of the Government of India to a policy of national food security. The availability of stocks of food grains within the country not only reflected a measure of success achieved by the agricultural sector, but also suggested the presence of an implementable food policy. But for this policy and other concerted efforts by the regional governments, the country would have witnessed widespread hunger and the adverse consequences encountered during earlier droughts. The recent drought, perhaps, has also brought out clearly that India’s agriculture, despite apparent progress made during the past several years, continues to be sensitive to the weather and a buffer stock of the order of 23 million tonnes is not much of a consolation, as a shortfall of about 20 million tonnes in output due to one very bad season is enough to almost wipe it out (Velayudham, 1987).

Communicable diseases like gastro-enteritis (cholera) in epidemic forms, food intoxication (e.g. cyanide and aflatoxin toxicity) resulting from consumption of wild tubers and fungus-infested grains, usually followed past scarcity situations (Krishnamachari et al., 1975). Their absence during the current drought is noteworthy. However, prevalence of night blindness in epidemic proportions reported from certain areas of Rajasthan (K.A.V.R. Krishnamachari, personal communication) compared to its absence in the neighbouring districts of Gujarat, calls for further investigation. Perhaps, under food scarcity situations caused by drought, vitamin A deficiency is one of the earlier signs of malnutrition to manifest itself, rather than signs of anaemia and other vitamin B deficiencies. The development of drought into distressing famines as witnessed in recent years in some of the African countries can be traced as much to the non-availability of a viable food security system or distribution mechanism at country level, or to unstable socio-economic and political conditions, rather than simply to a lack of food (Miller and Holt, 1975). The logic of ‘more food production = less hunger’ at a general level works only if other socio-economic and political conditions are conducive to organised action on a continuous basis. The Indian situation seems largely to indicate this. Maintenance of a near ‘status quo’ nutritional position in young adults and pre-school children in most areas, cannot, of course, be considered an outstanding achievement. But neither can it be entirely dismissed, since it stands out in sharp con-
tast to the situation seen, for example, in Bangladesh refugee camps, where the proportion of the severely malnourished was much higher than was usually seen in the community (Swaminathan et al., 1973).

However, the continued vulnerability of food productivity to the vagaries of the weather and the absolute dependence of the rural poor in scarcity relief works (for income) and fair price shops (for food grains) in times of such crisis has become abundantly clear. Loss of livestock reported in some areas like Gujarat, demonstrate the weakness of the present system in this respect, which leaves livestock under stress to fend for themselves. The drought has also underscored the need for maintaining adequate food-grain stocks, extending the network of fair price shops in drought-prone areas, and for the creation of subsidiary employment on a permanent basis.

The most important observation derived from the present survey, from the standpoint of diet, is the drastic reduction in the consumption levels of pulses. With the ongoing distribution of the staple cereals and edible oil through the fair price shops, a minimum quantity of 40 g. of pulses, besides 500 g. of cereal per person per day, would be sufficient to maintain the protein content of diets during drought. In other words, this would mean that a supply of about 5 kg pulses to a family of three adults and two children (four consumption units) should be ensured. In order to curb any likelihood of the misuse and resale of pulses, the feasibility of distributing them mixed with cereals during drought conditions could be explored. Similarly, programmes of specific nutrient supply, like supplementary feeding, massive doses of vitamin A and iron and folic acid for vulnerable groups, should be an integral part of any food distribution strategy, so that the worst forms of malnutrition and their consequences can be prevented.

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N. Pralhad Rao
(Chief, Division of Field Studies)
National Institute of Nutrition
Indian Council of Medical Research
Jamai-Osmania, P.O.,
Hyderabad–500007
A Case Study of Social Behaviour in a Natural Disaster: The Olivares Landslide (Spain)

JOSE LUIS GONZALEZ GARCIA and MARIA VICTORIA SORIANO PARRA

The modern sociological literature on disasters highlights the fact that many of the ideas about human behaviour in disasters which were long considered as valid, are wrong. The main discovery is based on the fact that situations of crisis increase people's moral principles and capability of response. This paper illustrates some of these ideas, in a case study of a village which was struck by a natural disaster in the north of Granada (Spain) in 1986. The population's attitude revealed a huge potential of resources that were underestimated by professionals of disaster management. The analysis shows that it is necessary to bring civil protection systems and the population's capability of response into close harmony.

INTRODUCTION

Over the years, much research has been carried out in North America on human behaviour in disasters. Study of the resulting literature shows some interesting findings about people's behaviour and reactions in emergency situations. These findings cast doubt on the image given by the cinema, the television or the press, destroying the myths that were previously considered fundamental in disaster management.

The belief that the population will be affected by panic or hysteria, and the idea that disasters engender social chaos, antisocial behaviour, confusion and bewilderment, have been common among the mass media and those responsible for public planning and disaster relief efforts. However, several social researchers (Quarantelli, 1973; Dynes and Wenger, 1983) now point out that these ideas are wrong, or, at least, they have been overvalued.

The studies carried out in the last 30 years have shown that panic behaviour is rare, even non-existent, in natural disasters, and only constitutes an important problem in fires or other similar circumstances, in which the human being must cope with complex situations that evolve very quickly and in which the information available for decision-making is very sparse (Canter, 1980).

It has also been pointed out that looting and antisocial behaviour are relatively rare, with the observation that Police files show no increment in the crime rate during the emergency period.

The notion that disasters cause a situation of bewilderment and paralysis (the "disaster syndrome") cannot be considered as a universal model, because the
scientific literature is full of remarks which show that the persons who rescue the victims are the victims themselves, the ones who take care of the injured people are the affected people themselves, and the recovery of the essential services is carried out by the survivors themselves. These discoveries, generally verified in the U.S.A., have not been sufficiently confirmed in other countries, and although there is a parallelism among the disasters which have happened in different countries, it is necessary to confirm these facts by observing situations which arise outside the U.S.A.

THE LANDSLIDE OF OLIVARES
In April 1986, some of the observations mentioned above were illustrated during an emergency which took place in the north of the province of Granada (Spain) as the result of a landslide that menaced Olivares, a little town with a population of 1,000.

The landslide destroyed several agricultural enterprises, a factory related to dry goods, communications, the electricity supply systems and the water pipes, and very seriously threatened the school, the church and the eastern side of the town. These facts made necessary the intervention of several public works services, the Red Cross, the Police Department, the Military Forces and scientific teams, who evacuated 70 families from the high risk zone of the designated security area (Gonzalez Garcia, 1987).

Although the emergency did not cause serious damage to health, it is clear that the gravity of the economic losses and the heavy and imminent threat of destruction of the town because of the advance of the landslide front, had a deep influence on the usual social behaviour of the population.

One of us was sent, as a coordination officer, to the place where the emergency occurred, and had the chance of making several direct observations and of carrying out informal interviews with the people.

One of the most remarkable aspects of their social behaviour was the population's high sense of participation and solidarity, which existed in every moment. This is in contradiction with the belief that disasters produce discouragement and antisocial behaviour, and which usually leads those responsible for civil protection to underestimate the local possibilities of self-reliance.

People affected by the emergency were not bewildered or disoriented at all. On the contrary, they reacted positively and efficaciously, with a high sense of responsibility. Many of the civil protection activities, such as the closing of the affected area, the organization and maintenance of an operational coordination centre, and some actions of logistic support, were correctly carried out by volunteers who were coordinated by the local authorities. One of these, the Country Council of Granada, made a brilliant response from the start, by supplying experts, evaluating the damage and even examining the affected area from the air.

Besides this, no measures to provide temporary housing of the people affected were necessary, since all the evacuees were lodged by their families and friends.

There was no panic or hysteria among the population, although the circumstances of imminent danger persisted. On occasion, it was even necessary to convince the curious of the instability of the slope and the danger of blocks sliding.

Yet, at the same time, there was a general feeling of fear and nervousness amongst the neighbourhood. Unlike the curious who arrived from other areas, the inhabitants of Olivares had received better information about the nature of the hazard that threatened them, which made them feel the anguish of losing their houses
and properties. This natural anxiety, faithfully reflected in the local press (El Ideal de Granada, 16 April 1986) gave those responsible for emergency management some qualms about the appropriate level of public information. They were very concerned to calm the population down and avoid excessive alarm, for fear of causing panic.

These concerns inevitably caused a certain anxiety over the broadcast of warning messages and some ambiguities and limitations in the information made available, which brought about the propagation of rumours and a loss of confidence in the civil protection officials.

Those affected were insatiable for information about the causes and evaluation of the phenomenon, which was an embarrassment for those responsible for public information.

Many specialists thought that the disaster had been triggered off by the exploitation of a quarry within the affected area. According to them, the quarry would have altered the natural drainage of the ravine, modifying the gravitational balance of the slope. However, other experts were less sure about the role played by the quarry. How should these doubts be transmitted to the population?

The mass media were not very helpful, because they were obsessed by the search for a tragic end and the visualization of an image that distorted the nature of the phenomenon, which they called “the walking mountain”, “the earth’s revolt” or other similar epithets.

The misuse of sensational headlines, the selection of certain pictures of the destroyed area and the reporting of dramatic anecdotes, created an image that exaggerated the real significance of the situation.

This fact supports a theory that has been tested by some social researchers (Dynes and Wenger, 1983), according to whom, the mass media involuntarily give an unreal image of disasters, by including in their reports an overdose of the tragic aspects of these situations.

CONCLUSION

The landslide of Olivares was a good chance to confirm in Spain several findings about social behaviour in natural disasters, which have been formulated elsewhere, particularly in America.

Panic and hysteria were absent during the emergency, the social atmosphere was rather good, and the local and volunteer organizations showed a capability of response even greater than would be expected in a normal situation.

Such remarks induce us to highlight the following observations:

The local population is a basic and potentially active element in disasters, responding with a high sense of altruism and efficacy.

Harmonizing the different forces which take part in a disaster is a complex and difficult task. The difficulties of coordination, deficient communications and the lack of adequate knowledge to take decisions, can never be perfectly resolved.

The affected population and the local organizations are the main elements which provide the response to many disaster situations. Outside relief groups must complement and support those actions, but never take the place of the local relief efforts and self-reliance.

These observations lead us to consider that emergency planning cannot be conceived of as a task that is only carried out by management emergency officers and relief groups. Emergency planning must also be envisaged from the point of view of the survivors and the affected citizens. We think that the most adequate solution to these problems lies in conceiving of disaster planning as a process composed of three stages.

As a first step, the organizations
responsible for civil protection and disaster management elaborate a basic plan, and the guidelines for the relief groups. In the second stage, all the relief groups formulate concrete proposals for operating within a planning committee. In the third stage, the public response to hazard and disaster is prepared, chiefly through public information and education programmes.

We believe that these three stages of planning must be interconnected. We cannot formulate operational concepts while assuming that the population is going to behave in accordance with the actions projected by the authorities.

The emergency planning of the first and second stages must take into account the possible behaviour of the population, and be flexible enough to allow improvisation and unpredicted emergent phenomena.

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José Luis Gonzalez Garcia
and
Maria Victoria Soriano Parra
Dirección General de Protección Civil
c/ Evaristo San Miguel,
No. 8
28008 Madrid, Spain
Experiences of Non-Governmental Organisations in the Targeting of Emergency Food Aid

A report on a "Workshop on Emergency Food Aid Targeting" at the London School of Hygiene and Tropical Medicine, London 4–6th January 1989

JOHN BORTON and JEREMY SHOHAM

INTRODUCTION

In January 1989 a two and a half day "Workshop on Emergency Food Aid Targeting" was held at the London School of Hygiene and Tropical Medicine (LSHTM) supported by a grant from the Health and Population Division of the Overseas Development Administration. This was part of a study of the methods used by Non-Governmental Organisations (NGOs) in targeting emergency food aid in Africa carried out jointly by the Relief and Development Institute (R.D.I.) and the Human Nutrition Unit, LSHTM. The objectives of the workshop were:

i) to provide an opportunity for participants to share their experiences in targeting emergency food in Africa during 1983-86;
ii) to obtain feedback on the overview paper and additional details on the case studies which had been prepared as part of the overall study;
iii) to look for areas of consensus on issues raised by the study and to identify other areas requiring follow-up and further research.

The response to the African food crisis of 1983–86 differed from previous large scale international relief activities in Africa in that:

a) substantially greater volumes of food were distributed to people still in their place of normal residence as opposed to camps. Though the data to support this assertion is poor it would appear that over half of the 5.4 million tonnes of cereals provided as emergency food aid between mid-1983 and mid-1986 (at a total cost in excess of $1.5 billion), was distributed to people still living in their area of normal residence.
b) the role of NGOs in these distributions was substantially greater than ever before. In the two major recipient countries (Ethiopia and Sudan) NGOs were frequently the preferred channel for distribution by donors for a variety of operational, accountability and political reasons.
Through their involvement in the distributions NGOs were frequently involved in the process of selecting areas and population groups to receive the distributions. As a result many NGOs gained considerable experience in the "targeting" of emergency food aid. Thus the RDI/LSHTM study was intended to assist in the documentation and analysis of these experiences.

As part of the overall study, the following 13 case studies were prepared using documentation made available by the participating agencies and interviews with agency personnel.

1. CAFOD/SUDANAID: Supplementary Feeding Programme, En Nahud Area Council, North Kordofan Province, Sudan 1985
2. CARE: General Feeding Programme, Kordofan Region, Sudan 1984–85
3. CARE: Supplementary (Wet) Feeding Programme, North Kordofan Province 1985–86
4. CARE: Supplementary (Dry) Feeding Programme, En Nahud Area Council, North Kordofan, Sudan 1986
5. CONCERN: Supplementary Feeding Programme, Sidamo Province, Ethiopia 1984–85
6. ICRC: Methods used in the targeting of ICRC feeding programmes
7. LRCRS: Supplementary Feeding Programme, Chad 1985–86
8. MSF Belgium: Programming of General and Supplementary Feeding Interventions, Chad 1984–85
9. MSF FRANCE: Supplementary Feeding Programme, Tahoua and Maradi Departments, Niger 1985–86
10. MSF HOLLAND: Supplementary (Wet) Feeding Programme, North Darfur Province, Sudan 1985–86
11. OXFAM: General Feeding Programme, Red Sea Province, Sudan 1985–87
12. REDD BARNA: Supplementary Feeding Programme, Sidamo Province, Ethiopia 1985–86
13. Save the Children Fund: General Feeding Programme, Darfur Region, Sudan 1985–86

Case studies numbers 1 and 7–13 were presented at the workshop.

The workshop was organised primarily around presentations of case studies by eight of the participating agencies. For the purposes of the workshop a somewhat arbitrary distinction was drawn between General and Supplementary Feeding Programmes so that each broad type of programme activity was discussed on separate days. As a preliminary to each of the first two days the researchers presented sections of an overview paper prepared after an initial review of the material in all the case studies (Shoham and Borton, 1989). Three working groups discussed topics identified during the first two days of the workshop and their findings were presented during the final session.

There were enormous differences between the programmes reviewed at the workshop in terms of the type of activity, the scale of operations, the level of resources available and degree of autonomy enjoyed by the agency. Thus the largest programme presented was the Save The Children Fund – UK (SCF) General Feeding Programme in Darfur which distributed 190,000 tonnes of cereal between late 1984 and late 1986, whilst the smallest was the highly targeted "wet-feeding" programme implemented by MSF-Holland in North Darfur, which at its peak in early 1985 was distributing approximately 40 tonnes/month to 5,000 recipients. Despite such differences, it was agreed that there were many similarities in the experience of the participating agencies. For example, all programmes experienced the difficulties of designing targeted interventions on the basis of very limited knowledge.
programmes had to adapt to rapidly changing situations, and virtually all programmes experienced logistical problems.

This report aims to synthesize points raised during the workshop and discusses them under thematic headings: Targeting; definitions and objectives; The choice of indicators; Role of the donors; Taking account of the perceptions of the affected population; Issues in the choice of programme; Issues in the evaluation of targeting methods and Issues for further consideration.

TARGETING: DEFINITIONS AND OBJECTIVES

In their overview paper, Shoham and Borton (1989, p. 5) defined targeting as "the process by which areas and populations are selected to receive a resource (emergency food aid) and then provided with it". The reasons why agencies target emergency food aid were suggested to be:

- limited resources;
- the desire to concentrate on the worst affected areas and populations;
- the desire not to damage the local economy.

Neither the definition nor the suggested reasons for targeting were challenged by participants.

Nevertheless, an issue that underlay many of the discussions (and consequently is discussed at greater length at different points in this report) was that of the objectives and assumptions implicit within targeted interventions. It was recognised that NGOs, together with many of the other organisations involved in relief programmes, rarely make explicit their objectives. Notions of saving life and reducing distress are implicit in their actions but are too broad as objectives against which actions can be tested. The lack of clarity in objectives creates significant difficulties in the analysis of agency practice and the evaluation of performance. The frequent absence of clear and concise objectives is understandable for a number of reasons.

First, relief operations involve many different organisations and groups of people (the donor public, donor organisations, NGOs, host governments and the affected populations themselves), all of whose perceptions of the situation, and so of objectives, may differ.

Second, emergency situations are inherently dynamic and the objectives of a relief programme may alter substantially during the life of a programme. The importance of flexibility in the design and management of relief programmes was stressed on several occasions during the workshop.

Third, there is limited understanding of the underlying processes operating during food crises in different areas and situations. Relief agencies are therefore forced to make assumptions when designing and managing programmes, with only sketchy information on such complex matters as coping strategies of the affected population, the effectiveness of traditional institutions and the operation of local grain traders and markets. Some of these assumptions may later turn out to have been incorrect. An example cited was that of an agency operating in Karamoja in northern Uganda where family rations were distributed on the assumption, derived from experience elsewhere in Africa, that the food would be shared within the family. However, three months later the high mortality rates had not been reduced and the agency came to realise that "uneconomic" members of the family were being discriminated against in the allocation of food within the household.

The lack of clarity in objectives is perhaps most evident in the case of General Feeding Programmes. There often appears to be some uncertainty as to
whether the objective is to save life or preserve asset holdings and thereby improve the rate of recovery in the post-emergency phase. Significantly different targeting methods might follow from the adoption of either of these as the primary objective. The total cost of the General Feeding programme implemented by SCF in Darfur from late 1984 until late 1986 is estimated to have been US$ 86 million, if all food and logistics costs are included in the estimate. It was suggested that these operations may have been less cost-effective when assessed in terms of saving life than in terms of assisting recovery.

THE CHOICE OF INDICATORS

Introduction

Before designing surveys for targeted food relief programmes an agency must establish which indicators are to be used for differentiating need between areas and populations. A substantial part of the discussion during the workshop concerned: a) problems in the use of anthropometric data for targeting purposes, and b) the potential role of socio-economic indicators for targeting purposes. The attention given to these two subjects reflected a general feeling that too great a reliance has been, and continues to be, placed on anthropometric data, such as weight-for-height data, for targeting purposes. In addition there was a real sense that recent experience had demonstrated that socio-economic indicators, such as grain and livestock prices and migration, offer a valuable, if not presently well understood, tool for targeting. At times the discussion veered towards an either/or format but this was inconclusive. There was in the end a consensus that in most situations the two types of indicator are complementary and so, where possible, both should be employed in targeting interventions.

Problems in the Use of anthropometric Data

There was general agreement that anthropometry is not the "exact science" that it is often claimed to be.

One conceptual problem with anthropometric data which continues to be poorly appreciated by non-nutritionists (including decision-takers within donor bureaucracies) is that such measurements of malnutrition do not necessarily reflect insufficient food intake of the measured individual. There are many causes of malnutrition which are not related to food availability, the most common being diarrhoea. Whilst not intended to detract from the awful suffering involved, it was suggested that representatives of the western media who search out the most emaciated children during emergencies may in some cases be focussing on children who have been suffering from chronic diarrhoea. These children might therefore respond more to medical treatment than food relief.

A further problem is that of using a single anthropometric cut-off point. This involves converting something which we know to be a continuous function into a single "Yes/No" situation. Such cut-off points are arbitrary and contribute to the false air of quantification surrounding anthropometric data. One nutritionist explained how she had attempted to introduce some flexibility into a Supplementary Feeding Programme which had been strictly employing anthropometric cut-off points to assess eligibility for admission, by allowing the final decision on whether or not to admit a child to the programme to be taken by the medical and nursing staff managing the feeding centres. This resulted in subsequent difficulties with Head Office staff and donors who questioned the inconsistencies between the numbers below the cut-off point and the numbers receiving rations.
The technical difficulty of carrying out accurate anthropometric measurements was noted. A stark example was an experiment in Darfur in late 1985 in which the same 131 children were measured by two nutritional assessment teams, one from MSF-Holland using the weight-for-height method and the other from the League of Red Cross and Red Crescent Societies (LRCRCS) using the Nabarro Chart method (Soeters, 1986). The former estimated that 24% of the sample were less than 80% weight-for-height whereas the latter estimated that 48% were less than 80% weight-for-height. Thus two different teams reached conclusions on the incidence of malnutrition which differed by 100%.

The difference was attributed primarily to observer error rather than differences between the methods used, though it was noted that the results from the Nabarro Chart for children above the age of three could show differences from those measured using the weight-for-height standard. It was pointed out that the Nabarro Chart was used widely by MSF-Belgium in Mali but only in conjunction with a head and foot-board. The fact that this additional equipment was not used by the LRCRCS team may have contributed to the degree of observer error.

This example shows how the techniques involved in anthropometric surveys are not as straightforward as sometimes thought by non-nutritionists. It was acknowledged that some agencies failed to realise the importance of repeated training and checking of those staff responsible for carrying out the measurements. The LSHTM's experience of anthropometric surveys in Britain has shown that inter-observer error could be reduced to less than 5%, but that this required repeated observer evaluations. It was naive to expect staff to be able to get consistent results after only one training session.

The issue of how to reduce the importance attached to anthropometric data was discussed at length. The attitude of the donors was seen to be crucial (see below). However, it was felt that non-nutritionist Head Office staff of some of the large NGOs were also to blame. Anthropometric data offered such staff a "technically respectable" set of figures on which to base their decisions to allocate resources. Figures were favoured because they gave decision-takers a basis for decision, as well as subsequent cover should a particular decision be queried at a later date. One participant saw non-technical superiors in agency Head Offices operating as a "filter" to effective communication between nutritionists and the donors. He was confident that if he were allowed direct communication with donor officials then the case for greater flexibility in the use of anthropometric data would be received and understood.

An example from Chad was cited where, despite a rapid anthropometric survey which had revealed comparatively low rates of malnutrition, socio-economic information obtained by the nutritionist convinced her that the situation was bound to worsen. Nevertheless, on the basis of the anthropometric results, the Head Office of the agency concerned was extremely reluctant to make an intervention in the area.

It was, however, pointed out that this experience - of too much significance being attached to anthropometric data by Head Office staff and donors - was not common to all participants. A participant from Redd Barna pointed out that anthropometric data was collected by their programme in southern Ethiopia, but was never requested by the agency's Head Office.
The Potential of Socio Economic Indicators

Most agencies had used socio-economic information both in their assessments and for targeting purposes and had found them of considerable value, either when used alone or in conjunction with anthropometric data. No attempt was made to define the term "socio-economic indicator" and it was frequently used in a very broad sense to encompass variables such as agricultural output, household income and asset surveys, reports on the incidence of wild food consumption, trends in grain and livestock prices, the incidence of displacement, etc.

There was general agreement that the perception of socio-economic indicators as "woolly" is not justified. There is no reason to believe that it is inherently more difficult to construct a logical framework for using socio-economic information than anthropometric information. As highlighted during the workshop, anthropometry itself is not an exact method. It was however acknowledged that further investigation is needed to develop the theory underpinning the use of socio-economic information for monitoring and targeting purposes and to establish more situation-specific models for different food crisis-prone areas. However, this should not be interpreted as rendering the concept and much of present practice of little use.

There was much interest in the Scoring System used by MSF-Belgium in Chad. Nine indicators had been selected and weighted on the basis of their ability to predict a nutritional decline. Mobile teams touring the country gave a score to each indicator. The total of the scores was then used by the Government to set the level and type of intervention by agencies in different areas of the country (Autier, 1988). This was seen as having been the first attempt at weighting different socio-economic indicators. It was noted that the system had been accepted by the donor community soon after its commencement at the end of 1984, because:

- the Government of Chad had adopted it as its system for allocating emergency food aid, and;
- the first results had shown a high correlation with anthropometric surveys carried out by MSF-Belgium in the same areas;
- an independent and highly regarded organisation (the Centre for Disease Control) had given the Scoring System its stamp of approval at an early stage.

Lessons from this experience might be drawn by agencies facing problems in convincing donors of the utility of other systems utilising socio-economic indicators.

The validity of attempting correlations between anthropometric and socio-economic data was questioned as there is the danger that the same things are being compared and good correlations are probable. This provoked a lengthy discussion about indicators and outcome variables. One conclusion of this discussion was that socio-economic indicators may correlate in some situations with anthropometric indicators but not in others. That such correlations may vary even within the same area was shown by the results of a study in Kerala, India, where there was little relationship between stunting and income in areas which were poorly served by water and electricity provision, but a stronger correlation was apparent in areas which were better served by such services.

Another conclusion was the recognition that the search for a single indicator which will tell us everything we want to know is futile. Each indicator can tell us a little about complex processes, but single indicators capable of summarising pro-
cesses in different areas simply do not exist. Chen's work in Bangladesh has shown that the best predictor of mortality is the floor area of the home. In another country with different living conditions and a different disease spectrum this indicator may have only limited predictive power (Chen, 1980). Of all the socio-economic indicators examined in cross-country comparisons, female literacy always gives the best correlation with the nutritional status of children.

Though the MSF-Belgium Scoring System had been developed by staff with a good knowledge of the country, it was suggested that the values attached to each indicator were possibly more a reflection of the opinions and value statements of these staff, than of an underpinning body of theory on such matters as the relationship between household migration and food intake. The need for further work to develop this theory was agreed. Again it was pointed out that by virtue of their role and collection of data, NGOs had a key role to play in the development of this body of theory.

Whilst the problems of anthropometric data were acknowledged, some participants pointed out that the collection of socio-economic data was also sometimes fraught with problems. Falsification of answers to questionnaires with the intention of obtaining more resources from an agency was not uncommon. Civil conflict is often a major contributory cause of famines, yet in such situations it was often not possible to obtain reliable information on the size of households because the presence of men of recruitable age was concealed.

Knowledge of Underlying Processes Operating During Food Crises and Type of Survey Procedure

There were different views over the extent to which information on the underlying processes was usually available. One view was that situations in which little was known are in fact rare. Information does exist on different areas, but may be difficult to obtain because it is spread across several different disciplines such as anthropology, geography, agricultural economics, politics, tropical medicine and nutrition. The need, according to this view, was for agencies to go to greater lengths to ensure that personnel are aware of all the available information before departing on a new assignment. The "excuse" of time pressure for this not happening more often was frequently not valid. It should be possible for agencies to anticipate areas where emergency programmes are likely to be implemented several weeks ahead of additional staff being sent.

An alternative view, shared by many participants, was that most of the knowledge available to agencies is obtained from "normal" situations and may not be relevant to understanding the abnormal conditions of a food crisis. Famines are the result of a collapse of the social and economic systems in an area. As a corollary, it was pointed out that the lack of information and understanding is in part a reflection of the failure of agencies to carry out more in-depth studies during the course of emergency operations. This point was exemplified by the significant contribution made to our understanding of the underlying social and economic processes in Darfur, by a social anthropologist employed by SCF during 1985–86 (de Waal, 1987). However, this was acknowledged to be something of an exception. It was agreed that the important and increasing "front-line" role of NGOs in relief operations carried with it an obligation to study the situations in-depth and to share such studies as widely as possible. It was suggested that, because of their access in situations which were politically sensitive and physically
difficult, NGOs were better placed to fill important gaps in understanding such situations.

The Overview Paper defined three broad categories of survey procedure for differentiating need between areas and populations. These were:

- the use of anthropometric survey data in conjunction with qualitative/anecdotal socio-economic information;
- reliance on quantitative socio-economic data collected by some form of objective sampling procedure;
- a systematically conducted subjective assessment using a panel of socio-economic and nutritional/health indicators.

ROLE OF THE DONORS

The influence of donors was a recurring theme throughout the workshop as they provide the resource being targeted by the NGOs.

Logistics

The capacity and performance of the logistics system in providing food supplies was seen as having a crucial influence on the design and effectiveness of the intervention, and therefore on the targeting methods that could be employed. Experience in Sudan provided a number of examples. For instance, the poor performance of the bulk logistics system from Port Sudan to Darfur during 1985 had a number of effects on targeting methods. When combined with political pressures from the local government and the food shortages faced by urban populations, SCF was obliged to give high priority to urban populations in its distributions during that year. The inadequacies of the General Feeding Programme in Darfur contributed to a decline in nutritional status and the perceived need for Supplementary Feeding Programmes. This need, together with the availability of limited quantities of European Community (EC) food aid in Darfur as a result of the EC Airbridge Operation, led to MSF-Holland implementing a highly targeted wet-feeding programme in North Darfur.

In the Red Sea Province, Sudan, OXFAM invested substantial effort and resources into surveys which were used to recommend ration levels for each village to the World Food Programme (WFP), who were responsible for supplying food to the affected population. For a number of reasons distribution schedules were frequently not met and in any given period actual deliveries to the villages were significantly below the recommended levels.

Type of Assistance

Aid donors, both bilateral and multilateral, were frequently perceived as not sufficiently prepared to provide resources other than food aid in response to emergencies. This restriction therefore ties agencies into programmes which may not be appropriate or cost-effective. A topical instance was described by an agency working in southern Sudan. Here the readiness of donors to provide food aid contrasted with the view of the affected population that their priority requirements were for cattle vaccines and improved health care. The two main factors contributing to this situation were seen as being:

- food aid is a more readily available resource due to surplus food production in many donor countries;
- the widely held view, among the general public and donor agencies, that food aid is the most appropriate form of response to an emergency where famine threatens.
The famine in northern Ethiopia during 1984–85 was considered by several participants as an atypical famine in terms of its scale, severity and form. Most "famines" were not of this "classic" type, in that interventions usually began at an earlier stage, when at least some food was still available for those who could afford it. Excess mortality therefore tends to occur in pockets of affected areas and is the result of a complex array of factors that are not all related to household food availability. Ideally free food distributions should form only one component of intervention strategies in most "famines".

Signs that some donors are beginning to adopt more flexible responses, for example by providing cash for employment creation schemes and de-stocking schemes, were welcomed. Nevertheless, it was felt that NGOs still needed to educate donors away from the notion that free food distributions should be the sole response model for all "famines". The importance of public opinion in shaping donor response strategies, and possibly in restraining moves away from strategies based on free food distributions, was recognised. NGOs would therefore have to include the public in their educational efforts.

However, more than one participant saw a fundamental conflict between such efforts and the present role and funding basis of relief agencies. Many agencies now derive a substantial part of their funds from the "well oiled machine" of the response system, which regularly presents an image of crisis and social collapse in which outsiders are required to step-in, distributing commodities to the destitute and starving.

Information Requirements of Donors

A recurrent theme of the workshop was that donors are perceived to accord invariably far greater weight to anthropometric data for programming and targeting purposes than is justified by either the quality of that data or the ability of such data to accurately differentiate "need" between areas and populations. Several participants explained how their decision to invest scarce resources in undertaking anthropometric surveys during emergency programmes had been strongly influenced by the attitude of the donors towards this type of data.

Donor organisations, it was recognised, are by nature risk-averse institutions, and it was thought that this has a significant bearing on their information requirements. The practice of using socio-economic indicators for targeting purposes is comparatively recent and the conventional wisdom among donor officials continues to be that anthropometric data are the best proxy indicators of risk of mortality in food crisis situations. Given the substantial level of resources that bureaucrats may be asked to mobilise in response to a food crisis there is bound to be resistance to newer and less generally accepted concepts and methods.

One reason why donors prefer anthropometric data is that they are obliged to make programming choices between countries and relief operations. Anthropometric indicators appear to provide a credible quantitative basis for comparison. Inter-country comparisons of socio-economic indicators are inherently more problematic because they are so situation-specific and in many cases difficult to quantify.

Examination of the targeting system used by SCF in Darfur during 1986 suggested that donor preference may indeed not be restricted to anthropometric data, but take account of any information which can be quantified and so appear "scientifically respectable". The SCF system did not involve the collection of anthropometric data, though such data
were available for randomly selected sample sites throughout the region, as the result of surveys by combined Oxfam/UNICEF/Ministry of Health teams. Instead there was a significant investment by SCF in Household Surveys which quantified socio-economic resources at household level.

In practice many of the targeting decisions in Darfur were taken less on the basis of results from the Household Survey than subjective information provided through the network of Field Officers based in each Area Council. Preliminary findings of an anthropologist working in the area were also valuable in gaining insights into the social and economic processes operating within the area. Due to data management problems much of the data from the Household Surveys were not processed until the end of the programme. Nevertheless the initial results of the Household Surveys were used as the basis of presentations to donors in Khartoum and were invariably accepted without questions being raised about data quality or alternative ways of interpreting the results.

TAKING ACCOUNT OF THE PERCEPTIONS OF THE AFFECTED POPULATION

The different perceptions of the affected population's need held by governments, donors, NGOs and the people themselves was a recurring theme during the workshop. The mismatch cited earlier between the priority needs as perceived by the Dinka in southern Sudan and what the donors were most readily prepared to give was a classic example. The role of Oxfam in Red Sea Province provided food for thought. The agency had been responsible for monitoring the distributions of food by WFP and for recommending ration levels for different areas. By virtue of its intermediate position between the affected population and the donor and its approach (involving a programme of public meetings in all villages), the agency was sensitive to these differences in perceptions and Oxfam field staff saw themselves as an information channel and intermediary between the two. Considerable effort was put into explaining the programme and planning decisions to the affected population, and representing their views to WFP, who were providing the resources. Another innovative feature of this programme was the setting up of a Complaints Desk (also referred to as the "Sheik Desk") in the Oxfam office in Port Sudan to which, in theory, anyone could come to discuss the operation of the programme.

There was agreement on the need to involve the affected population more in the design of the programmes, but there was not always agreement on how this could best be done. Calls for more responsibility to be given to "the people" were countered with examples of social differentiation and questions about who "the people" were. This led to discussion about which groups or individuals could be taken as representative of the affected population. One participant felt there was a need to differentiate between the "affected population" and the recipient group, which in many programmes was a subset of the whole population in an area. Through their Supplementary Feeding Programmes many agencies dealt primarily with mothers and children and there were significant difficulties in organising channels for representing this group. For an agency to operate as an agent of social change and institution builder was perfectly acceptable but this depended very much on the agency's time frame. Some felt it was simply not possible to consider or address these issues when an agency arrived at a late stage of a crisis.

It was felt that government officials, even those at the Provincial or District level, should not automatically be relied
upon to be representative of the affected population. Because of the impossibility of carrying out detailed surveys of need over whole regions, several agencies had used local government officials to direct them to the “worst affected” areas before carrying out local surveys. The extent to which local government officials could be relied upon in this role was apparently not supported by the experience of CAFOD/SUDAN-AID in En Nahud Area Council in Kordofan. The last Rural Council to be included in the Supplementary Feeding Programme revealed the highest rates of malnutrition. The poor awareness of the severe problems in that Rural Council may simply have been due to its distance from, and poor representation in, the Area Council administrative offices in En Nahud town.

The scope for communities to carry out their own targeting by selecting “needy” families from within the community was discussed. This approach was seen to be problematic, as it lays those responsible for the selection open to tremendous social pressures and may skew distributions to those able to wield greater pressure. Furthermore, it raises difficult issues over differences in perceptions of “need” between agencies and the affected population. In southern Ethiopia Norwegian Church Aid ran a trial in which the elders of a community had been asked to select those in need. A weight-for-height survey was then carried out of all children under five years and it was found that only 50% of those who were malnourished (i.e. less than 80% weight-for-height) had been selected by the elders. The proportion was even less for the severely malnourished, only 30% of those below 70% weight-for-height having been selected. Whilst Norwegian Church Aid continues to use “community selection” in the area, this is always done in conjunction with anthropometric surveys.

One of the working groups addressed the question “How can the perceptions of the affected population be better drawn upon in programme design?” As its starting point it took the not uncommon scenario of an agency team arriving in an area and rapidly having to assess the situation and design an intervention. Pressure of time usually means that it is not possible to carry out surveys designed to draw out the perceptions of the affected population. However, a number of ways were suggested in which these perceptions could be obtained:

- anthropometric or socio-economic surveys carried out in the area should involve an explicit attempt to seek out and interview the most resource-poor households;
- including an anthropologist on the assessment team or, failing this, designating a member of the team familiar with the local language to be specifically responsible for obtaining a sense of the population’s perceptions;
- using local staff wherever possible and ensuring that their knowledge was fully utilised;
- guarding against an over-reliance on officials and, where relevant, staff of the implementing partner agency;
- trying to consult people from as many different sections of the community as possible and double checking what is said;
- being aware of the strong possibility that the worst affected members of the population will be “invisible”.

The scope for using local staff as a channel for representing the views of the affected population was stressed. Localisation of as many decision-taking positions as possible was seen as crucial. The earlier an agency could become involved in an area, the more opportunities it would have to interact with the affected
population. It was suggested that there were two ways in which the perceptions of the affected population could be looked at. First, the way their perceptions affected programme implementation and, secondly, ways in which the local population could be integrated into structures deciding the programme design and allocation of relief food.

ISSUES IN THE CHOICE OF PROGRAMME

Supplementary Feeding Programmes

One session focussed on the appropriateness of Supplementary Feeding Programmes as a response to food crises. A key issue is the relative cost-effectiveness of Supplementary and General Feeding Programmes. Supplementary Feeding Programmes, especially wet-feeding programmes, are extremely resource-intensive and in many situations have not achieved the results desired. For example, although nutritional impact evaluation was recognised to be problematic, the experiences of Norwegian Church Aid and the International Committee of the Red Cross (ICRC) in Ethiopia showed that intensive wet-feeding programmes for severely malnourished children, had limited nutritional benefits. The view was expressed that in terms of the numbers involved, more mortalities occur in the large group of moderately malnourished children than the smaller group of severely malnourished, and that it might be more appropriate for programmes to be targeted on the moderately malnourished. The opportunity cost of wet-feeding programmes is often so high that the targeting of some other more numerous group may be warranted. More rigorous information is needed to clarify this issue. However, it was also recognised that there will always be support for programmes that attempt to save the lives of the most seriously affected individuals.

There may be an incentive for some agencies to operate these high profile programmes as a result of their fund raising potential.

The issue of the appropriateness of Supplementary Feeding Programmes where General Feeding Programmes are poorly operated or completely absent was addressed. One view was that Supplementary Feeding Programmes should never be considered in such situations and that NGOs would do better to lobby for more effective General Feeding Programmes. By setting up Supplementary Feeding Programmes some pressure is taken off donors and governments to provide effective General Feeding Programmes. Furthermore, if the General Feeding Programme is inadequate then there is little practical or ethical reason for operating a Supplementary Feeding Programme which will have to readmit children soon after discharge from the programme. The opposing view was that in some situations adequate General Feeding Programmes may be impossible to implement for non-political reasons. For example, for MSF-Holland in Somalia the problem was one of bulk logistics. In such situations agencies may not feel able on humanitarian grounds to stand back and refuse assistance. It would make more sense simultaneously to operate Supplementary Feeding Programmes and lobby donors and governments for a more effective General Feeding Programme. It is also unlikely that some of the smaller agencies would be heard unless they joined together and presented a united lobby.

A second working group attempted to define the circumstances in which Supplementary Feeding Programmes might be appropriate in more detail.

The working group concluded that when a food needs assessment identified a need, General Feeding should always have priority and that Supplementary
Feeding Programmes were only acceptable under certain conditions, for example where the number of kwashiokor cases were high; where the agency did not have sufficient resources to implement a General Feeding Programme; or where there was concerted political pressure for the implementation of a Supplementary Feeding Programme.

The working group attempted to define those situations where different types of Supplementary Feeding Programme might be more appropriate. Two types of Supplementary Feeding Programme were identified:

- Supplementary feeding of an entire population if their ration or diet was inadequate;
- Supplementary feeding of vulnerable groups within a target population if their ration or diet was inadequate.

Wet on-site feeding or dry take-home rations could be considered for either type of programme. Commonly cited advantages and disadvantages of each type of programme were identified. For example, dry ration programmes are known to incur less expense but allow little control over the use of the ration at home. Wet rations were acknowledged to be better targeted to those in need, but to be cost and personnel intensive while excluding the family from certain responsibilities.

It was felt that it is usually possible to define firm criteria for the establishment of Supplementary Feeding Programmes for refugee populations. However, it is far harder to draw up guidelines for non-refugee populations. Many more variables would have to be taken into account, including the stage of the emergency when the agency becomes involved and the context of the emergency, such as geographical constraints and political climate. Taking account of these variables, four situations were identified where some form of Supplementary Feeding Programme has been carried out and may be appropriate in the future:

- When there is need to establish family food security if the general ration is not appropriate for some groups in the family. This might be thought of as complementary feeding.
- When there is a need to prevent deterioration of nutritional status of vulnerable groups.
- When there is a need to set up a curative programmes to assist large numbers of malnourished children.
- Where there is no General Feeding Programme and only limited resources for a Supplementary Feeding Programme, so that decisions need to be taken about who to feed, carry out triage programmes.

While it may be possible to establish broad guidelines, the actual decision is often influenced by a number of external factors, such as logistics, which are beyond the agency’s control. Thus if agencies wanted to commit themselves to drawing up clear guidelines, based on the premise that Supplementary Feeding Programmes are only useful in very specific circumstances, then problems of inappropriate emergency “food baskets” and tardy donor responses would need to be tackled. For example, emergency food aid supplies do not provide sufficient quantities of foods appropriate for weaning-age children. This reflects a genuine shortage of these commodities and dependence on one or two donors. Finally, the working group concluded that most Supplementary Feeding Programmes should have a measles vaccination and vitamin A distribution component.

Subsequent discussion focussed on defining the circumstances in which wet or dry feeding might be appropriate. Some participants felt that wet feeding...
had only very limited use, two reasons for this being:

- there is recent evidence from relief programmes to show that mothers reduce a child's food intake at home if the child is seen to be fed at a centre;
- wet feeding takes the control and care of the child away from the family. It was suggested that wet-feeding might only be appropriate in certain very limited circumstances. One example was a conflict situation where the government or forces controlling an area would not allow a dry ration distribution for fear that the food would leak to opposing forces. A number of participants cited their own experience of this type of situation. Another example was in refugee camps where large numbers of new arrivals were physically and emotionally distressed and where there were shortages of fuel and water. In this type of situation a wet general ration might be appropriate. Even here it was suggested that it might be better to provide such distressed populations with the means to prepare their own food, thereby allowing them to retain some control over their circumstances.

It was suggested that where there were large numbers of malnourished children one approach might be to distribute a general ration with a dry supplementary component to all children under 80% weight-for-height, including the severely malnourished. Therapeutic feeding would then be restricted to children not improving on the dry ration. This approach had already been tried in different situations but had been difficult to evaluate as no mortality data were collected. However, clinic records and observations indicated that even severely malnourished children gained weight on such a regime, providing there were no complicating factors. When children on therapeutic feeding were examined it was found that many had underlying disease or social problems that would have existed normally but were exacerbated by the emergency.

The most appropriate way to deal with situations where there were large numbers of kwashiorkor and/or marasmic cases received lengthy discussion. It was eventually agreed that kwashiorkor cases would have to receive therapeutic feeding but that marasmic children could receive a dry supplementary ration.

**ISSUES IN THE EVALUATION OF TARGETING METHODS**

The overview paper stressed that agencies should evaluate their emergency programmes more often. This would enable some of the operating assumptions to be tested and subsequent practice to be improved. Several examples arose during the workshop where it was agreed that it would have been valuable for the agency to have evaluated a new technique. For example there should have been an assessment of MSF-Holland's practice of taking malnutrition rates in two villages to be representative of a "conglomeration" of villages in Darfur, or problems encountered during the programme, such as the causes of the high drop-out rates encountered in some of the wet-feeding programmes.

Evaluations of emergency programmes are difficult for many related reasons. Improvements in the nutritional status of the population may be due to a period of favourable rainfall after a drought. The activities of other agencies operating in the area are also a confounding factor. Good base-line data are rarely available. There may also be institutional or political resistance to an evaluation. An example was cited of a Supplementary Feeding
Programme where the recovery rates were very poor, even though the ration being provided was 1,500 Kcal. A proposal by a nutritionist within the agency for more detailed monitoring of the situation was resisted by the nutritionist's superiors because it was suspected that this would lead to the programme's closure.

Cost-effectiveness was recognised as a particularly poorly understood aspect of emergency programmes. Some of the discussion of objectives within General Feeding Programmes and the wisdom of implementing intensive feeding programmes made implicit assumptions about cost-effectiveness considerations which have never been studied.

A third working group studied the question: "What aspects of targeting should be evaluated as a matter of course before, during and after emergency programmes?" in more depth.

There was agreement on the overall need for evaluation of relief programmes. But, it was recognised that organisations have their own characteristics and background so that it may be difficult to impose uniform evaluation procedures. Methods of evaluation would therefore need to be adapted to account for the objectives of the organisation and programmes.

An unresolved issue was whether impact evaluation should include groups or areas not targeted in the relief programme, in order to provide baseline information and to assess the overall impact of the programme in relation to the wider community.

It was felt that there are a number of routine management information components within agency relief programmes that need to be formalised in such a way that internal evaluation procedures for these components becomes routinised and institutionalised. These evaluation procedures must be seen in terms of their low cost in relation to the overall, far larger, expense of the various components of relief programmes. Such evaluation can therefore be highly cost-effective. Furthermore, as famines develop slowly, it should be possible to design and implement evaluation components as part of a relief programme. However, it was also recognised that many agencies only become involved in relief programmes at later stages of a famine when evaluation may come into conflict with the operational requirements of urgently administering relief.

The working group emphasised the need to involve national counterparts and institutions actively in the process of continual evaluation. While recognising that some of the evaluation topics and components may best be undertaken by the organisation itself, others may be more suitably evaluated by outside research groups given the operational demands on agency staff. However, it is important that such research groups are conversant with the operational constraints on user agencies so that the practical needs of agencies can be addressed in conducting evaluations. The development of closer links between relief organisations and research communities may therefore be appropriate.

A number of key subjects for evaluation were identified by the working group. These included:

- Quantitative and qualitative aspects of socio-economic variables, e.g. the quantitative variation of certain types of indicator within defined areas or population groups.
- The appropriateness, and in some cases cost-effectiveness, of different levels of targeting. For example, the disadvantages and advantages of targeting within defined populations rather than feeding all members of that population.
(intra-village versus inter-village targeting).
- The reliability of data and information collected from local information sources, e.g. needy areas identified by local officials. Does this information reflect actual need for food relief or political/cultural perceptions of need which external agencies may see as an inaccurate reflection of need?
- What happened to families who received no food?
- What were the long term effects of the food emergency especially in relation to vulnerability to subsequent food emergencies?

Discussion centred around the use of non-target groups as control groups for evaluation. Some participants felt that it was very important to have control groups. Others suggested that it was unlikely that control groups and local survey teams would participate readily in information gathering if there were no tangible relief benefits. Examples were cited of sophisticated information systems collapsing as soon as relief programmes ended. This was contrasted with situations where information is regularly collected without short-term benefits for the providers of information, e.g. household budget surveys.

It was suggested that investigation should be pursued in areas where information is provided on an apparently selfless basis. Tigray and Eritrea were suggested as possible areas, as data collection is an integral part of administration within each community and information is subject to verification from a number of different levels. The inference to be drawn was that administrative and political structures may be important factors in determining the success of information systems which aim to use control groups.

ISSUES FOR FURTHER CONSIDERATION
Suggestions were made for possible follow-up/further research on targeting related issues. There was widespread support for the proposal to repeat the workshop at a country level, thus involving country-level NGO staff and indigenous agencies in a review of targeting experiences. As many case studies related to programmes implemented in Sudan it was felt logical to aim to hold the first of such workshops there. Additional case studies should be compiled for future workshops on both indigenous NGOs' experiences and more recent experiences since the period 1984–86.

A recurring theme was for the need for more detailed investigation into the relationship between anthropometric and socio-economic data. Therefore, the proposal to analyse existing data sets, held by some of the participating agencies, where there was an overlap in the areas surveyed, was welcomed.

It was generally felt that the workshop provided a valuable opportunity for the exchange of ideas and experiences. The method followed during the targeting study (ie. of independent researchers drawing together case study material and then hosting a small, informal workshop) was seen as a particularly useful approach, enabling NGOs to review their experiences together. Pressure of time on agency staff and a certain reluctance to share experiences on a formal basis meant that such a method offered real benefits. Thus, it may be useful to consider the possibility of examining other issues of agency practice using such an approach. 5

NOTES
1. Prepared as part of a joint study by the Relief and Development Institute and the London School of Hygiene and Tropical Medicine.
2. Anthropometric indicators measure the growth performance of children and compares this to international standards, and uses this as a proxy indicator for a number of factors including food intake and therefore the level of malnutrition.

3. For further information on the Nabarro Chart, see reports compiled by Nabarro et al., 1982–84.

4. For the benefit of those unfamiliar with the concept of socio-economic indicators a definition is offered here. Socio-economic indicators attempt to define the degree of stress being experienced by a population by measuring the economic and social circumstances and changes in these circumstances as the population responds to the stress.

5. Participants made a number of constructive suggestions on the structuring of such workshops. They are included here as they may be of use to others involved in running similar workshops. By presenting fewer case studies longer periods would have been available for discussion. More time should have been allowed for Working Groups. Participants should be encouraged to study all the case studies before the Workshop, possibly by making attendance conditional upon the response to a questionnaire on the material. One agency representative felt that the occasions on which agency personnel came together in such an informal group were so infrequent that an additional day could have been added to the schedule, and participants allowed to select topics for discussion unrelated to the subject of the workshop.

REFERENCES


John Borton and Jeremy Shoham
Relief and Development Institute
1 Ferdinand Place
London
NW1 8EE, UK
Traumatized by the devastating floods which struck the country in 1987 and 1988, the Government of Bangladesh brought together about 25 international and 100 Bangladeshi scientists for a seminar to discuss global, regional and local aspects of the floods which regularly disrupt economic life in Bangladesh. The seminar, held in Bangladesh’s new International Conference Centre in Dhaka, was inaugurated by the President of Bangladesh. Mr Kazi Zafar Ahmed, Deputy Prime Minister and Political Adviser to the President, was Chairman of the Seminar Organising Committee.

Fifty technical papers were presented in two-and-a-half days of discussions which were organised within five groups:

1. Permanent flood control and management.
3. Living with floods: the need for disaster management.
4. Geomorphological processes leading to floods.
5. Anthropogenic perturbations of the environment and the greenhouse effect.

Technical recommendations emerging from these groups were overshadowed by the organising committee’s presentation at the closing session of a “Dhaka Declaration” for consensual acceptance. The bottom line of this declaration was a resolution to set up an International Institute of Environmental Studies and Disaster Management in Dhaka under the patronage of the President of Bangladesh and with an advisory panel of 23 international and Bangladeshi scientists. Since the foreign scientists invited to the seminar were present as individuals, not as official representatives of their governments or international agencies, the establishment of such an international institute will probably take some time.

H. Brammer
37 Kingsway Court,
First Avenue,
Hove,
E. Sussex
Concerned by alarmist statements about an impending rise in sea-level of 1–3m which would submerge one third of Bangladesh, the Coastal Area Resource Development and Management Association (CARDMA) organised a one-day seminar in Dhaka on 5 March 1989 to review the state of “greenhouse” knowledge and possible implications for Bangladesh. CARDMA is a voluntary association of 13 Bangladeshi Members of Parliament with coastal constituencies, supported by a panel of technical experts. The seminar was opened by the President of Bangladesh, and the two technical sessions were chaired respectively by the Ministers of Finance and Planning. Four foreign and six Bangladeshi scientists presented technical papers.

The seminar should do much to allay public fears concerning the impact of a rising sea-level on Bangladesh’s coastal areas. The latest predictions of a global sea-level rise are of only 15–30 cm by 2030. More worrying for Bangladesh are predictions that global warming might increase the frequency of tropical cyclones and storm surges in the Bay of Bengal, and might increase monsoon rainfall (by 5–100 per cent in different projections) and so increase the frequency and severity of river floods which already plague Bangladesh.

The effects of a rising sea-level on Bangladesh are difficult to predict. The Ganges-Brahmaputra-Meghna delta is dynamic: subsiding near the coast by about 1 cm a year, but receiving annually around 2 billion tons of river alluvium which apparently balances this subsidence. Probably, tidal sedimentation would continue to raise coastal areas concurrently with a rising sea-level, and sedimentation during annual floods would continue to raise river levees. The areas which might suffer most seriously would be interior floodplain areas (and coastal polders protected from tidal flooding) where seasonal flooding is by ponded rainwater, not silty river or tidal water. Pump drainage or warping (flooding with silty water) would be needed to counter such adverse effects of a rising sea-level. Environmental impact study sites need to be established to measure and assess possible changes.

No formal recommendations were made at the end of the seminar, but it was arranged that CARDMA’s panel of experts would prepare an action plan based on information and recommendations presented during the seminar; (a report on CARDMA’s first conference to prepare an environmental action programme for the coastal areas is understood to be in the process of publication).

H. Brammer
37 Kingway Court,
First Avenue,
Hove,
E. Sussex.
FORTHCOMING EVENTS

PASTORAL ECONOMIES IN AFRICA AND LONG-TERM RESPONSES TO DROUGHT

Colloquium at the University of Aberdeen in April 1990

Aberdeen has long had a special interest in the problems of pastoral economies in Africa as a result of the work of animal scientists and research organisations concerned with nutrition. The African Studies Group at Aberdeen proposes to organise its next Colloquium in April 1990 around the question of long-term responses to drought in African pastoralist societies or in mixed economies with a significant element of pastoralism.

The Group would expect to base the Colloquium on discussion of research on pastoral areas of Africa (in either the recent or the more remote past). The intention is to draw participants from different backgrounds and disciplines into a consideration of some of the issues involved in understanding drought in pastoralist Africa and in devising long-term strategies. In particular, do drought problems in Africa have a special character because they are in Africa: does the continent's geography and its historical experience create a unique context necessitating particular kinds of longer-term responses?

The Group would welcome offers of papers for delivery at the Colloquium and subsequent publication. Specifically, it would welcome case studies of responses by outside agencies or by the pastoralists themselves to drought. The Group also invites discussions of problems of implementation in Africa, as well as the dilemmas inherent in discerning the nature of the problems. For further information, please contact Jeffrey Stone, Secretary, Aberdeen University African Studies Group, L.10 Link Block, Taylor Building, King's College, Aberdeen AB9 2UB, U.K.

DISASTERS VOLUME 13 NUMBER 1

This handsomely produced book is the result of a conference held in Bad Homburg, Germany, in December 1982, under the auspices of the Werner-Reimers-Stiftung and the Maison des Sciences de l’Homme and organised by the Commission on the Anthropology of Food of the International Union of Anthropological and Ethnological Sciences. Practically all the 20 contributions deal with the certainty of seasonal fluctuations in food supply in small-scale traditional societies, living at subsistence level.

The first three chapters (Hladik, Harrison and Stini) deal with biological and evolutionary aspects of seasonal variations in food supply. It is clear that adaptation to such variations has had important physiological consequences for human populations, which raises the possibility that “loss of this adaptation ... may not be a progress in human evolution” (p. 23). There is plenty of evidence in the case studies which follow that seasonal variations are not, in themselves, a threat to survival (e.g. Wilmsen and Durham on !Kung San foragers in northwestern Botswana; Bailey and Peacock on the Efe, tropical rainforest hunter-gatherers of northeastern Zaire; de Garine and Koppert on the Massa and Mussey of Chad and Cameroon; and Little, Galvin and Leslie on the Turkana of northern Kenya). Several chapters, on the other hand, demonstrate that the institutionalisation of hunger – of permanent food insecurity – is a phenomenon of the ‘modern’ world. Watts, for example, in an intricate and theoretically most important study of food insecurity among Hausa peasants, shows how household and community vulnerability to famine is associated with the historically ‘uneven’ development of the market. Three papers on Indian groups (Malhotra and Gadgil on pastoral and non-pastoral nomads of Maharashtra; Pingle on various populations of central India; and Bharati and Basu on villages in western Bengal) provide eloquent and telling testimony of the disastrous impact economic ‘development’ can have on the food security of rural people in the Third World. While Marshall Sahlins’ characterisation of hunter-gatherers as the “original affluent society” may be too extreme, his general, depressing point that “Now, in the time of the greatest technical power, starvation is an institution ... the amount of hunger increases relatively and absolutely with the evolution of culture” (Stone Age Economics, Tavistock Publications, 1974, p. 36) finds strong empirical support in these pages.
Despite the strong (and understandable) biological and ecological emphasis that runs through the book, social and cultural anthropologists will be pleased to find that the symbolic importance of food and customary diet is not ignored. Freeman’s chapter on the Inuit of Canada, Alaska and Greenland is an elegant demonstration of the importance of traditional foods and customs associated with their procurement, sharing and consumption, in shaping political identity: “[Though] I have learned more of the white man’s ways . . . I am still Inuk because I grew up on Inuk food” (p. 166).

In teasing out the complex relations between the Oto and Twa of the Lake Tumba region of Zaire, Pegazy gives us another example of how customary diet can function as an identity marker. Perhaps the best general demonstration that, even in the “serious matter” (as Wilmsen and Durham call it) of “getting food”, human behaviour cannot be explained in terms of animal models, is provided by de Garine and Koppert. They conclude that the Massa and Mussey aim, above all, to satisfy cultural demands for prestige “and then to reach an acceptable, but not optimal, nutritional comfort” (p. 253).

This is, as the editors admit, a “mixed bag”: an attempt to explore the biological and social implications of food supply variations, without pre-judging the most important issues and the most fruitful lines of enquiry. The strengths and weaknesses of the book follow from this. On the one hand it conveniently brings together some impressively detailed and methodologically rigorous descriptions of food production, distribution and consumption in a wide range of economies and environments. On the other hand, each of the contributions stands very much by itself, a problem to which, inevitably, the editors respond only half successfully in their discussion of ‘common issues’ in the final chapter. This is the kind of book which only a reviewer is likely to read all the way through and any review of which is bound to be highly selective. I hope this one has conveyed something of its riches and its potential importance in helping to identify areas for future research and (dare one hope?) political action.

David Turton
Dept. of Social Anthropology
Faculty of Economics and Social Studies
University of Manchester
Manchester M13 9PL


This book was written in the light of research carried out by an interdisciplinary team of researchers at the University of Southern California, which has been examining, since 1983, earthquake mitigation and emergency response issues from the standpoint of members of the population with physical disabilities. The authors set out to discuss why physically disabled persons in the population warrant special emphasis in natural hazards research and policy. It was felt that a policy is now all the more important because whereas disabled people were in the past very often residentially and institutionally segregated, now they are more dispersed throughout the community, living independent lives. There is not necessarily
someone immediately on hand to lend assistance in the event of an emergency.

Very little has been written on this subject. Perhaps this is not surprising given the enormity of the calamity in most earthquakes and the widespread devastation that can be caused, therefore making it difficult to single out the effects of the disaster on particular groups of people. The authors, given the paucity of information available, were not able to add very much. The data they had were considerably limited and were based on studying 18 disabled people who had been affected in the Coalinga (California) event in 1983.

However, their discussion on disasters generally and how these affect disabled people provides useful insights into ways in which disabled people themselves can be prepared to cope with disasters and emergencies, and how services can be made aware of any special needs of people with disabilities. Their reflections on disability generally and their analysis of the various models of disability – medical, economic, and sociopolitical – provide insights which many researchers in the field of disability ignore. It is pointed out how difficult it is to generalise about response to earthquakes, given the very different degrees of disabling factors and how specific disabilities hindered an individual person’s reactions. For instance, the problems of hearing impair people when they cannot hear fire alarms or understand spoken warning messages and instructions.

The authors started their research assuming that people with disabilities face a higher risk of injury in earthquakes because their physical limitations may reduce their ability to carry out recommended self-protective actions. However, it was interesting to note that recent studies of building occupant behaviour and earthquake-related injury suggest that attempting to take recommended self-protective actions may not always reduce the risk of injury and, conversely, that the inability to move about during and immediately after earthquake impact may not necessarily increase risk. It was discovered, for instance, in an earthquake in Japan that produced damage and casualties in several towns, that the more people moved about during the shaking period, the more the chance of injury was increased. The authors draw the conclusion, therefore, that “the empirical evidence does suggest that individuals with mobility limitations do not necessarily face a higher risk of injury during earthquake shaking than fully ambulatory persons, so long as they have some means of avoiding being hit by falling or moving objects.”

Nevertheless, the authors accepted, as a result of scrutinising epidemiologic studies, that disability is a risk factor when considering the effect of earthquake-related injuries. It was not possible to say whether this was due to the limitation imposed by disability or whether disabled people are more often found in environments that are inherently more hazardous – for example substandard buildings (as a result of their socioeconomic status), or whether as the result of a combination of factors.

Having considered the special problems that disabled people face in earthquakes, a number of conclusions and recommendations are made by the authors. These are based on little empirical evidence but rather more on intelligent observation and insights.

This book serves a useful function in examining the practical problems surrounding disabled people in the event of disasters affecting the environment, including earthquakes, and can be recommended on this score. However, in so far as the book aims to concentrate on earthquakes specifically, the long research undertaken seems to have uncovered
very little. Hopefully, the information gathered together in this academic way will be used and interpreted in a practical way for the benefit of disabled people, and will serve to mitigate the worst effects of disasters - not only earthquakes.

Ann Darnbrough
AHRTAG
1 London Bridge Street
London SE1 9SG


This is a large and lavishly produced book, with many illustrations (though none in colour) and tables. Many, perhaps half, of its 520 articles are necessary, though unexciting, entries on specific rocks or minerals: mercifully these tend to be short. The rest are longer accounts of particular subjects or disciplines, and are, on the whole, well-written and sensibly illustrated by people who are authorities in their field. These set pieces are certainly the strength of the book, but one can’t help wondering who they were written for: they are generally at the Scientific American level but with occasional detailed technical information that seems inappropriate without more space to explain it. What does one make, for example, of the second-order differential equation used to describe the behaviour of a seismometer, or of the fact that illmenite belongs to space group R3 and that its crystals are tabular parallel to {0001}? Such information is correct, but I doubt whether anyone who understood it would be looking for it in an encyclopaedia. For the professional Earth Scientist this book is interesting to browse through and useful for teaching. Much of the content is perhaps too geological for readers of Disasters, though articles on, for example, Earthquakes, Volcanoes, Plate Tectonics, and Soil are well-written and provide good introductions to subjects of interest to this journal. The content is restricted to that implied in its title (perhaps surprisingly in these days when most universities have departments of Earth Sciences rather than Geology), and there are no articles on, for example, climate or oceanography. This imposed narrowness may be responsible for some puzzling omissions: the word, “tsunami” for example, cannot be found in the index and is not discussed under earthquakes or seismology. All the articles list a brief bibliography for further reading. The index is satisfactory if you already know where you are likely to find something, but will be less easy to use for those who find themselves turning to this encyclopaedia for help with a technical term or expression that they cannot associate with a wider subject.

James Jackson
Bullard Laboratories
Madingley Rd.
Cambridge
CB3 0EZ
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