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DISASTERS is published four times a year, in March, June, September and December by Blackwell Publishers, 108 Cowley Road, Oxford OX4 1JF or 238 Main Street, Cambridge, MA 02142, USA. Mss and books for review should be addressed to The Editor, DISASTERS, Overseas Development Institute, Regent’s College, Inner Circle, Regent’s Park, London NW1 4NS.

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MICROFORM: The journal is available on microfilm (16mm or 35mm) or 105mm microfiche from the Serials Acquisitions Department, University Microfilms Inc. 300 North Zeeb Road, Ann Arbor, MI 48106, USA.


ADVERTISING: For details contact Ludo Craddock, 15 Henry Street, Oxford OX2 ODG, UK (Tel./Fax 01865 722 964) or write to the Publishers.

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Printed and bound in Great Britain by Redwood Books, Trowbridge. This journal is printed on acid-free paper.
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Desert Locusts in Africa: a Disaster?

S. KRALL, Deutsche Gesellschaft für Technische Zusammenarbeit

Migrating locusts, especially the desert locust (Schistocerca gregaria), have been feared in Africa for thousands of years as famine-inducing pests. Instead of simply waiting for outbreaks to occur, attempts are being made to take preventive action against these pests. Since the breeding areas of the desert locust are distributed across the entire Sahel region, the Arabian peninsula, Pakistan and India, a gigantic logistical and organizational effort is required. Every year, millions of dollars are spent on these preventive control measures, which are still unable to prevent locust plagues completely. The outbreaks in 1987/88 and 1993/94 are the most recent examples. Exactly how large potential disasters caused by gigantic locust swarms may be and whether the effort and expense involved in preventing them pays off economically has never been systematically investigated. The Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) project, 'Integrated Biological Control of Grasshoppers and Locusts', has attempted to assess, on the basis of the available data, what the costs and potential benefits are and to identify the difficulties involved in developing an effective strategy.

The desert locust (Schistocerca gregaria) has been known for millennia as a fear-instilling pest. Its breeding areas range from India and Pakistan to the Arabian peninsula and all the way across Africa to Mauritania, the westernmost country of the Sahel belt. This species is feared principally because of its ability to form gigantic swarms covering an expanse of several hundred square kilometers. These can attack cultivated areas and inflict damage on a spectacular scale (Table 1).

The phenomenon of swarming is based on the ability of this locust species to live in two different so-called phases. If environmental conditions are unfavorable, which is primarily the case when there is insufficient precipitation, then the insects live as isolated, solitary individuals in semi-desert-like areas, which are referred to as recession areas. If there is a period of one or more years without abundant precipitation, then mass reproduction takes place, resulting in a change in the insects' behavior. When they reach a certain critical population density, the insects first enter a transitional phase and then become gregarious. It is in this gregarious phase that swarms of adult locusts and bands of juvenile individuals (hoppers) form. These swarms of literally millions or billions of insects constitute voracious feeding machines of awe-inspiring proportions. During this phase, they are able to leave their original breeding areas and temporarily enter other regions as well, where they can also breed. This so-called invasion area is larger than the...
### TABLE 1

**Crop losses due to the desert locust**

<table>
<thead>
<tr>
<th>Year</th>
<th>Country</th>
<th>Amount of crop eaten by locusts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1944</td>
<td>Libya</td>
<td>7,000,000 grapevines (19% of total vine cultivation)</td>
</tr>
<tr>
<td>1954</td>
<td>Sudan</td>
<td>55,000 tonnes of grain</td>
</tr>
<tr>
<td>1957</td>
<td>Senegal</td>
<td>16,000 tonnes of millet; 2,000 tonnes of other crops</td>
</tr>
<tr>
<td>1957</td>
<td>Guinea</td>
<td>6,000 tonnes of oranges</td>
</tr>
<tr>
<td>1958</td>
<td>Ethiopia</td>
<td>167,000 tonnes of grain (enough to feed 1,000,000 people for one year)</td>
</tr>
<tr>
<td>1962</td>
<td>India</td>
<td>4,000 hectares of cotton (value: £300,000)</td>
</tr>
</tbody>
</table>

Source: Steedman (1990)

---

**FIGURE 1** Recession and invasion areas of the desert locust (Steedman, 1990)

recession area (Figure 1).

Mass reproduction takes place irregularly. Since the 1970s it has only been observed twice, namely with a large outbreak in 1987/88 and a smaller one in 1993/94. In the past, attempts were made to cope with these outbreaks using mechanical control techniques. But since these were typically not applied until a locust outbreak had already begun, only relatively modest successes were achieved. As technological advances were made, there was a shift toward using more sophisticated means to control locusts. Today, highly potent insecticides are applied using portable devices, vehicle-mounted sprayers, or even airplanes and helicopters. At the same time, it has grown increasingly important not merely to combat plagues directly but instead to prevent them.
IS EARLY DETECTION BETTER THAN CONTROL?

The Anti Locust Centre in England and, later, the Food and Agriculture Organization of the United Nations (FAO) have tried to establish an effective early warning system. This system is based on reports submitted by all the affected countries, which are centrally organized within the FAO, and to an even larger extent on the monitoring of climatic data captured with the Meteosat satellite. A bulletin is regularly issued to ensure that the data flow back to the affected countries. The system is only as good, however, as the data which are fed into it. Observations can only come from the countries if these are financially and logistically in a position to carry out complex and labor-intensive surveys in their semi-arid regions. Apart from the lack of funds, which can be compensated for by contributions from donor countries, a major obstacle is posed by security issues.

In the last ten years alone, at one time or another it was impossible to conduct surveys in Somalia, Ethiopia/Eritrea, Sudan, Chad, Niger, Mali and Mauritania. These countries contain the most important breeding areas of the Sahel zone. At the moment it is virtually impossible to carry out surveys in northern Mali because of conflicts between the central government and Tuareg rebels and in Niger they can only be conducted with a military escort. It is also almost completely impossible to collect data in Somalia, despite the fact that critical breeding areas are situated in that country.

Owing to these extremely unfavorable conditions, effective early detection is a virtual impossibility. The situation is aggravated further by the fact that many breeding areas are located in regions so inaccessible that no surveys are feasible. Consequently, looking at things realistically, all that can be accomplished by early detection is to confirm outbreaks relatively early. No truly effective measures can be taken, however, to combat the observed initial swarming tendencies. All that can be done is react to major upsurges and plagues — in other words, after the swarms have already formed. During this phase, however, control is extremely difficult owing to the mobility of the insects. Often enough, the control teams do not arrive at the locations where swarms have been sighted until after they have migrated to other areas. But since desert locusts do not consciously target cultivated areas, swarm formation does not automatically imply gigantic losses, even though this is often assumed. The 1987/88 plague, for example, is not known to have inflicted any major damage. The total harvest was even significantly greater than in locust-free years (Figure 2).

PREVENTION AND CONTROL STRATEGIES

Both the FAO and most of the affected countries have proclaimed preventive control to be the most important method and they are also practising what they preach. Preventive control involves travelling to potential breeding areas at the beginning of the rainy season to conduct surveys and, if critical population densities are encountered, to initiate control measures immediately. Some surveys are also carried out with helicopters, which can be employed in areas that are inaccessible to ground vehicles. It is laborious and costly to conduct surveys in the semi-desert areas of the Sahel, especially when using helicopters. And even when surveys are conducted thoroughly, it is only possible to find some of the locusts. In most cases, therefore, reproduction of the insects cannot be significantly reduced by combating those that are found. Besides the fact that many areas are inaccessible, work is often
IMPeded by difficult security situations.

In the past, supraregional organizations were responsible for monitoring the breeding areas. Foremost among them was the Organisation Commune de Lutte Antiacridienne et de Lutte Antiaviaire (OCLALAV), which embraced the countries of western Africa. Owing to financial difficulties caused by the failure of member countries to make the pledged financial contributions, however, OCLALAV was unable to carry out its intended tasks. It was almost completely dissolved a few years ago and all of its branch facilities in the member countries were handed over to the respective national crop protection services. Nor is the situation much better with the other supraregional organizations. The bottom line is that early detection and preventive control are now almost entirely up to the affected countries themselves, confronting them with major financial, staff and logistical problems that cannot be solved unless support from donor countries is forthcoming.

If there is a plague, the crop protection services of the affected countries take action, receiving support on a case-to-case basis from supraregional organizations like the Desert Locust Control Organization for Eastern Africa (DLCO-EA). Control measures are often enacted in an unsystematic manner, responding to swarms as they are reported. For the most part, the control measures in the Sahel are extremely poorly organized. (The locust control campaigns in Northern Africa, India and Pakistan are better organized.) There are also differences in the strategies applied. Whereas in many countries a control team is dispatched every time a report is received, even unconfirmed ones, in other cases control measures are carried out at strategically important sites. In all cases, the operations are logistically very demanding. In addition to the immediately incurred costs, there are also other expenditures in the form of regular
WHAT DOES CONTROL OF DESERT LOCUSTS COST?

One basic problem associated with the economic analysis of desert locust control is the lack of suitable figures. This is due, on the one hand, to the irregular occurrence of plagues and, on the other, to the complexity of the subject matter. How can control of a band of larvae in the Tamesna Desert of Niger, for example, be brought into direct relation with potential damage? In a recent study, Herok and I have come to the conclusion that none of the usual procedures can be effectively applied to assess the magnitude of the risk that desert locusts will induce disastrous crop failures (Herok and Krall, in press). Since virtually no dependable figures about destroyed harvests and other damage are available, we have taken a different approach, although it too suffers from a number of inadequacies.

On the basis of the available figures about the costs of surveying control measures carried out between 1986 and 1993, and data on sighted larvae bands and locust swarms between 1939 and 1985, model calculations were performed. The following parameters were incorporated into the calculation:

— costs of a control campaign;
— affected land area;
— value of the threatened crops;
— potential crop losses; and
— effectiveness of control measures.

Figure 3 shows the results that were obtained for different levels of control effectiveness and potential losses. The figures clearly demonstrate that with these crops, which for the most part are not very valuable (Table 2), a positive cost-benefit relationship results only at a very low monetary input or if very optimistic assumptions are made (i.e. a high potential loss level and highly successful control measures). At annual costs of more than US$10 million annually for all of the affected African countries, the return on investment hardly justifies the outlay. According to FAO information, the average yearly contribution by donors to desert locust control in the past ten years has been US$25 million.

DISCUSSION

As we have seen, the control of desert locusts represents a unique case within the context of pest control. It is difficult or impossible to carry out economic analyses at the operational or even the national level. An enormous area must be studied, making it extremely difficult to obtain reliable figures. Since the damage caused is heterogeneous in nature (in other words, exhibiting an asymmetrical distribution), average figures can only be employed cautiously.

It can be regarded as relatively certain that desert locusts do not pose any risk of a large-scale disaster. Yet, on a smaller scale, the threat can and must be interpreted quite differently. If a region is massively attacked, serious supply shortages can result unless losses are compensated for at the national level. But monetary compensation through a program similar to the hail insurance available to European farmers is hardly feasible in Africa at this time. Theoretically, however, this would be a sensible approach, since continuously practiced early detection and control measures are very cost-intensive. In the years 1986–1989, nearly US$300 million were spent in Africa and the Arabian peninsula for locust control. This is a great deal of money for the (typically) very extensively grown crops of the Sahel (Office of Technology Assessment, 1990) (Table 2). Kremer has shown, for Mali, that 90 per cent of the funding for the
FIGURE 3  *Annual yield losses prevented by locust control for different levels of control effectiveness and loss*

TABLE 2

**Important crops threatened by desert locusts in a typical Sahel country (Niger) with total yield (in 1990), average per-hectare yields (in 1989) and average market price (in 1985)**

<table>
<thead>
<tr>
<th>Crop</th>
<th>Pearl millet</th>
<th>Sorghum</th>
<th>Maize</th>
<th>Cowpeas</th>
<th>Peanuts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total yield (t)</td>
<td>1,110,300</td>
<td>283,000</td>
<td>1,800</td>
<td>214,400</td>
<td>7,000</td>
</tr>
<tr>
<td>Yield/ha (kg)</td>
<td>340</td>
<td>340</td>
<td>708</td>
<td>145</td>
<td>429</td>
</tr>
<tr>
<td>Market price (F CFA/kg)*</td>
<td>80</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>135</td>
</tr>
</tbody>
</table>

*150 F CFA = 1 DM (1985)
Source: FAO Yearbook

1990 locust campaign came from donors (1992). This is financially unsustainable and stunts the development of other plant protection strategies.

It would also be beneficial to develop an entirely new strategy, getting away from large-scale intensive survey and control measures. After carrying out a sound analysis of all available data, the possibility of restricting surveys to certain representative areas should be seriously considered. Since nearly all of the plagues affecting the Sahel zone emanate from the region around the Red Sea, that would probably be the most suitable region to monitor. The control activities could also
be reorganized by taking a regionally differentiated approach instead of combating every swarm sighted, even in the most remote areas. While doing so, the importance of protecting crops should always be kept in mind. Since the mass reproduction of desert locusts probably ceases by itself, in every case, without having to be actively combated, the view that failure to implement control measures would lead to an exponential growth of the locust population is unfounded. Indeed, since the massive application of insecticides leads to considerable potential, and in many cases real, environmental damage, it is urgently necessary to cut down on their use.

Do migrating, swarm-forming locusts constitute a potential cause of disaster? Certainly not throughout large regions, but definitely on a smaller scale. It is doubtful, however, whether this potential threat is large enough to justify the expenditures that are now being made with the consensus of donor and recipient countries. In the medium term, it would be better to introduce some form of insurance cover for affected rural families, since this solution would definitely be much more cost-effective than the control strategy being applied today. In addition, it would be much less dangerous for the environment and, if well organized, safer for the affected families. The current strategy fails both to prevent plagues and to compensate families which have suffered crop losses.

References


Address for correspondence: S. Krall, Deutsche Gesellschaft für Technische Zusammenarbeit, PO Box 5180, D-65726 Eschborn, Germany.
The long-term psychological after-effects of the 1992 Erzincan earthquake are examined. 461 subjects from Erzincan were administered a semi-structured interview. Emotional distress was measured by a symptom checklist containing 40 items. 129 subjects from Ankara, the capital of Turkey, were also used as a comparison sample. The factor analysis revealed that distress symptoms can be grouped into phobic anxiety, somatization, depression and hostility. The comparison of the Erzincan and Ankara samples showed that the Erzincan sample had higher phobic anxiety scores, the females from Erzincan had higher distress as compared to the males from Erzincan and to both males and females from Ankara. Regression analyses showed that being female and evaluating one's home as insecure against future earthquakes were related to elevated levels of distress. Results showed that, even after sixteen months, Erzincan residents had higher phobic anxiety and that females seemed to be especially vulnerable to distress. Implications of the results for psychosocial intervention are discussed.

Victims of natural disasters experience considerable stress. They have to adapt to drastically altered physical environments and have to face the emotional trauma of observing loss of lives, injury and property destruction. Victims of some disasters, furthermore, like those exposed to earthquakes, have to live with the threat of a potential recurrence (Baum et al., 1983; Rubonis and Bickman, 1991). Although the psychological consequences of disasters have been studied extensively, studies in this area seem to have produced conflicting results (Rubonis and Bickman, 1991). Some suggest that there are universal psychological problems among victims following a disaster experience, while others suggest that the psychological consequences are not universal but are related to victim and disaster characteristics (Baum et al., 1983; Nolen-Hoeksema and Morrow, 1991; Rubonis and Bickman, 1991). Adams and Adams (1984) proposed a twofold stress reaction model to account for the consequences of disasters as stressors. In this model, one reaction is thought to be associated with physiological responses, psychosomatic reactions and depletion of energy, while the other involves psycho-emotional responses which include anxiety, depression, anger or rage and a sense of helplessness. Typical symptoms experienced by disaster victims include depression, anxiety, somatic complaints.
and sleep disturbances (Nolen-Hoeksema and Morrow, 1991; Powell and Penick, 1983; Shore et al., 1986; Zhang and Zhang, 1991). When victim characteristics are considered, it has been reported that greater psychopathology occurs for female victims and for victims who had psychological problems prior to the disaster (Nolen-Hoeksema and Morrow, 1991; Powell and Penick, 1983). Disaster characteristics have also been reported to be related to psychological consequences. The unexpectedness of, and unpreparedness for, a disaster, its scope and intensity, and the extent to which it is general to a geographic community, all seem to be positively related to the distress experienced by the victims (Baum et al., 1983; Nolen-Hoeksema and Morrow, 1991). Finally, the effects of disasters on psychopathology seem to diminish with time (Rubonis and Bickman, 1991).

Erzincan, a city in the eastern part of Turkey, was struck by an earthquake measuring 6.8 on the Richter open scale on 13 March 1992, at 19.19 local time. 541 people were killed, 850 were severely injured and 5,500 buildings collapsed or were severely damaged (Deprem ve Erzincan, 1992; Revel, 1993). Erzincan has a history of severe earthquakes. In 1939 a major earthquake shocked the city, killing more than 15,000 and injuring 4,000. Further earthquakes occurred in 1942, 1966, 1967 and 1984, but the 1992 quake was the most severe since 1939. Residents of Erzincan are therefore quite familiar with the threat and devastating effects of earthquakes. As Revel (1993) has pointed out, since everybody in the city has had first-hand experience of an earthquake, or has a friend or relative with such experience, Erzincan residents may be said to have a ‘community memory’ of earthquakes.

The general aim of this study was to examine the psychosocial impact of the March 1992 earthquake on the residents of Erzincan. The article will focus on the psychological distress of the sample and some variables that are related to distress.

METHOD

Subjects

The subjects were an accidental sample of 489 adults (206 females and 283 males) living in the city of Erzincan in eastern Turkey. Twenty-eight subjects who reported that they were not in Erzincan during the earthquake were eliminated from the analysis, leaving a total of 461. The characteristics of the sample are given in Table 1. An accidental sample of 129 adults living in Ankara was also used as a non-disaster exposed comparison group. The characteristics of the Ankara sample are given in Table 2.

Instruments

A questionnaire divided into six parts was used to collect data. The first part focused on socio-demographic variables, the second on the housing characteristics of the sample both before and after the earthquake and the third on the earthquake experience and its emotional effects. The fourth part contained questions on the subject’s evaluation of earthquake relief work and the adequacy of help received from the Government and on attitudes towards living in Erzincan. The fifth part aimed to assess future expectations related to the earthquake.

The last part of the questionnaire contained a shortened, modified version of the Revised Symptom Checklist-90 (SCL-90) (Derogatis and Cleary, 1977), which had already been translated into Turkish and used in research with Turkish samples (Dağ, 1990). SCL-90 is a multidimensional self-report inventory which quantifies psychopathology in terms of nine primary symptom constructs. For the
### TABLE 1
Socio-demographic and earthquake-related characteristics of the Erzincan sample

<table>
<thead>
<tr>
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<th>Percentage</th>
<th>Mean</th>
<th>s.d.</th>
<th>Range</th>
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<td>Age</td>
<td>37.26</td>
<td>11.21</td>
<td></td>
<td>15–77</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>42.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>57.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>9.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>87.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>2.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>1.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (in years)</td>
<td>7.45</td>
<td>4.33</td>
<td></td>
<td>0–15</td>
</tr>
<tr>
<td>Currently employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Yes</td>
<td>62.2</td>
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<tr>
<td>No</td>
<td>37.6</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Place of birth</td>
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<td></td>
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<tr>
<td>Erzincan</td>
<td>75.9</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Other</td>
<td>24.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of deaths from the household</td>
<td>0.05</td>
<td>0.27</td>
<td>0–3</td>
<td></td>
</tr>
<tr>
<td>Number of injuries from the household</td>
<td>0.10</td>
<td>0.39</td>
<td>0–3</td>
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<td>Property loss in the earthquake</td>
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<tr>
<td>Yes</td>
<td>91.3</td>
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<tr>
<td>No</td>
<td>8.7</td>
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<tr>
<td>Feels secure at present home</td>
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<td>Yes</td>
<td>34.3</td>
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<td>No</td>
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<td>Previous quake experience</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Worried that there will be another quake in Erzincan</td>
<td>Yes</td>
<td>88.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>11.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trusts authorities for appropriate action in future quakes</td>
<td>Yes</td>
<td>29.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>55.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don't know</td>
<td>14.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Made preparations for a future quake</td>
<td>Yes</td>
<td>32.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>67.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Some percentages do not add up to 100 due to missing values.
TABLE 2
Socio-demographic characteristics of the Ankara sample

<table>
<thead>
<tr>
<th></th>
<th>Percentage</th>
<th>Mean</th>
<th>s.d.</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>35.75</td>
<td>11.99</td>
<td></td>
<td>15–70</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>53.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>46.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>17.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>74.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Widowed</td>
<td>2.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>4.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (in years)</td>
<td>8.97*</td>
<td>3.65</td>
<td></td>
<td>0–15</td>
</tr>
<tr>
<td>Currently employed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>67.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>30.1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*The Ankara sample had more years of formal education (F(1,572) = 7.45; p < 0.01).

The present study, 40 items taken from the Somatization, Depression, Anxiety, Phobic anxiety and Hostility subscales, items on eating and sleep problems and an item on images and thoughts about the earthquake were used. The response format was also changed to increase the ease of responding and a three-point rather than a five-point scale was used. The respondents were required to consider the last two weeks in answering each question and to rate each item on a three-point scale of distress, from ‘not at all’ (1) to ‘very much’ (3). We focus here on the results of the shortened modified SCL (SCL-40) and responses to questions on the emotional effects of the earthquake.

PROCEDURE
The study was conducted in two phases. In the initial phase, the researchers visited Erzincan and had informal discussions and group meetings with adults from different occupations and districts, and obtained information on various aspects of their earthquake experience, their attitudes towards the help received and relief work, future life in Erzincan, the characteristics of desirable housing arrangements for Erzincan and their emotional reactions. The purpose of this phase was to capture the earthquake experience from the viewpoint of its victims and, possibly, to use their own wordings in the instrument to be developed for the study.

In the second phase, eleven psychology students were trained to administer the research instrument as a structured interview. The research team visited houses, work sites and public places in different districts of Erzincan and asked adults whether they would like to participate in research related to the earthquake experiences of individuals. Although the sample was an accidental one, the researchers tried to sample from as many different districts of Erzincan as possible. Households accounted for 41.3
per cent of the sample, work places for 54.8 per cent and public places like cafes for 3.9 per cent. Only one adult from each household was administered the research instrument. The refusal rate was very low but, in cases of refusal, the next household or work place was used to gather data. The second phase of the study took place in July 1993, nearly sixteen months after the earthquake. The city was still in the process of being reconstructed, the shopping centre was still not repaired or reconstructed and the majority of shop owners were conducting their business in prefabricated shops. Although most of the new earthquake disaster housing projects were nearly completed, the majority of the houses were still not occupied by their new owners. The physical damage caused by the earthquake was therefore still clearly visible. Data from the Ankara sample were collected in April and May 1994. They were only given the shortened modified SCL-40 with questions on socio-demographic variables.

RESULTS

Emotional reactions

The subjects were asked several questions with structured response categories in order to examine their emotional reactions to the earthquake. In response to the question 'Were you emotionally affected by the earthquake?' (Yes/No), 96.7 per cent answered yes. This question was followed by an open-ended question, 'In what ways were you affected?', to which 48.4 per cent stated that they experienced fear and panic. Worry about family members, feelings that life was meaningless and sadness about the dead and injured were other responses. A combination of these reactions was reported by 24.7 per cent of the sample. When asked whether these emotional problems still distressed them, 36.9 per cent chose the 'still distresses me very much' category, while 42.7 per cent selected the 'still distresses me somewhat' category. Only 18 per cent chose the 'doesn’t distress me any more' category. The last question on this topic was 'What per cent of other Erzincan residents were emotionally distressed by the earthquake?', to which 96.5 per cent responded 'nearly everybody' or 'the majority'.

Factor analysis of the symptom checklist

The responses of the Erzincan and Ankara samples to the 40 items of the modified and shortened SCL-40 were subjected to factor analysis using varimax orthogonal rotation. Initially, nine factors explaining 54.7 per cent of the variance were obtained. Further analysis with restrictions on the number of factors revealed that four factors explaining 40.7 per cent of the variance produced the clearest solution. Items loading above 0.30 on each factor were chosen. Items with above 0.30 loading on more than one factor were included in the factor on which they had the highest loading. Table 3 presents the four factors, their items and the factor loadings. The first factor contained items on fear and anxiety, the second on somatic symptoms, the third on depression and the last one on hostility.

In order to compare the scores of the Erzincan and Ankara samples on the four factors of the SCL-40 (factor scores were computed by summing the ratings of items that belonged to each factor) and to examine possible gender differences, a 2 (sex) by 2 (Ankara/Erzincan) by 4 (phobic anxiety; somatization; depression; hostility) analysis of variants (ANOVA), with repeated measures on the SCL-factors was performed. The results revealed a significant gender by SCL-factors interaction (F(3,1488) = 12.38; p < 0.001), residence by SCL-factors interaction (F(3,1488) = 32.07; p < 0.001) and gender by
TABLE 3

Items of the four SCL-40 factors, their factor loadings and Cronbach Alpha* values

<table>
<thead>
<tr>
<th>Factor and item no.</th>
<th>Item</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1: Phobic anxiety (variance explained 26.9%; Cronbach Alpha = 0.86)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Feeling afraid in open spaces or on the streets</td>
<td>0.61</td>
</tr>
<tr>
<td>9.</td>
<td>Thoughts or images about the earthquake</td>
<td>0.51</td>
</tr>
<tr>
<td>11.</td>
<td>Crying easily</td>
<td>0.38</td>
</tr>
<tr>
<td>12.</td>
<td>Feeling afraid in closed places</td>
<td>0.72</td>
</tr>
<tr>
<td>13.</td>
<td>Suddenly scared for no reason</td>
<td>0.61</td>
</tr>
<tr>
<td>15.</td>
<td>Feeling afraid when left alone at home</td>
<td>0.69</td>
</tr>
<tr>
<td>20.</td>
<td>Worrying too much about things</td>
<td>0.41</td>
</tr>
<tr>
<td>26.</td>
<td>Feeling afraid to travel by buses, trains, etc.</td>
<td>0.57</td>
</tr>
<tr>
<td>28.</td>
<td>Having to avoid certain things, places or activities because they frighten you</td>
<td>0.63</td>
</tr>
<tr>
<td>32.</td>
<td>Thoughts of death or dying</td>
<td>0.42</td>
</tr>
<tr>
<td>35.</td>
<td>Feeling uncomfortable in crowded places</td>
<td>0.35</td>
</tr>
<tr>
<td>39.</td>
<td>The feeling that something bad is going to happen to you</td>
<td>0.47</td>
</tr>
<tr>
<td>40.</td>
<td>Thoughts and images of a frightening nature</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Factor 2: Somatization (variance explained 5.4%; Cronbach Alpha = 0.84)

| 3.                  | Feelings of dizziness or faintness                                   | 0.52           |
| 5.                  | Pains in heart or chest                                              | 0.63           |
| 7.                  | Feeling low in energy or slowed down                                 | 0.56           |
| 17.                 | Pains in lower back                                                  | 0.54           |
| 22.                 | Heart pounding or racing                                             | 0.67           |
| 23.                 | Nausea or upset stomach                                              | 0.53           |
| 24.                 | Soreness of your muscles                                             | 0.63           |
| 27.                 | Trouble getting your breath                                          | 0.54           |
| 29.                 | Numbness or tingling in parts of your body                            | 0.59           |
| 30.                 | A lump in your throat                                                | 0.46           |

Factor 3: Depression (variance explained 4.8%; Cronbach Alpha = 0.73)

| 8.                  | Thoughts of ending your life                                         | 0.59           |
| 16.                 | Blaming yourself for things                                          | 0.33           |
| 18.                 | Feeling lonely                                                       | 0.49           |
| 19.                 | Feeling blue                                                         | 0.51           |
| 21.                 | Feeling no interest in things                                        | 0.46           |
| 25.                 | Having trouble falling asleep or not being able to sleep well        | 0.46           |
| 31.                 | Feeling hopeless about the future                                    | 0.51           |
| 33.                 | Overeating                                                           | 0.38           |
| 34.                 | Waking up very early in the mornings                                 | 0.37           |
| 36.                 | Feeling everything is an effort                                      | 0.44           |
| 38.                 | Feelings of restlessness                                             | 0.49           |

Factor 4: Hostility (variance explained 3.5%; Cronbach Alpha = 0.73)

| 1.                  | Headaches                                                            | 0.47           |
| 2.                  | Nervousness or shakiness inside                                      | 0.72           |
| 4.                  | Feeling easily annoyed or irritated                                  | 0.68           |
| 10.                 | Reduction in your appetite                                           | 0.31           |
| 14.                 | Temper outbursts that you could not control                          | 0.40           |
| 37.                 | Getting into frequent arguments                                      | 0.42           |

*Cronbach Alpha is a reliability coefficient
residence interaction ($F(1,496) = 5.24; p < 0.02$). Table 4 gives the means for the four SCL-factors for males and females. Females scored significantly higher than males on all factors except for depression. For both females and males, scores on the hostility factor were significantly higher than the other three SCL-factors.

Table 5 presents the means for the SCL-factors for the Ankara and the Erzincan samples. Residents of Ankara and Erzincan differed only in their phobic anxiety scores, Erzincan residents scoring higher than the Ankara sample. For both samples, hostility scores were the most pronounced and were higher than the other three SCL-factor scores. For the Erzincan sample, however, hostility and phobic anxiety scores did not differ.

Table 6 presents the mean distress scores of males and females from Erzincan and Ankara. Females from Erzincan scored significantly higher than males from Erzincan and significantly higher than both females and males from Ankara.

### Predictors of the four SCL-factors

The significance of some socio-demographic and earthquake-related variables as predictors of the four factors of the SCL-40 were tested by using stepwise regression analysis. An initial correlational analysis revealed that reported financial loss in the earthquake was not significantly related to the scores on any of the four factors. An examination of the number of dead and injured amongst family members revealed that the numbers were too low to be included in the regression analysis and property loss was not entered due to the skewness of the data (i.e., the very high percentage of subjects reporting such a loss). Finally, age, years of education, sex, whether the subject felt safe from earthquakes at his or

### Table 4

<table>
<thead>
<tr>
<th></th>
<th>Phobic anxiety</th>
<th>Somatization</th>
<th>Depression</th>
<th>Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>females</td>
<td>1.94&lt;sub&gt;CD&lt;/sub&gt;</td>
<td>1.73&lt;sub&gt;C&lt;/sub&gt;</td>
<td>1.66&lt;sub&gt;BC&lt;/sub&gt;</td>
<td>2.07&lt;sub&gt;D&lt;/sub&gt;</td>
</tr>
<tr>
<td>males</td>
<td>1.55&lt;sub&gt;AB&lt;/sub&gt;</td>
<td>1.37&lt;sub&gt;A&lt;/sub&gt;</td>
<td>1.49&lt;sub&gt;AB&lt;/sub&gt;</td>
<td>1.83&lt;sub&gt;C&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Note: The subscripts (CD, C, etc.) are used to show means that differ significantly from each other on the basis of Duncan’s ‘Honestly Significant Difference’ (HSD) test. Means not sharing the same subscript are significantly different (Duncan HSD, $p < 0.01$).

### Table 5

<table>
<thead>
<tr>
<th></th>
<th>Phobic anxiety</th>
<th>Somatization</th>
<th>Depression</th>
<th>Hostility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ankara</td>
<td>1.49&lt;sub&gt;A&lt;/sub&gt;</td>
<td>1.50&lt;sub&gt;A&lt;/sub&gt;</td>
<td>1.65&lt;sub&gt;A&lt;/sub&gt;</td>
<td>1.94&lt;sub&gt;C&lt;/sub&gt;</td>
</tr>
<tr>
<td>Erzincan</td>
<td>1.78&lt;sub&gt;BC&lt;/sub&gt;</td>
<td>1.54&lt;sub&gt;AB&lt;/sub&gt;</td>
<td>1.54&lt;sub&gt;AB&lt;/sub&gt;</td>
<td>1.94&lt;sub&gt;C&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

Note: See note to Table 4.
TABLE 6
Means of SCL-factor scores for females and males from Erzincan and Ankara

<table>
<thead>
<tr>
<th></th>
<th>Erzincan</th>
<th>Ankara</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td>2.06s</td>
<td>1.59A</td>
</tr>
<tr>
<td>Males</td>
<td>1.59A</td>
<td>1.37A</td>
</tr>
</tbody>
</table>

Note: See note to Table 4.

Sex and the subjects' evaluations of whether they felt safe from future earthquakes appeared as significant predictors for all the factors. Being female, evaluating the current house as unsafe and making preparations for a future earthquake seemed to be related to higher levels of phobic anxiety. Somatization was positively related to age and to evaluating the present house as unsafe and negatively related to education. Sex and safety at home were the two significant predictors for both depression and hostility. Being female and evaluating the current accommodation as unsafe seemed to be positively related to scores on the depression and the hostility factors.

DISCUSSION

This article has focused on the distress symptoms of the 1992 Erzincan earthquake

TABLE 7
Significant predictor variables for the four SCL-factors

<table>
<thead>
<tr>
<th>Criterion variable</th>
<th>Predictor variable</th>
<th>r</th>
<th>Beta</th>
<th>(r^2) change</th>
<th>T</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phobic anxiety</td>
<td>Sex (male)</td>
<td>-0.46</td>
<td>-0.43</td>
<td>0.21</td>
<td>-9.46**</td>
</tr>
<tr>
<td></td>
<td>Secure at home (No)</td>
<td>0.20</td>
<td>0.14</td>
<td>0.02</td>
<td>3.16**</td>
</tr>
<tr>
<td></td>
<td>Future preparation (No)</td>
<td>-0.15</td>
<td>-0.11</td>
<td>0.01</td>
<td>-2.49*</td>
</tr>
<tr>
<td>Somatization</td>
<td>Sex (male)</td>
<td>-0.44</td>
<td>-0.40</td>
<td>0.19</td>
<td>-8.03**</td>
</tr>
<tr>
<td></td>
<td>Education</td>
<td>-0.32</td>
<td>-0.15</td>
<td>0.04</td>
<td>-3.01*</td>
</tr>
<tr>
<td></td>
<td>Age</td>
<td>0.07</td>
<td>0.11</td>
<td>0.01</td>
<td>2.31*</td>
</tr>
<tr>
<td></td>
<td>Secure at home (No)</td>
<td>0.18</td>
<td>0.10</td>
<td>0.01</td>
<td>2.15*</td>
</tr>
<tr>
<td>Depression</td>
<td>Sex (male)</td>
<td>-0.23</td>
<td>-0.21</td>
<td>0.05</td>
<td>-4.19**</td>
</tr>
<tr>
<td></td>
<td>Secure at home (No)</td>
<td>0.18</td>
<td>0.15</td>
<td>0.02</td>
<td>2.95*</td>
</tr>
<tr>
<td>Hostility</td>
<td>Sex (male)</td>
<td>-0.28</td>
<td>-0.24</td>
<td>0.08</td>
<td>-4.99**</td>
</tr>
<tr>
<td></td>
<td>Secure at home (No)</td>
<td>0.28</td>
<td>0.24</td>
<td>0.05</td>
<td>4.97**</td>
</tr>
</tbody>
</table>

*p < .05; **p < .001.

Note:
- \(r\) = Correlation coefficient showing the relationship between two variables.
- Beta = Regression coefficient employed in predictive models.
- \(r^2\) change = The additional proportion of variance explained by a particular variable.
- \(T\) = A statistical procedure to test the significance of the variable.
victims. The majority of the subjects reported that they were emotionally affected by the earthquake, fear and panic being the most frequently reported reactions. The majority of victims stated that these emotional problems still distressed them, even though the study took place sixteen months after the earthquake. The ability to predict geological catastrophes such as earthquakes is not very advanced (Baum et al., 1983) and thus the reactions of the victims may reflect their continuing worry about the possibility of a new earthquake. Most of the sample (88.9 per cent) reported that they were worried about a potential earthquake and 64.3 per cent reported that they did not feel safe from a new earthquake in their present houses. Furthermore, 55 per cent of the sample reported that they did not believe that the authorities would take appropriate action in a future earthquake. All these findings seem to point out that, although considerable time has elapsed since the quake, the Erzincan earthquake victims are still distressed by the issue of earthquakes. Although the majority of the sample reported emotional consequences which still bothered them, only a small percentage of the subjects reported that they have made preparations for a future earthquake. This finding seemed unexpected, since it has been shown that people typically underestimate risks to which they are chronically exposed (Lehman and Taylor, 1987) and that those who engage in earthquake preparedness activities show awareness of the threat and, consequently, higher levels of stress (Faupel and Styles, 1993). Although the present sample did not seem to underestimate the risks of a future earthquake, the majority have not taken safety preparations. This may reflect a feeling of powerlessness or fatalism, as noted by Revel (1993). It may be useful to organize earthquake education programmes in order to motivate the residents of Erzincan to engage in household preparedness activities.

The factor analysis of the shortened modified symptom checklist revealed that distress symptoms can be grouped into phobic anxiety, somatization, depression and hostility. Comparison of the Erzincan sample with the non-disaster exposed Ankara sample showed that females from Erzincan had higher stress scores than males from Erzincan and higher also than males and females from Ankara. Although no systematic data are available to explain this finding, the researchers noted that female residents of Erzincan lead very closed, housebound lives. They have very close ties with female neighbours but limited contact with the outside world. They were reluctant to let male interviewers enter their homes but were very hospitable towards the female interviewers. Some of them even displayed emotional reactions, like crying while answering the questions. It is possible that these close female to female networks in Erzincan and their frequent informal gatherings help to keep the earthquake topic alive for the female community, and thereby serve as maintainers of stress reactions (Nolen-Hoeksema and Morrow, 1991). From the viewpoint of providing counselling, it seems important to explore female social networks in Erzincan and to develop service delivery systems that will incorporate these rather housebound individuals. Such a disaster education and psychological counselling programme may need to be delivered for groups of women in their own houses.

There was also an interaction between place of residence and distress factors which showed that, except for the scores on the phobic anxiety factor, the Erzincan and Ankara samples did not differ. The Erzincan sample had higher phobic anxiety scores, which may reflect their
continuing worry about a future earthquake. The analysis also showed that, for the Erzincan sample, scores on phobic anxiety and hostility were higher than their scores on somatic complaints and depression. Thus, fear and hostility seemed to be more pronounced distress symptoms for the Erzincan sample and it may be fruitful to target these reactions in planning psychosocial intervention programmes in Erzincan. It is interesting to note that, for the Ankara sample, the hostility scores were higher than the other three stress factor scores. This may be related to the fact that, although the Ankara sample did not directly experience a physical disaster, data from this sample were collected just after the announcement of the economic stability measures by the government, which brought considerable financial distress to the majority of individuals. Some subjects from the Ankara sample, although not directly questioned, noted that they were under considerable financial stress due to the economic austerity decisions. Thus, the elevated hostility scores of the Ankara sample may be related to economic hardship.

Finally, in line with the literature (Rubonis and Bickman, 1991), females had significantly higher stress scores as compared to males on all factors except for depression. For depression, although the females had slightly higher scores, the difference was not significant. This finding seems unexpected in the light of findings showing a higher prevalence of depression in females as compared to males (Russo, 1990). When the predictors for the four distress factors were examined, sex appeared as a significant variable for all of the factors. Being female seems to be related to higher levels of distress. This finding once again underscores the importance of reaching female victims in community psychosocial intervention programmes.

Subjects’ evaluations of the safety of their homes appeared as another important variable related to distress. Evaluating one’s house as unsafe from potential earthquakes is related to higher levels of phobic anxiety, somatization, depression and hostility. Thus, it seems important to consider the housing preferences of the residents of an earthquake vulnerable area and to base housing projects on these preferences. It may also be important to give information to the residents on standards and methods of construction. The housing preferences of Erzincan residents will be discussed in another paper. It seems, however, that they prefer single-storey as opposed to multi-storey, medium- or high-rise housing. Although the government offered new flats to people whose houses had been destroyed, with long-term instalment plans, these were in multi-storey apartments.

Finally, making preparations for a future earthquake was related to higher phobic anxiety, which may indicate that, while a realistic acceptance of vulnerability may increase fear, this fear may be necessary for the future reduction of damage. It should be noted, however, that the present study used retrospective self-report data and an important shortcoming was that other possible stress sources were not examined. Thus, the results need to be assessed cautiously. In future studies it is essential to explore stress sources other than the threat of a future earthquake.

Even after sixteen months, the Erzincan residents reported that they were still distressed by emotional reactions. The distress of female residents seemed to be more pronounced. Attitudes towards the present house seemed to be an important variable related to distress. Although reconstruction and repair work in Erzincan has been conducted quite rapidly, the psychological aftermath of the disaster and the counselling needs of residents have
not been addressed. The residents of an area vulnerable to earthquakes need psychological counselling and education services, and in planning these it may be essential to give special emphasis to the needs of female residents.

Notes

This research was made possible by a grant from the Middle East Technical University, Earthquake Engineering Research Center. The assistance of the staff of the Center is gratefully acknowledged.

1. Accidental sampling is a non-probabilistic sampling procedure in which the researcher selects any case he happens to come across for inclusion in the sample.

References


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Representing Refugees: The Role of Elites in Burundi Refugee Society

MARC SOMMERS, Boston University

Among Burundi refugees in Tanzania, men who have a university education and know English or French are most likely to represent their concerns to officials, particularly those from UNHCR. Officials consequently learn about the perspectives of refugees from these men. Based upon findings from two years of field research in Tanzania, the history of relations between ethnic Hutu elites and the peasantry in Burundi is outlined and it is explained why education has assumed such pronounced significance in Burundi refugee society. The use of ethnicity as a political tool for elite refugees is also described. It is concluded that elite refugees may not, as is often claimed, represent the refugee majority.

This paper will examine why elite men have assumed the role of representatives of the majority of Burundi refugees living in Tanzania. Well-educated refugee men are most likely to present their views to officials concerned with refugee issues and members of the media. Officials and reporters rarely hear from any other kind of refugee. To explain this phenomenon, I will describe how Hutu elites from Burundi have come to assume a position of unusual stature, and how ethnicity is used to shield a divisive refugee society from view.

Before examining these issues, however, two fairly obvious but frequently overlooked reasons for the pronounced elite access to officials require mention. In Tanzania, the almost complete dominance of educated men over refugee discourse with officials of the United Nations High Commissioner for Refugees (UNHCR) and other organizations is due in part to the fact that these elites speak French or English. Direct communication with foreign officials often requires this facility. Many Burundi refugees cannot even speak Swahili, Tanzania’s predominant language. Indeed, only a small percentage of women refugees speak it (Daley, 1991), thus accentuating the gender-specific perspective that officials receive. Another obvious advantage that elite men retain is geographic, a factor Chambers (1979) has raised before. Most of the refugees are situated inside organized settlements or within rural Tanzania. Encounters with refugee officials often rely upon infrequent settlement visits, since most officials live in Dar es Salaam, Tanzania’s coastal capital. Some members of the urban refugee elite have never been to the settlements, while others left them in part because, after spending most of their lives in boarding schools and cities, they cannot farm.

I conducted fieldwork in 1990–92
among elite and non-elite urban refugees from Burundi’s 1972 genocide, before the shattering developments that followed the assassination of Burundi’s President Ndadaye on 21 October 1993. I had initially concentrated my research on elite refugees, as they were the only refugees known by relevant agencies to be living in Tanzania’s capital. After many months, however, I gained access to a significant population of non-elite Burundi refugees who had illegally left remote settlements to live clandestine lives in Dar es Salaam. This population, I soon discovered, numbered perhaps 20,000 in total and was comprised primarily of young men in search of cash for their families, work experience and urban adventure. And, unlike the elite refugees in town, their presence was unknown to government and refugee agency officials.

HUTU ELITES AND THE PEASANTRY

The literature on Burundi relies upon the ethnic cleavage to explain frictions and conflicts in history. Yet the concepts of ethnic Hutus as Burundi’s majority population and the Tutsis as the ruling minority are relatively recent tools for demonstrating solidarity between Burundians hailing from different regions. German and Belgian colonial rulers extracted these two identities from pre-colonial Burundian society and transformed them from latent ‘genetico-status group[s]’ (Weinstein and Shrire, 1976) into bounded ethnic stereotypes that facilitated the governing and guiding of colonial society. The Hutus’ ethnic opposite, the Tutsis, benefited from the colonial system, while Hutus suffered a general loss of political, social and economic power.

Hutu elites have often shared little with the masses of Hutu peasants (Weinstein and Shrire, 1976). High-status Hutus in pre-colonial times shared class interests with high-status Tutsis. During the colonial era, most of the westernized Hutu elites distanced themselves from the rural protests that occurred. Following independence, they vied for power against Tutsi elites and ultimately lost. Only then ‘did they seek to associate themselves with the Hutu peasantry’ (Weinstein and Shrire, 1976, p. 37). Yet a fundamental difference between their aims remained. In the abortive 1965 revolt, ‘The peasants attacked a system’, Weinstein and Shrire wrote, while ‘the Hutu elite wanted to gain control over it’ (1976, p. 37).

The 1972 revolt and subsequent ethnic genocide further demonstrate the differences separating Hutu elites and peasants. While most Hutu students and government workers were uninvolved with the actual revolt, Tutsi soldiers killed many of them following its failure. Hutu farmers, on the other hand, largely carried out the revolt, which represented only the latest in a series of incidents that has been described as a ‘peasant protest culture’ in Burundi (Weinstein and Shrire, 1976, p. 48). Yet the Tutsi-dominated government army concentrated on killing those considered members of the elite, in what one commentator described as ‘the nearest equivalent offered by Africa of a “final solution”’ (Lemarchand, 1989, p. 22). Although severely affected, the army did not target those peasants who helped initiate the revolt.

In a region of the world where people value education highly, the significance of education for refugee survivors of Burundi’s 1972 massacre is remarkable. This, again, arises in large part from Burundi’s past. Colonial administrators elevated Tutsi men for advanced training and education and excluded Hutus almost entirely. Aspiring Hutus found solace in missionary schools and seminaries, which spawned an educated and resentful Hutu counter-elite (Greenland, 1976, p. 110). In 1972, the Tutsi government used the peasant revolt as an excuse to ‘decimate all
potential leadership elements among the Hutu' (Weinstein and Shrire, 1976, p. 51), killing nurses, priests, civil servants, urban professionals and secondary school students. The government’s attempt to liquidate all Hutus with a trace of secondary education was so effective that ‘an entirely new social order’ arose in the post-genocide Burundi (Lemarchand, 1982, p. 210).

It is thus not surprising that the educated Hutus who managed to escape the army’s clutches began to perceive themselves as leaders of Burundi refugees. Many became politicized through their experience. Secondary and university education had come to hold tremendous symbolic meaning in Burundi refugee society generally — few Hutus ever gained entry to higher education in Burundi, and a great many of those who did perished in 1972. In the Tanzanian settlements for Burundi refugees, very few refugees have continued education beyond primary school. As Malkki explains, refugees perceive Tanzanian authorities as carrying out a Tutsi-like policy of excluding Hutus from higher education (1989). University educated refugees, consequently, seemed to have attained an unusually high social stature in refugee society. Few in number, and holding the education that caused other Hutus to become victims in 1972, they stand as symbolic survivors of Tutsi oppression. Additionally, since post-primary education has been largely withheld from Hutus, in both Burundi and Tanzania, those who had university education also symbolize refugee empowerment. Hutu refugees with education threaten Burundian Tutsis, the thinking goes, because that is why others were murdered.

Some of the elite refugees living in Dar es Salaam fled Burundi after 1972, during episodes where the combination of Hutu ethnicity and secondary or university education made them fear for their lives. They may have entered Dar es Salaam after first fleeing to Rwanda, but most of them received their education in Burundi and have lived in Dar es Salaam with UNHCR recognition. Their legal residence meant that they did not have to lead clandestine lives, and so could be outspoken with their views. Although still careful of attracting attention, they had the luxury of relative safety in Dar es Salaam, and their symbolic stature in refugee society lent them the conviction that their views were important.

THE URBAN CONTEXT

Chambers has cited the ‘urban and elite biases’ (1979, p. 382) found in literature on, and work with, refugees. ‘Urban refugees’, he stated, ‘often educated, articulate and politically active, demand attention and usually receive it’ (p. 383). My findings with Burundi refugees in Dar es Salaam support Chambers’ contention, yet also reveal that the urban elites may take more advantage of their access than he reveals. Officials may receive these men as leaders or able representatives of many of the 150,000 refugees located in remote settlements. Officials are scarcely aware of the thousands more who live clandestinely in Tanzania’s capital.

It is not unusual for African peasants to shield their opinions from strangers, and probable that elites will express theirs. With refugees, this difference is accentuated. Many non-elite Burundi refugees identify themselves as the ‘people of ’72’ and hold strong views about many issues, but public expression of such views are usually left to others. They are wary of Tanzanian authorities in the settlements and conceal their refugee identity in the city, as they fear negative reactions against it. Elite refugees assume this role, and some casually categorize their non-elite brethren as Watu Wadogo (‘Little People’) or Watu Wachinichini (‘Very Low People’). Some non-elite refugees that I interviewed
also identified themselves as Watu Wachinichini.

THE ETHNIC CARD

The most dangerous assumption that non-refugees can make about refugees is that they all hold similar viewpoints. Much of this is due to the way refugees are created and institutionalized. People who are refugees for any length of time can be said to be part of a refugee society, which necessarily contains increasingly significant differences from their home society. Such differences may take essential forms. Burundian nationals who fled the 1972 violence came from different regions of the country, carrying with them variations in culture and distinct differences in dialect and socio-economic experience. Yet each of these people became a generic 'refugee' after crossing the border. Their disparate pasts became institutionally irrelevant and, as such, no longer formally existed. People who would consider each other strangers in Burundi were all categorized simply as 'Burundi', or 'Hutu', refugees, and the categorization began to imply that they were mostly the same sort of people.

Yet those, for example, who were fishermen in Burundi could no longer fish as refugees, and those who depended on coffee earnings could no longer rely on that cash crop. Most of the refugees were set in the midst of tsetse-infested forest and had to clear and farm a new type of soil in a new land. And while the refugee settlement society they reconstructed is casually called 'Burundi' by those who voyage beyond its bounds, the 'Burundi' they refer to is an entirely new society, drawing more of its reference from settlement life and the host nation than from their shared homeland. Burundi refugee society is separate from Burundian society, just as New York’s Little Italy is separate from Italy. In recreating their homeland in the settlements, Burundi refugees have recreated themselves.¹

In my work with elite and non-elite urban refugees from Burundi, I discovered that the elites’ views tended to have a political and activist nature, while non-elites were usually distinctly apolitical, their views given more to fatalism and religious influence. This was demonstrated in 1992, following a widely publicized March ultimatum issued by Tanzania’s Minister for Home Affairs, Augustine Mrema. Burundi refugees, he announced, had three months to decide whether to become Tanzanian citizens or repatriate. The UNHCR-mandated ‘third option’, retaining refugee status, was only mentioned later. Mrema’s dramatic ultimatum was never carried out, but it effectively forced Burundi refugees to confront their future. Many elite refugees expressed their conviction that they would be sent home to their doom. They sought to retain their refugee status to keep the option of repatriation open once truly free and fair multi-party elections occurred in Burundi. Non-elites also tended to favor retaining their refugee status and discounted Tanzanian naturalization as an option, but for different reasons. They emphasized the role of the army. If the army remained dominated by ethnic Tutsis, elections were irrelevant, a perception that has since become painfully accurate. In the words of one refugee: ‘The army IS the government!’ Many non-elites recited Sisi tunataka amani (‘All we want is peace’) to me, and indicated that they sought to wait to see if there would be peace or violence there. Most of the refugees I interviewed were fundamentalist Christians, who frequently connected ‘peace’ to the belief that God would ultimately inform them when it was safe to return home. Until then, waiting as a refugee would be difficult, but it would be folly to try to alter their situation. Another recurrent theme in discourse was how their lives as refugees were prone to victimization.
Profound differences in viewpoints between elites and non-elites were not immediately apparent to me during my work with Burundi refugees. I soon learned, however, an essential element of refugee life: for most Burundi refugees, public silence is the safest strategy for survival. The lives of the poor and disenfranchised are often tenuous, and most Burundi refugees believe that voicing their views publicly could not help them. Attaching a viewpoint to one’s identity promotes a person’s delineation from the rest, which may invite danger. Most refugees I met maintained a studied anonymity in public. It was better to be invisible.

The literature on Burundi refugees considers them ethnic Hutus, and I am not here to challenge this contention. But for non-refugees, this perspective can erase suspicions that Burundi refugees may be hiding other, equally significant identities from view. My findings reveal that they are. The hidden division is based on distinctions between two areas of southern Burundi, where most of the refugees came from in 1972. The Imbo are people who fled from the coastal strip along Lake Tanganyika. Traditionally, they are fishermen. The highland refugees have united as a created social entity called the Banyaruguru, a name borrowed from a high-status Tutsi group. They are largely farmers whose home areas in Burundi also contain Tutsis, and a few have intermarried with them. This distinction between highland Banyaruguru, who come from areas mixed with ethnic Tutsis, and the lowland Imbo, whose home areas contained relatively few Tutsis, is charged with tremendous emotion.

Refugees often deeply distrust members of the opposing group, privately denigrating them as secret allies or relatives of the Tutsis. The two major Burundi refugee political parties embody this difference. Ubumwe (also known as Frolina) seems to be almost entirely composed of Imbo refugees, while Palipehutu’s members appear dominated by Banyaruguru refugees. Both parties are infrequently mentioned in literature about Burundi refugees, in large part because they are officially outlawed from refugee settlements. Yet Tanzanian authorities are aware of their presence and appear to have allowed them to operate quietly. Palipehutu is the largest party, having an organizational network that extends into many countries from their headquarters in Belgium. Over the years, it has been considered an extremist party by Burundi government officials and banned from the country. Officials, and even some refugees, contend that Palipehutu, which stands for the Party for the Liberation of the Hutu people, strives to recreate Burundi as an explicitly ethnic Hutu state, although some Palipehutu officials deny this. Both groups endorse violent means to attain power in Burundi.

While I can only state that Banyaruguru refugees appear to dominate Palipehutu’s membership (at least in Tanzania), most Ubumwe officials that I spoke with related that their organization was an emphatically Imbo party. Most of the non-elite refugees that I interviewed also believe this. Ubumwe’s agenda appeared to be less explicit than Palipehutu’s, and it certainly lacked the international organization of their bitter rival, but both parties seek the downfall of Tutsi hegemony in Burundi.

The most politically and symbolically significant issue for Burundi refugee conformity is ethnic solidarity. The social cleavage in Burundi refugee society, dividing refugees into Imbo and Banyaruguru groups, has been kept hidden from outsiders, apparently by joint party mandate. Many elite refugees privately related their concern that open knowledge of this cleavage could endanger the refugees’ position before outsiders, as it weakens the perception of refugee solidarity. Politi-
cal leaders of Burundi refugees can claim a huge constituency for themselves if they are all identified simply as ethnic Hutu. This is the same strategy that Hutu elites in Burundi utilized before 1972.

CONCLUSION

Self-censorship is a common mode of behavior for most Burundi refugees dealing with non-refugees, the reasons for which may arise from forces within as well as without refugee society. Elite refugees may not aptly represent non-elite views, and in many respects this should not be surprising, for their lives are different from the rest. They faced different problems before becoming refugees, and have continued to do so afterwards. Their education has accorded them access and status, as well as made them targets of repressive acts. Elite refugees cannot succeed at invisibility nearly as easily as non-elites.

Finally, as members of an often silenced society, refugees may require representation in order to direct their views to those wielding power over their lives. Yet it does not follow that the representatives accurately represent everyone’s views, nor that the prioritization of their concerns mirrors those of the majority. Indeed, the perspectives may be quite different. Assuming otherwise may create a misleading picture of refugee society. Officials who evaluate or make policy according the concerns advanced by the elite minority may not be serving the interests of the refugee majority.

Notes

This is a revised version of an earlier paper presented at the African Studies Association 36th Annual Meeting on 4 December 1992 in Boston, MA. Its original title was ‘Urbanization and Representation: Class, Politics and Access Among Burundi Refugees in Urban Tanzania’. I owe thanks and gratitude to the Rotary Foundation and Sigma Xi for their support of my field research.

2. The same cannot be said for outspoken leaders, such as Joseph Karumba of Ubumwe, whose actions have attracted confrontations with government officials which have been reported in the Tanzanian media, and Remmy Gahutu of Palipehutu, who was arrested and died while in detention.

References


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The widely held view that malnutrition is a late indicator of famine is challenged on the basis of evidence that people often deliberately reduce their food intake as an early response to inadequate food security. This broadens the possible interventions in response to high malnutrition rates to include measures to support livelihoods under threat of collapse. In the late stages of famine, social disruption and distress migration often result in a degraded health environment which may raise the threshold of nutritional status associated with an increased mortality risk. It is important to assess the underlying causes of malnutrition and the associated health risks. At present, the main objective of nutrition surveys is usually to obtain a reliable estimate of the prevalence of malnutrition among children under five years of age, with little analysis of the underlying causes of malnutrition. Experience from the 1984–85 famine in Darfur led to the development of an alternative approach to nutritional assessment which could be applicable elsewhere in Africa. The combination of quantitative and qualitative methods was particularly valuable as a means of gaining a wider and deeper understanding of the nature of the nutritional situation.

Malnutrition is an obvious manifestation of famine and, not surprisingly, a nutritional survey is often one of the first steps taken by agencies looking for evidence that a famine is taking place. Some relief agencies characterize famine according to a particular prevalence of acute malnutrition; for one agency, this corresponds to 10 per cent of children less than 80 per cent weight-for-height (SCN News, 1991).

There are two main reasons why rates of malnutrition have taken centre stage in food related emergencies. First, the nutritional status of children and hence the prevalence of malnutrition can be estimated by anthropometric measurements reasonably quickly and with a calculable degree of reliability. Second, the anthropometric status of children has been used as a proxy indicator of starvation and risk of death, which are perceived by outside observers to be fundamental aspects of famine. Anthropometric data therefore provide the vital evidence needed by agencies to launch international appeals for funds to resource emergency relief.

If high rates of malnutrition are considered the outcome of famine, or even as defining famine, immediate life-saving interventions are needed in response. The usual response is the distribution of emergency food aid and supplementary feeding programmes for malnourished children and other physiologically vulner-
able groups. In this article we challenge this limited view and present a new conceptual framework of the role of nutrition in famine. The broadening of our view of nutrition in famine naturally leads to an expansion of the options for intervention in response to nutritional information.

Numerous nutritional surveys have been carried out in famines and several nutritional surveillance systems have been established in different countries to provide information in food related emergencies. The original purpose of nutritional surveillance was considered to be policy and planning in the medium to long term, programme management and evaluation, and timely warning and intervention for famine prevention (Mason et al., 1984). Ideally, nutrition should improve as information leads to better understanding of nutritional problems and thus more appropriate policies and programmes. In practice, nutritional surveillance has mostly been used for the purpose of advocacy, and for targeting food aid. The nature of the methods used has prevented the use of results for identifying more appropriate interventions.

Current nutritional surveillance methods concentrate on quantitative measures of anthropometry. This general measure of nutritional outcome cannot explain the mechanisms that led to a rise or fall in the rate of malnutrition or suggest whether any change was to be expected. They indicate whether or not there may be a problem but not why, nor what to do about it. They serve the purposes of outsiders, and have little regard to the perceptions or needs of local people. In this article we present an alternative approach to nutritional surveillance, based on a review of the role of nutritional assessments for famine early warning and targeting, which includes an in-depth case study of nutritional surveillance in Darfur between 1984 and 1991 (Young and Jaspar, 1992, 1995).

A NEW WAY OF LOOKING AT NUTRITION IN FAMINE

A decline in people's access to food is now widely believed to be the underlying cause of starvation and famine, but this decline, at least in peacetime, does not happen suddenly. It is rather a slow process, gradually worsening until starvation and death can be avoided no longer. In less severe famines, there may be no excess deaths at all. Instead, acute poverty may slowly deplete people's resources and their ability to cope, but not immediately endanger their lives.

Nutrition is integral to the process of famine, but the role that nutrition plays has been largely misunderstood or at least over-simplified. The entitlement theory of famine, as conceptualized by Amartya Sen (1981), sees starvation (and, by implication, malnutrition) as the underlying cause of famine deaths. This has been disputed by Alex de Waal, who shows that the links between impoverishment, starvation and death are not straightforward and that most famine mortality is disease-driven, as a result of localized health crises (de Waal, 1990). Nutritionists have been singularly silent in contributing to the analysis of famine. This has led to a major weakness in current concepts of famine, especially since the overwhelming response to famine is the distribution of food, usually in the form of 'nutritionally balanced rations', targeted at the apparently nutritionally vulnerable. To redress the balance we have combined current concepts of famine with nutritional theory and empirical evidence, to develop a new model which clarifies the role of nutrition.
The early stages of famine: nutritional status as an indicator of food insecurity

The initial stage of famine may be described as a period of food insecurity, which means that the access people have to food has been reduced. Sen describes a person’s access to food as his or her ‘exchange entitlement’, which refers to the ability to command food by whatever means, such as trade, production, own labour and inheritance or the transfer of assets (Sen, 1981). Exchange entitlements can worsen as a result of a reduction in income (a fall in the value of assets or unemployment), or they can worsen as a result of an increase in market prices, following a decline in food supply. The impact of conflict and war on entitlements is usually more immediate and severe than drought: food production is disrupted; crops and livestock may be destroyed; trading networks contract; markets may disappear, causing widespread shortages of essential items; thieving and looting become commonplace; people may be forcibly moved or their movements may be restricted, thereby limiting access to wild foods and separating them from their assets and local support networks; and
waged income may be seriously affected, both by the collapse of local infrastructure and the restriction on movements.

People adopt a range of strategies in response to a reduction in their entitlements in order to cope with the threat of famine. The main aim of these strategies is to preserve productive assets, which are needed to sustain their future livelihoods and way of life. The first strategies used involve only a small commitment of domestic resources and are readily reversible. People often consciously make changes to their diet in response to food shortages related to drought. This may involve a switch to cheaper, less desirable and maybe less nutritious foods, or a reduction in the number or size of meals eaten. In both Africa and Asia, people often reduce their food intake as an early response to famine (Jodha, 1975; Corbett, 1988; Rahmato, 1988; de Waal, 1989). The short-term cost of hunger is preferable to the long-term costs of asset depletion and loss of livelihood.

Changes in food intake can lead to rapid weight loss, particularly in young children, which is reflected by the weight-for-height nutritional index. In non-crisis years, fluctuations in anthropometric status frequently occur seasonally. Seasonal changes in food intake as a result of the hungry season are often reflected in the prevalence of malnutrition (Chambers et al., 1981; ACC/SCN, 1989). In Darfur, the anthropometric status of individual villages measured by the weight-for-height index was found to be both sensitive and timely in relation to changes in food security (Young and Jaspars, 1994). Both seasonal and unseasonal patterns of food security were reflected by the prevalence of acute malnutrition and the mean anthropometric status. Dramatic changes of up to 20 percentage points in the prevalence of malnutrition within a period of two to three months were attributed to the changing food security situation. In addition, the changes in nutritional status occurred at about the same time as changes in other early warning indicators, in particular the market price of cereals. Malnutrition could therefore be seen as an indicator of food insecurity, or an early indicator of famine.

Changes in anthropometric status occur as a result of disease as well as changes in food intake, but it is unlikely that any disease, with the possible exception of measles, could bring about such striking changes in the prevalence of malnutrition as seen in Darfur. An increase in infectious disease may be expected during the rainy season, especially diarrhoea and malaria. The importance of diarrhoea as a cause of malnutrition has been questioned by Briend (1990); in Bangladesh, the effect of episodes of diarrhoea on weight gain were transient and could not be detected after a few weeks (Briend et al., 1989).

The late stages of famine — nutritional status as an indicator of mortality risk

If food security conditions do not improve and famine progresses, people are forced to use coping strategies that become increasingly threatening to the survival of their livelihoods. Productive assets are sold off, until eventually people have no other choice but to starve or migrate in search of relief or other means of support. Destitution corresponds to a collapse in entitlements (Figure 1). Associated with destitution, and the accompanying social disruption, is the development of localized health crises. A deterioration in the local health environment affecting, for example, water supply, sanitation and overcrowding, increases exposure to infectious disease and leads to an increase in morbidity and mortality. Health problems are further exacerbated by the lack of healthcare services and by the difficulties facing a displaced population in caring for the sick.

An increase in morbidity as a result of a deteriorating health environment, how-
ever, is not the only reason for famine deaths. Malnutrition undoubtedly plays a critical role, as it aggravates the outcome of many infections. Severe malnutrition increases the incidence, duration and severity of infection (Tomkins and Watson, 1989) and is associated with a greatly increased risk of mortality (Gomez, 1956; Kielmann and McCord, 1978; Chen et al., 1980; Van den Broeck et al., 1993). The risk of death associated with moderate malnutrition is less clear. According to several studies, it appears that, as nutritional status declines, the risk of dying changes only slightly until a threshold is crossed, after which mortality risk rises steeply. In stable situations, this threshold of increased mortality risk roughly corresponds to the cut-off point used to classify severe malnutrition, but the increased exposure to disease found in a poor health environment is likely to raise the threshold of increased mortality risk, which would mean a larger proportion of the children at the lower end of the distribution would suffer a higher risk of death.

It is therefore the combined action of increased vulnerability to disease and increased exposure to disease that leads to famine deaths. These factors probably act synergistically and, although their individual contribution to famine mortality is largely unknown, it almost certainly varies according to local conditions and subsequent patterns of morbidity.

The interaction between malnutrition and morbidity means that the relationship between starvation and death is likely to change with the development of different stages of famine in different contexts. High rates of malnutrition may occur at both the early and late stages of famine, but the associated risks of increased mortality depends on the health risk factors present in the environment. Settled communities suffering high rates of malnutrition in the absence of health risk factors may not necessarily experience high death rates. This is supported by evidence from some historical famines, that the overall level of mortality actually improved as a result of the hot dry conditions that brought famine, causing a reduction in disease (Dyson, 1993).

In contrast, during a health crisis, when exposure to disease is heightened and treatment harder to obtain, the moderately malnourished as well as the severely malnourished may show an increased risk of death. In the later stages of famine, therefore, during a health crisis, prevalence rates of malnutrition may be a good indicator of increased risk of mortality, but not necessarily so in the early stages of famine in a stable environment which may be 'healthier' than normal.

The few studies that have been carried out of malnutrition and mortality among famine affected populations support these ideas and suggest a varying relationship which is influenced by the local health environment. Following the Bangladesh famine of 1973, for example, levels of nutritional status had improved and the effects of low weight-for-height on mortality were much less dramatic than for the same levels of nutritional status during the famine (Bairagi et al., 1985). Similarly, in 1985–86 in southern Ethiopia, Lindtjorn (1990) reported that the relationship between mortality and wasting was significantly stronger among populations living in relief shelters than in traditional pastoralist and agro-pastoralist communities. This varying relationship is reviewed in detail in a later paper (Young and Jaspars, forthcoming).

In Figure 1, we have deliberately not specified the timing of events or their spatial relationship. At any one time, different villages or groups of people may be experiencing different stages of the process. Also, over time the sequence of events may be repeated, but the stages will occur in quicker succession as people move faster down the sequence, or even
start midway through the sequence. Acts of war and violence, for example, may forcibly prevent people from following coping strategies, or destroy their assets.

The sequence itself may also vary. In some cases, for example, distress migration may occur for reasons other than a reduced entitlement to food. Local conflict and insecurity are the obvious candidates, but another is lack of water. A reduction in food intake at an early stage may not be a general phenomenon and differences between locations, groups of people and also within households should be expected, depending on individual response strategies. Some people may reduce, or make changes in, their food intake early on, whereas others may give preference to children or workers.

THE USES OF NUTRITION DATA

The limited and misleading view of famine as a sudden event accompanied by high rates of malnutrition associated with famine deaths determines how nutrition data are interpreted and used. The main objectives of the subsequent interventions are to prevent famine-induced mortality and alleviate malnutrition. In this context, nutrition surveys have focused on anthropometric data, which has been used for advocacy, and for targeting interventions and, to a much lesser extent, for determining the type of response.

Nutrition data have proved a reasonably effective tool for advocacy; high rates of malnutrition conjure up images of starving children, which is often justification enough for emergency food aid and other resources. Once an emergency food distribution has been agreed on, a targeting strategy is needed to restrict coverage of the intervention to those communities, households or individuals who are expected to benefit most. Anthropometric status is often used as the criterion to target food aid to individual malnourished children or their families, or as part of a geographic targeting strategy which favours those areas with a high prevalence of malnutrition. Response options are generally few during a food crisis and, in the past, the question asked by many nutrition surveys was often whether or not to distribute free food and, if so, how much was needed (Kelly, 1990; Pelletier and Msukwa, 1990).

Broadening the role of nutrition data

The conceptual framework presented in Figure 1 for clarifying the role of nutrition in famine has major implications for famine assessment and response. The framework shows famine as a process during which people take decisive action in response to their circumstances. High rates of malnutrition may be found long before a health crisis and associated deaths. In the early stages of famine, people are not usually in imminent danger of dying and neither are they passive victims of forces beyond their control. Interventions that treat them as such are inappropriate and, ironically, the typical life-saving tactics of relief programmes, such as food distribution, can undermine local efforts and at the same time exhaust available resources. More appropriate interventions are required, such as strengthening food security through credit schemes, income generation programmes, or measures to strengthen public health by reducing exposure to disease and/or increasing resistance, through immunization.

As the aim of the intervention is altered, so the targeting strategy must be also. As discussed in the previous section, anthropometric status at the level of the community is potentially a sensitive indicator of changes in food security and can therefore be used as a proxy for the local food security situation, provided the impact of disease on nutritional status is taken into account. Interventions intended
to support livelihoods and strengthen food security may be targeted at individual communities that are identified with the help of anthropometric data, such as the prevalence of malnutrition or average anthropometric status. Anthropometric data only provide one indication of which communities are most affected by inadequate food security and so the targeting strategy must include other relevant criteria. These should include information about the underlying causes of worsening food security (see the section on methods below).

Despite the potential of anthropometric status for helping to identify food insecure communities, it is inappropriate for identifying the poorest people within that community or those with vulnerable livelihoods. This is because, on an individual level, the relationship between anthropometric status and poverty is weak (though in research studies it is usually significant as a result of the large sample size used). Thus, individual anthropometric status is inappropriate for targeting livelihood support measures at food insecure or poor households, because the children of those households are not necessarily malnourished.

In summary, for targeting purposes it is important to distinguish between the use of anthropometry as a proxy for the food security of a community and its use to identify individual children at risk of dying. Anthropometric status at the level of the community (prevalence of malnutrition and mean anthropometric status) can be used as a proxy for food insecurity, provided there are no concurrent changes in the health environment (particularly measles), and it can therefore contribute to a geographic targeting strategy. At the level of the individual, the best available indicator for targeting children at increased risk of death is individual anthropometric status. In the early stages of famine among settled communities in a reasonable health environment, only severely malnourished children suffer a greater risk of dying, but in the later stages associated with a poor health environment malnourished children may also incur a higher risk of dying.

METHODS

Nutritional survey methods are usually centred around the collection of anthropometric data for use by decision makers operating at an administrative level well beyond the level of the community (regional, national or even international). Far less attention is given to the underlying causes of malnutrition or the perceptions, priorities and actions of local people.

Nutrition surveys are usually based on anthropometric measurements of a cluster sample of children. The cluster sample method has been adapted from the survey methods used to estimate immunization coverage (Miller et al., 1977). There are several limitations to this approach, even when it is applied in a non-emergency context. These include concerns about the reliability of nutritional status data, problems with interpretation, the high costs of collecting data and the long time taken for data collection and distribution.

The results from a simple random sample or cluster sample are rarely as objective or reliable as they first appear. Particularly during a food crisis, it is difficult to ensure that the sample is representative of the population of interest. Large-scale migration often leads to incomplete or biased coverage of the population. In emergencies, results are often biased by limited access, which is frequently restricted by insecurity or impassable roads. Data collated from clinics are usually biased towards more affluent or more accessible areas and younger children, while fluctuating clinic attendance introduces a further source of bias.
Additional problems arise from the National Center for Health Statistics/Centers for Disease Control (NCHS/CDC) reference growth curves, despite their international status and endorsement by WHO (1986). The reference curves are derived from two distinct data sets which do not join at the point where they overlap because of differences in their variances (Dibley et al., 1987). The charts and tables available from WHO do not reflect these discontinuities as the curves have been smoothed out, but nevertheless an artifactual increase in malnutrition at about two years is produced, which exaggerates the prevalence of malnutrition between 12 and 24 months. It is therefore important that any comparisons between samples of children are matched for age, which is rarely done during an emergency assessment.

A second problem arises in the presentation of nutritional indices which are usually expressed as either a percentage of the median, or as 'standard deviation scores' (also known as Z scores) (WHO, 1986). Which method is chosen affects the prevalence of malnutrition. The use of Z scores may, for example, produce a prevalence rate twice as great as compared with percentage of the median (WHO, 1986; Young and Jaspars, 1992).

Since malnutrition is multi-causal, careful identification of the underlying causes of malnutrition within a given seasonal and geographical context is vital. Large-scale surveys based on aggregated data are often difficult to interpret as aggregation masks diversity within the population. If valid comparisons are to be made between the rates of malnutrition in different groups or areas, the full number of clusters (usually 30) are required for each group or area of interest (Miller et al., 1977).

Localized differences in rates of malnutrition are very important to distinguish in relation to developing food crisis, as food security rarely deteriorates uniformly or in the same way throughout an area. The underlying causes of malnutrition must be interpreted within the confines of its geographical and social context. Many factors can confuse the interpretation of anthropometric data. Some of the most malnourished children may, for example, be removed from the sample because of migration of the more vulnerable households, or the death of the weakest children. These confounding variables will affect the anthropometric statistics and may serve to conceal the actual changes that are taking place.

Large surveys are expensive to undertake, especially where the population is scattered, or the local infrastructure is inadequate or non-existent. The costs of mobilizing survey teams are high; vehicles and fuel must be provided, and staff hired or withdrawn from their normal work activities. Local ministries and organizations can rarely afford such surveys and so funds are usually provided by external donors. Standard cluster surveys that cover a vast area often take weeks if not months to complete, which rarely coincides with the needs of local or national decision makers. Especially during a crisis, decisions have to be made quickly and cannot necessarily wait for information to become available. To be most effective, the dissemination of survey results must be timely in relation to the needs of key decision makers.

**ALTERNATIVE APPROACHES**

Despite the problems outlined above, new approaches to nutritional surveillance have been slow to develop, especially in the context of famine. This is perhaps because, in times of food crisis, the emphasis is on reliable estimates of malnutrition for the purposes of advocacy. Survey methods must be seen to be reliable and be endorsed by a recognized authority, such as the World Health
Organization. Nevertheless, there have been moves among nutritionists to experiment with new approaches that have been developed in other fields of development work, such as the use of rapid rural appraisal and participatory rural appraisal. Three alternative approaches were applied in a community-based nutritional surveillance programme in Darfur, Sudan (Young and Jaspars, 1992). These included: purposive sampling of sentinel sites in place of cluster surveys, the combination of both qualitative and quantitative methods to allow more meaningful interpretation, and a strong emphasis on community participation to make the programme more salient to local people and to improve sustainability in the long term.

Sentinel sites and purposive sampling

Surveillance of a small number of the most food insecure communities (sentinel sites) reduces the scale of data collection and leads to big savings in terms of personnel, costs and time. An additional advantage of this approach is the depth of analysis and interpretation that is possible when focusing on individual communities. The impact of confounding variables may be accounted for and subtle differences between social and ethnic groups are more readily apparent.

In Darfur, selecting the most food insecure communities and measuring all the children in these communities did away with the problems of cluster surveys and random sampling. Also, the changes in nutritional status were considerably more sensitive to changes in food security than to data aggregated over a wider area. Trade-offs had to be made, however, between the area covered (number of sentinel sites) and the depth of understanding of causes of malnutrition. A single broad survey provides few, if any, insights into the locally specific causes of malnutrition, while a limited area of sentinel sites means the nutritional situation in large areas has to be predicted from other information.

The use of both qualitative and quantitative methods

Combining qualitative and quantitative methods overcomes many of the problems encountered when either is used in isolation. The greater flexibility of qualitative methods makes it easier to take into account information about food security and the health environment which is highly context-specific. The results of qualitative investigations are available immediately and the causes of nutritional problems may be discussed with local people. This can then be used as a basis for reviewing the advantages and disadvantages of potential solutions. In Darfur, the flexibility of qualitative methods allowed other potentially interesting points to be investigated, such as patterns of consumption of particular wild foods.

A drawback of qualitative methods is the difficulty faced by outsiders who wish to validate the findings. Despite the often eloquent language of qualitative techniques, suspicions arise among those far removed from the site of data collection and analysis, as they are unable to check or re-analyze the data. For this reason, the use of qualitative and quantitative methods in combination is a considerably more powerful tool than using either in isolation. Together, they provide nutritional statistics, coupled with a penetrating descriptive analysis of the underlying causes and review of potential solutions.

Community participation

The involvement of the local people in Darfur in the collection of data and in its subsequent analysis and interpretation was an attempt to shift the locus of power in the process of assessing nutrition and
food security. Previously, assessments have always been based on the information needs of outsiders and therefore on their perceptions of how to judge the severity of famine and food security. We tried to forge more equal relationships, with both sides bringing their experience and expertise to the situation. A framework was developed to describe the nutritional status of the population and underlying causes, which allowed local people to express their situation in terms understood by outsiders. This was important because the information was intended to be of practical use beyond as well as within the community.

In response to a very severe period of food insecurity, the Darfur communities initiated short-term palliative measures, but could do little else to effect their situation in the long term without outside support. This was because the underlying causes of food insecurity and malnutrition were operating at a level which was beyond their influence. In addition, their efforts were severely hampered by the extremely weak public service infrastructure and their overwhelming lack of resources.

Other examples of community-based surveillance programmes, particularly in the context of inadequate food security, are few, although UNICEF strongly advocates a participatory approach to the assessment and analysis of nutritional problems (UNICEF, 1990). The Iringa Nutrition Programme in Tanzania, supported by UNICEF, is a good example of successful participation. Unlike the food insecure communities of North Darfur, however, the Iringa Programme operated in the context of a well-developed health service infrastructure and benefited from considerable external inputs (JNSP, 1989).

CONCLUSION

A better understanding of the role of nutrition in famine could have great practical advantages. Frameworks for understanding famine, a clearer role for nutritional data in relief management and early warning, and the use of more appropriate methods, could all improve the assessment of, and response to, the problems of food security and famine.

References


Young, H. and Jaspars, S. (forthcoming) *Malnutrition, Disease and Death in Times of Famine*.

Address for correspondence: Helen Young, 16B Spencer Road, Twickenham, Middlesex TW2 5TH.
Errors in Calculating Weight-for-Height

SARAH B.J. MACFARLANE, Liverpool School of Tropical Medicine

Weight-for-height is widely used as an index of recent malnutrition and often forms the basis on which major policy decisions are made about nutrition interventions. This article illustrates potential for error in the calculation of weight-for-height. Comparisons are made between results obtained using the international reference figures published by the World Health Organization, the plasticized cards distributed by Teaching-aids At Low Cost and by using the computer software package Epi Info (versions 5 and 6). An assessment is made of the errors introduced by treating supine measurements incorrectly as stature or by treating stature measurements as supine. Comparisons are also made between the use of standard deviation scores and percentages of the median. It is recommended that the international reference figures be published in a more convenient tabular form and that the plasticized cards and percentages of the median should not be used for studies involving international comparison. Investigators who plan to use Epi Info are advised to take into account the way in which it calculates weight-for-height when collecting and analyzing their height measurements.

In February 1994 the total refugee or displaced population in Sub-Saharan Africa alone was estimated at over 16 million, with 1.3 million severely malnourished and two million at high risk (ACCSN, 1994). Estimates of malnutrition rates made in these circumstances are usually based on sample surveys of the prevalence of wasting, or weight-for-height, amongst children under five years of age. Weight-for-height is accepted as an index of recent malnutrition because it provides an assessment of the weight of the child given the height achieved (Keller, 1993) and can be measured without knowledge of the child’s age. Major decisions about nutrition interventions are made on the basis of estimated rates of malnutrition. It is important that the index is accurately measured and properly classified in order to ensure precise estimates of the size of the problem and to make it possible to detect changes.

Calculation of the weight-for-height index depends on the availability of growth figures for a reference population. A child’s weight is compared with the median weight of a reference child of the same height and the difference is expressed as a multiple of the reference standard deviation, known as the weight-for-height standard deviation score (SD score) (Waterlow, 1977). The World Health Organization (WHO) has adopted a set of
figures based on American children published by the Centers for Disease Control (CDC) (NCHS, CDC, 1978) and recommends their use as an international reference (CDC/WHO reference) to facilitate comparisons between populations (WHO, 1983). There is a continuing debate about the appropriateness of having a universal reference population, particularly one based on a western population with a low prevalence of breast-feeding (Macfarlane, 1994). Technical problems with the reference have also been noted, particularly in the measurements at 24 months at the transition between its two population components (Dibley et al., 1987a, b; Cole, 1985). Under 24 months, the figures are based on data from the Fels Longitudinal Study (collected on children aged 0 to 36 months), and over 24 months on a combination of cross-sectional surveys conducted by the National Center for Health Statistics (NCHS) (collected on children aged 24 months to 18 years). The CDC/WHO reference figures are currently used in the calculation of malnutrition rates worldwide.

Further debate focuses on the value of the weight-for-height index below which a child is said to be malnourished (Keller, 1983). It has become common practice to define the first level cut-off as the lower end of the normal range of the reference population, that is, two standard deviations below the reference median. Children who have a SD score of less than —2.0 are said to be acutely malnourished or wasted. In some surveys, instead of using standard deviation scores, the child’s weight is expressed as a percentage of the reference median for the same height and a value of 80 per cent is said to correspond approximately with a SD score of —2.0 (Beaton et al., 1990).

Calculations of weight-for-height are not easy and are often made by inexperienced field workers in difficult circumstances (Macfarlane et al., 1993). The purpose of this article is to examine the scope for error in calculation of weight-for-height and the consequent classification of malnutrition using the CDC/WHO reference.

ALTERNATIVE FORMATS IN WHICH THE REFERENCE DATA ARE AVAILABLE

The CDC/WHO reference data are published by WHO in tabular form (WHO, 1983). Weight-for-height figures by sex are provided as centiles (3rd, 5th, 10th, 20th, 30th, 40th, 50th, 60th, 70th, 80th, 90th, 95th and 97th) and as standard deviations above and below the median (−3, −2, −1 SD scores, median, +1, +2, +3 SD scores). Separate tables are provided for: weight by length of boys 49 to 103 cm in height (based on the Fels data); weight by stature of boys 55 to 145 cm in height (based on the NCHS data); weight by length of girls 49 to 101 cm in height (based on the Fels data); and weight by stature of girls 55 to 137 cm in height (based on the NCHS data). Standard deviations are not provided separately and must be calculated from the above figures. Weights are rounded to the nearest tenth of a kilogram and provided at half centimetre intervals of length or stature.

The reference data have been made more popularly available by Teaching-aids at Low Cost (TALC) and Oxfam (Young, 1992) in the form of a plasticized card (prepared by CDC, Nutrition Division) which is designed for quick reference in the field. One card provides the median, −2, −2.5 and −3 SD scores of weight and the other the median, 85, 80, 75, 70 and 60 per cent of the median weight (rounded to the nearest tenth of a kilogram) in half centimetre intervals of supine length from 49 to 84.5 cm and of stature from 85 to 130 cm. Both sexes have been combined to make the cards easier to use. Standard deviations below the median can be calcu-
lated by subtracting the weight figure corresponding to \(-2\) SD from the median and dividing the result by two.

Several computer software packages have been designed to ease the calculation of the anthropometric indices. A popular program is Epi Info, recently revised from Epi Info 5 (Dean et al., 1990) to Epi Info 6 (Dean et al., 1994). EpiNut (Coulombier et al., 1991) has been incorporated into Epi Info 6 which has now superseded CASP and ANTHRO (Sullivan and Gorstein, 1990). Epi Info has a convenient data entry screen which simultaneously converts weight, height, age and sex data into weight-for-age, height-for-age and weight-for-height indices providing centiles, percentages of the median and SD scores. Calculations can also be made in batch mode using the EPINUT sub-program. The calculations are based on the CDC/WHO reference and use supine length if the child is below 24 months of age (based on Fels data) and stature from 24 months onwards (based on NCHS data). The manuals for both versions of Epi Info indicate that when age is not known the calculation of weight-for-height assumes supine length (based on Fels data) if the measurement is below 85 cm and stature for 85 cm and above (based on NCHS data). This is not actually the case. When age is not known, Epi Info 5 assumes supine length (based on Fels data) for heights up to 103 cm for males and 101 cm for females. Epi Info 6 differs in approach between its two sub-programs. The interactive data entry program ENTER performs as the manual; that is, supine below 85 cm and stature for 85 cm and above, whilst the sub-program EPINUT performs with the same rules as Epi Info 5. This is a discrepancy which will, no doubt, be rectified. Weights and heights can be entered to two decimal places and the indices are presented to two decimal places. Accuracy may be modified by the user, but with difficulty.

**CALCULATION ERRORS**

The major differences between the various formats of the reference figures lie in the degree of accuracy of their presentation, the point of changeover between length and stature, and whether or not the values are reported separately by sex. An additional source of difference in the ultimate classification of a child's nutritional status is in the use of percentages of the median or of standard deviation scores. The effect of these differences is considered here by studying the child on the 'borderline' or on the cut-off point itself. In the sections which follow, calculations are made for the child who has a weight value which corresponds to two standard deviations below the reference median for a reference child of the same height according to the CDC/WHO published reference figures (WHO, 1983); that is, with a SD score of \(-2.0\).

Table 1 shows the SD scores obtained from Epi Info and calculated from the TALC plasticized card for the reference figures over a length range from 50 to 80 cm and a stature range from 85 to 130 cm. For length/stature greater than 55 cm, Epi Info provides figures very close to the expected value of \(-2.0\). Epi Info is more accurate since the weight figures in the WHO published tables have been rounded to one decimal place. The TALC scores, on the other hand, differ from the expected by as much as 0.25 SD scores, with females getting consistently lower values and males higher. The sex differences arise from the averaging of the weight values for the combined TALC figures.

The percentages of the median obtained for the same children are given in Table 2. The TALC figures range from 73.5 to 85.18 per cent, again with higher values for males than for females. The Epi Info figures range from 75.58 to 84.32 per cent, with no apparent difference between the
sexes. The fourth and seventh columns of Table 2 contain the Epi Info SD score which corresponds to the weight which is closest to 80 per cent of the reference median for each child. There is a wider range for length (−1.60 to −2.54) than for stature (−2.16 to −2.46), with no obvious trend of difference between the sexes.

A comparison is made in Table 3 of the figures obtained when the child’s height is measured as length but incorrectly assumed to be stature in the calculation of the weight-for-height index. Columns two and five give the weight for the male and female children falling two standard deviations below the median of the WHO published figures for the lengths in column one. Columns three and six give the corresponding figures obtained from Epi Info. These always lie close to −2.0 as in Table 1. The fourth and seventh columns provide the figures which would be obtained if the child’s height were incorrectly assumed to be stature and not length. Table 4 gives the same information, but instead for children whose heights

<table>
<thead>
<tr>
<th>Length cm</th>
<th>WHO² weight med-2SD kg</th>
<th>Epi Info² SD score</th>
<th>TALC³ SD score</th>
<th>WHO² weight med-2SD kg</th>
<th>Epi Info² SD score</th>
<th>TALC³ SD score</th>
</tr>
</thead>
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<td>−2.10</td>
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<td>−1.91</td>
<td>−2.00</td>
<td>3.3</td>
<td>−1.99</td>
<td>−2.00</td>
</tr>
<tr>
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<td>−1.85</td>
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<td>−2.05</td>
<td>−2.14</td>
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<td>6.8</td>
<td>−1.98</td>
<td>−2.12</td>
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<table>
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<th>Stature cm</th>
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<th>Epi Info² SD score</th>
<th>TALC³ SD score</th>
<th>WHO² weight med-2SD kg</th>
<th>Epi Info² SD score</th>
<th>TALC³ SD score</th>
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<td>−1.91</td>
<td>10.7</td>
<td>−1.96</td>
<td>−2.09</td>
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<td>−1.92</td>
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<td>−2.16</td>
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<td>−1.86</td>
<td>12.7</td>
<td>−1.97</td>
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<td>−1.86</td>
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<td>21.8</td>
<td>−2.02</td>
<td>−2.13</td>
</tr>
</tbody>
</table>

¹CDC/WHO published reference (WHO, 1983)
²Calculated using Epi Info (Dean et al., 1990, 1994)
³Calculated from the plasticized card (Young, 1992)
### TABLE 2
Comparison of weight-for-height indices using standard deviation scores and percentages of the median for children on the borderline of acute wasting

<table>
<thead>
<tr>
<th>Length (cm)</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TALC¹ % median</td>
<td>Epi Info² % median</td>
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<tr>
<td>50</td>
<td>73.53</td>
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<td>55</td>
<td>76.74</td>
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<td>83.55</td>
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<tr>
<td>80</td>
<td>85.18</td>
<td>84.32</td>
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### Stature (cm)

<table>
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<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
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<tr>
<td>130</td>
<td>83.21</td>
<td>83.34</td>
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</table>

¹Calculated from the plasticized card (Young, 1992) for the weight figures given in Table 1
²Calculated using Epi Info (Dean et al., 1990, 1994) for the weight figures given in Table 1
³Calculated as the SD score corresponding to the weight which is closest to 80 per cent of the reference median, using Epi Info (Dean, 1992, 1994)

Each measurement requires appropriate and accurately calibrated equipment. Even if the field workers are well trained, errors will inevitably be made. It is, therefore, of interest to investigate the effects of small errors of measurement on the ultimate classification of the child's nutritional status.

The change in standard deviation score resulting from a small error (i.e., an increase or decrease) in weight over a narrow height range is given by

MEASUREMENT ERRORS

There is plenty of scope for error in the actual measurement of weight and height.
TABLE 3
Comparison of the standard deviation scores obtained when supine length measurements are treated incorrectly as stature for children on the borderline of acute wasting

<table>
<thead>
<tr>
<th>Length cm</th>
<th>WHO¹ weight med-2SD kg</th>
<th>Epi Info² SD score on length</th>
<th>Epi Info³ SD score on stature</th>
<th>WHO¹ weight med-2SD kg</th>
<th>Epi Info² SD score on length</th>
<th>Epi Info³ SD score on stature</th>
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<td>-1.86</td>
<td>9.6</td>
<td>-1.95</td>
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<td>-1.86</td>
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<td>-1.99</td>
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</table>

¹CDC/WHO published reference (WHO, 1983)
²Calculated using Epi Info 5 (Dean 1990), no age specified
³Calculating using Epi Info 5 (Dean, 1990), specifying any age greater than or equal to 24 months

<table>
<thead>
<tr>
<th>size of the error (kg)</th>
<th>standard deviation of weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(for height in the same range)</td>
<td></td>
</tr>
</tbody>
</table>

If the error in measurement is as much as 0.5 kg for a child's weight in a range of values for which the standard deviation of weight is about 0.8 kg, the resulting error in the standard deviation score will be 0.625 SD score. An error of 0.1 kg would result in an error of 0.125 SD score.

The same formula can be used to estimate the effects of errors in the height measurement. The numerator becomes the difference in median weight between the correct and incorrect height measurement. If the change in median weight associated with a difference of one cm in height is approximately 0.2 kg, the error in weight caused by an error of 1 cm in the height measurement will result in a difference of 0.25 SD scores, over a range in which the standard deviation of weight is 0.8 kg. An error of 0.5 cm would result in a difference of 0.125 SD score.

SAMPLING ERRORS
The potential for sampling error is well described in most manuals on survey...
Comparison of the standard deviation scores obtained when stature measurements are treated incorrectly as supine length for children on the borderline of acute wasting

<table>
<thead>
<tr>
<th>Stature cm</th>
<th>WHO(^1) weight SD score on stature</th>
<th>Epi Info(^2) SD score on stature</th>
<th>Epi Info(^3) SD score on stature</th>
<th>WHO(^1) weight SD score on length</th>
<th>Epi Info(^2) SD score on length</th>
<th>Epi Info(^3) SD score on length</th>
</tr>
</thead>
<tbody>
<tr>
<td>70</td>
<td>6.8</td>
<td>-1.99</td>
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<td>-2.02</td>
<td>-2.23</td>
</tr>
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</tr>
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<td>-1.98</td>
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<tr>
<td>80</td>
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<td>-1.97</td>
<td>-1.99</td>
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<tr>
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<td>-2.23</td>
<td>12.7</td>
<td>-1.97</td>
<td>-2.34</td>
</tr>
</tbody>
</table>

\(^1\)CDC/WHO published reference (WHO, 1983)

\(^2\)Calculating using Epi Info 5 (Dean, 1990), specifying any age greater than or equal to 24 months

\(^3\)Calculating using Epi Info 5 (Dean, 1990), no age specified

Methodology, but it is worth pointing out that the purpose of obtaining a malnutrition rate on the basis of a sample is to estimate the rate for the population from which the sample has been drawn. This estimate will have a margin of error associated with it which depends on the prevalence rate itself and the sample size. Table 5 shows the precision of estimates for different sample sizes and assuming simple random sampling. Precision can be specified in advance in order to calculate the appropriate sample size and calculated after the study is completed in order to produce confidence intervals for the population estimate.

Simple random sampling is logistically inefficient for large surveys. Cluster sampling is recommended based on experience gained during immunization coverage surveys (Henderson and Sundaresan, 1982). Children are selected in clusters from contiguous households in randomly selected villages. This increases the margin of error (i.e., decreases the precision) about the population estimate, since children in a cluster are likely to be more similar to each other than if they had been selected at random. The decrease in precision associated with cluster sampling is known as the design effect and can be calculated when the study has been completed.
TABLE 5
Sample sizes1 required in order to estimate 95% confidence intervals for the malnutrition rate with specified absolute precision (using simple random sampling)

<table>
<thead>
<tr>
<th>Prevalence rate %</th>
<th>Precision +/− 1%</th>
<th>Precision +/− 2%</th>
<th>Precision +/− 3%</th>
<th>Precision +/− 4%</th>
<th>Precision +/− 5%</th>
<th>Precision +/− 10%</th>
</tr>
</thead>
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<td>5</td>
<td>1,825</td>
<td>456</td>
<td>203</td>
<td>114</td>
<td>−</td>
<td>−</td>
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<tr>
<td>10</td>
<td>3,457</td>
<td>864</td>
<td>384</td>
<td>216</td>
<td>138</td>
<td>−</td>
</tr>
<tr>
<td>15</td>
<td>4,898</td>
<td>1,225</td>
<td>544</td>
<td>306</td>
<td>196</td>
<td>49</td>
</tr>
<tr>
<td>20</td>
<td>6,147</td>
<td>1,537</td>
<td>683</td>
<td>384</td>
<td>246</td>
<td>61</td>
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<tr>
<td>25</td>
<td>7,203</td>
<td>1,801</td>
<td>800</td>
<td>450</td>
<td>288</td>
<td>72</td>
</tr>
<tr>
<td>30</td>
<td>8,067</td>
<td>2,017</td>
<td>896</td>
<td>504</td>
<td>323</td>
<td>81</td>
</tr>
<tr>
<td>35</td>
<td>8,740</td>
<td>2,185</td>
<td>971</td>
<td>546</td>
<td>350</td>
<td>87</td>
</tr>
<tr>
<td>40</td>
<td>9,220</td>
<td>2,305</td>
<td>1,024</td>
<td>576</td>
<td>369</td>
<td>92</td>
</tr>
<tr>
<td>45</td>
<td>9,508</td>
<td>2,377</td>
<td>1,056</td>
<td>594</td>
<td>380</td>
<td>95</td>
</tr>
<tr>
<td>50</td>
<td>9,604</td>
<td>2,401</td>
<td>1,067</td>
<td>600</td>
<td>384</td>
<td>96</td>
</tr>
</tbody>
</table>

1Calculated as: $\frac{1.96^2 \times (\text{prevalence \%}) \times (100-\text{prevalence \%})}{\text{precision \%}^2}$

Assuming an infinite population

Empirical evidence from immunization surveys has shown the design effect to be about two, i.e., cluster sampling requires double the sample size in order to achieve the same precision as with random sampling. It appears that the design effect is usually the same for nutrition surveys (Binkin et al., 1992).

It has been recommended that a larger cluster sample survey of nutritional status should contain 30 clusters of 30 children (Binkin et al., 1992). This is based on an expected malnutrition rate of 50 per cent, 95 per cent confidence, 5 per cent precision a design effect of two and an allowance for loss. It is a generous sample size since the prevalence of wasting seldom even approaches 50 per cent.

CONCLUSIONS

Tables 1, 3 and 4 illustrate discrepancies in the value of the weight-for-height standard deviation score depending on how it is calculated. The differences between the figures when calculated using the WHO tables and Epi Info are small. A problem, not illustrated in the tables, arises because the WHO tables do not provide a separate figure for the standard deviation. It is expected that the standard deviation (below the median) will be obtained by subtracting the value for −1 SD from the median. It would not only be convenient for the user to be given the standard deviations directly, but helpful if they were provided with greater accuracy than is possible in the above calculation. It appears that the reference figures published by WHO are intended primarily for immediate classification into a malnutrition category without calculation of the index itself. The plasticized card is based on a similar principle. It is a good idea, but the combination of the sexes introduces unnecessary discrepancies.

Epi Info is likely to provide reliable figures because it contains the algorithms
on which the WHO tables are based. It was not the purpose of this article to check the accuracy of these figures any further. One serious problem, however, with Epi Info is the confusion both between versions 5 and 6 and within version 6 over whether supine length or stature is used. Another problem occurs when some ages are known and others are not. When Epi Info performs as indicated in its manual, it treats the height measurement of children whose ages are known, as supine before 24 months and as stature from 24 months but, for children whose ages are not known, the changeover occurs above and below 85 cm. This is an inconsistency which can introduce a bias.

Whilst the errors themselves are important, they must be set against the size of the problem. If the ultimate purpose of the exercise is to classify children as malnourished or not, it is necessary to consider problems of specificity and sensitivity (Keller, 1983). Table 6 is designed for this purpose and is based on the properties of the normal distribution. Assuming weight-for-height is normally distributed and using a SD score of —2.0 as the cut-off for acute malnutrition, then 2.28 per cent of the reference population would be classified as malnourished. In societies where the mean of weight-for-height is lower than that of the reference population, the expected numbers malnourished will be higher, as indicated by the middle row of the table, where the percentage below —2.0 rises to 30.85 per cent when the mean of the sampled population is 1.5 SD scores below the reference. The upper and lower rows of the table indicate the average changes in specificity and sensitivity when SD scores are consistently classified incorrectly. It is, in fact, rare for the mean of weight-for-height to be less than one standard deviation below the reference (equivalent to 16 per cent of the population with values less than —2.0 SD scores).

Suppose that in a survey, age is known and the 85 cm criterion has been used for selecting between measurement of supine length or stature; then the SD scores of children who are less than 85 cm and greater than or equal to 24 months will be incorrectly calculated by Epi Info as in the fourth and seventh columns in Table 3 (under 86 cm). These average at —1.76 and —1.86 for males and females, respectively. The row corresponding to a SD score of —1.75 in Table 6 shows that sensitivity is 100 per cent, but that specificity decreases from 98 to 87 per cent as the mean of the population drops to 1.5 standard deviations below the reference mean and the percentage of the total population who are incorrectly classified as malnourished increases from 2 to 9 per cent. The other possibility in the same survey is that children who are 85 cm and over but younger than 24 months will be incorrectly classified. Since most of the populations surveyed will be shorter than the reference, this will occur less frequently than the first example.

In a recent report of the worldwide magnitude of protein-energy malnutrition (De Onis et al., 1994), 84 per cent out of 75 developing countries showed a prevalence of stunting of more than 16 per cent (equivalent to a mean height-for-age of —1 SD scores) and 12 per cent showed a rate of more than 50 per cent (equivalent to a mean height-for-age of —2 SD scores). Referring to the WHO reference tables and to the normal distribution, in a population with a mean height-for-age SD score of —2.0, approximately 50 per cent would be expected to have a supine length of less than 85 cm at 30 months and 15 per cent at 36 months.

In a survey where ages have not been recorded and the 85 cm changeover point has been used, the errors introduced by using Epi Info 5, or the EPINUT sub-program within Epi Info 6, are likely to be
<table>
<thead>
<tr>
<th>CDC/WHO reference SD score used as cut-off</th>
<th>Pop. with mean of 0.00</th>
<th>Pop. with mean of −0.25</th>
<th>Pop. with mean of −0.50</th>
<th>Pop. with mean of −0.75</th>
<th>Pop. with mean of −1.00</th>
<th>Pop. with mean of −1.25</th>
<th>Pop. with mean of −1.50</th>
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</thead>
<tbody>
<tr>
<td>−1.50</td>
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</tr>
<tr>
<td>% pop. below −1.50</td>
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<td>10.56</td>
<td>15.87</td>
<td>22.66</td>
<td>30.85</td>
<td>40.13</td>
<td>50.00</td>
</tr>
<tr>
<td>sensitivity %</td>
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<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>specificity %</td>
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<td>93.18</td>
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<td>% pop. false positive</td>
<td>4.40</td>
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<td>14.98</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>% pop. below −1.75</td>
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<td>6.68</td>
<td>10.56</td>
<td>15.87</td>
<td>22.66</td>
<td>30.85</td>
<td>40.13</td>
</tr>
<tr>
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<td>100.00</td>
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<tr>
<td>% pop. false positive</td>
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<td>3.88</td>
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<tr>
<td>% pop. below −2.00</td>
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<td>6.68</td>
<td>10.56</td>
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<tr>
<td>% pop. below −2.25</td>
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<td>2.28</td>
<td>4.01</td>
<td>6.68</td>
<td>10.56</td>
<td>15.87</td>
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<tr>
<td>sensitivity %</td>
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<td>56.86</td>
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<td>66.54</td>
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<td>100.00</td>
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<td>100.00</td>
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<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>% pop. false negative</td>
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<td>2.79</td>
<td>4.40</td>
<td>6.55</td>
<td>9.19</td>
<td>12.10</td>
<td>14.98</td>
</tr>
</tbody>
</table>

1 Sensitivity is calculated as the percentage of the population with SD scores below −2.0 which would, correctly, be classified as malnourished if the cut-off was set at another level.

2 Specificity is calculated as the percentage of the population with SD scores above −2.0 which would, correctly, not be classified as malnourished if the cut-off was set at another level.
those in the fourth and seventh columns in Table 4 (86 cm and above). These average at $-2.16$ for the males and $-2.13$ for the females. Referring to the row corresponding to a SD score of $-2.25$ in Table 6, specificity is now 100 per cent and sensitivity increases from 53 to 73 per cent as the mean of the population drops to 1.5 SD scores below the reference mean and the percentage of the total population who are malnourished but not classified as such increases from 1 to 8 per cent.

The difference in results between percentage of the median and SD scores is of constant concern (Sachdev et al., 1992). Field workers find the percentage of the median easier to calculate, especially as the standard deviations necessary for the calculation of the SD score are not readily available. The assumption that 80 per cent is equivalent to a SD score of $-2.0$ is clearly a broad generalization (Table 2). For supine length, there is a definite trend with the value of the percentage of the median which corresponds to $-2$ SD scores increasing from 76 per cent at 50 cm to 84 per cent at 80 cm for males and from 76 to 83 per cent for females. The figures for stature are more consistent and average at 83 per cent for males and 82 per cent for females. The averages of the SD scores which correspond to 80 per cent of the median (columns four and seven of Table 2 for stature) are $-2.34$ and $-2.26$, respectively. Table 6 gives an indication of the sensitivity and specificity resulting from incorrect classifications from $-1.50$ through $-2.50$. The differences are not negligible.

Some of the problems described in this article illustrate the potential for error in large quantitative studies in which investigators rely blindly on a computer program for analysis. For many it is simply a relief to know that the computer will do the calculations for them and there is no thought about the assumptions underlying the program itself. Another example arises from the analyses of the Demographic and Health Survey (DHS) data sets (IRD/Macro International, 1991). In many of these surveys, supine length is measured between 3 and 36 months. It appears that, in the calculation of the SD scores between 24 and 36 months, 1 cm is subtracted from the lengths which are then treated as stature in the calculation of the SD scores. Calculations such as those in Table 3 show that, for some lengths, the SD scores are as high as $-1.5$ for males and $-1.6$ for females; that is, 0.5 SD scores above the expected value of $-2.0$. This means that relatively less children will be selected as malnourished in this age group than in the 3 to 24 month age group. The DHS surveys are used for many purposes, but it is unlikely that users or readers are aware that this transformation has been used in the calculation of both the weight-for-height and, of course, the height-for-age SD score.

This article has restricted attention to those children who lie on the borderline of acute malnutrition. Similar problems will occur at any point in the range of values, but may not be consistent in size. The effect, for example, of the 1 cm transformation, used for the DHS data, is to bring extreme values of the SD scores closer to the mean. This will affect studies in which weight-for-height is analysed as a continuous variable.

The purpose of this article has been to assess the potential for error in the calculation of the weight-for-height index and in the subsequent classification of nutritional status. It is assumed that weight-for-height is a suitable index of malnutrition, that the CDC/WHO reference data are used and that children with values of weight-for-height below $-2$ SD scores are classified as malnourished. The debate around all these assumptions is not discussed. The errors described are small relative to the extent of malnutrition (ACC/SCN, 1994; De Onis, 1994), but it is important to know they can exist. Survey
investigators have to make pragmatic decisions about the methodologies to employ, taking into account the circumstances in which the survey is conducted. They need clear-cut guidelines about the implications of their decisions. They must also take into account the use which will later be made of their results.

If the aim of the study is to make a quick assessment of the situation and TALC cards are available, it is reasonable to use them, but with the caution that more females will be classified as malnourished than males. These results cannot be used for international comparison. The same recommendation applies to the use of percentages of the median. They may be used locally for convenience, but should no longer be calculated in studies which are going to be quoted for international comparison. It is recommended that summaries of the CDC/WHO figures are made more widely available than at present and that they are redesigned to provide standard deviations above and below the median. When a computer package is used, investigators should be cautious to match their study design to suit its assumptions. These recommendations will still apply when the international reference is itself revised.

**Note**

I am grateful for having been given the opportunity to write this paper whilst visiting the Department of Population and International Health, Harvard School of Public Health.

**References**


Address for correspondence: Sarah B.J. Macfarlane, Liverpool School of Tropical Medicine, Pembroke Place, Liverpool L3 5QA.
Despite efforts made in the last few decades to improve disaster relief programs, there is still no uniform international reporting scheme for the documentation of morbidity and mortality incurred during disasters caused by flood. The Midwest flooding of the Mississippi and Missouri Rivers during the summer of 1993 served to remind us of further improvements required in flood and disaster aid programs. For appropriate provision of aid, it is necessary to have accurate information regarding injuries and illnesses sustained during and after the disaster. Such information guides planning efforts for tailored assistance programs following a specific type of disaster. Unfortunately, such data for specific types of disasters have been largely incomplete.

Most disaster relief programs are criticized for two major reasons: assistance is late in arriving and is often inappropriate to the needs resulting from the specific type of disaster. We propose that improvements in data gathering during floods, including a uniform international reporting scheme, will enable more timely relief efforts that can be better tailored to the needs of disaster victims.

Floods are the most common, and cause the greatest mortality, of all natural disasters (French, 1989). Injuries and illnesses sustained depend on the type of flood. As a rule, history's most severe floods have been slow in onset and long in duration. This typical course has often resulted in a forewarning for endangered communities and initiation of evacuation procedures when necessary. Previous studies of post-disaster relief of floods have dealt with such floods. The typical focus of such relief efforts in floods has been infectious disease surveillance and case detection and management. A health appraisal of morbidity in Khartoum, Sudan after a major flood in August 1988 established diarrhoea and malaria as the most common specific causes of illness (CDC, 1989). The greatest health concerns in slow floods have been certain communicable diseases, environmental sanitation, food and nutrition, and vectors.

A 'dual personality' of floods, however, shows them to also cause a more acute pattern of morbidity. Floods associated with tsunami, tropical cyclones (typhoons, hurricanes) and extra-tropical depression, for instance, cause some of the most widespread, frequent and damaging disasters in the world (Noji, 1991). Flash floods are particularly dangerous because very little time elapses between the onset of the storm and the arrival of the flood wave. In flash flood and other flood
situations where the impact is more immediate, most deaths are due to drowning, while morbidity is usually a result of exposure to injury by moving debris and high winds. Often such floods are caused by dam collapse, sometimes due to previous flooding or unstable infrastructure. In August 1979, the Manchu 2 dam in Morvi, India collapsed, demonstrating the destructive force associated with the abrupt breakdown of a dam. A wall of water swept through the industrial town killing over 5,000 people.

In surveying the medical and scientific literature, as well as government reports, there are few studies that provide accurate information on morbidity and mortality related to floods. French et al. (1983) reviewed National Weather Service Reports from 1969 to 1981 to examine mortality due to flash floods. Causes of death were given in only 16 of 32 reports and accounted for only 190 of 1,185 deaths (15 per cent). Of the 190 deaths, 177 (93 per cent) were due to drowning and a large portion (42 per cent) of these drownings were car related, such as when cars were driven into low areas or across flooded bridges. Other drownings occurred in homes, campsites or in areas where persons attempted to cross bridges and streams. The authors also note that 'only a few reports contained information on the age and sex of the flash flood victims' (p. 587).

Telleria (1986) also noted the lack of information available regarding mortality sustained during floods in Bolivia. Flooding of the Mamore River in 1948 caused seven deaths and in 1955 there were eighteen deaths associated with the overflow of the Ibare River. There was no information available on the causes of the deaths. The author also described four deaths during the slow floods in March 1978. Two deaths were attributed to drowning, one was by snakebite and the cause of the other death is unknown.

Coolidge (1973) described events in 1972 in Rapid City, South Dakota when six hours of heavy rain caused flooding and the collapse of a dam. The death toll was 238 out of a population of 50,000. Accurate figures are not available for the number and types of injuries, although it is known that this disaster did not generate a large number of severe injuries. Most of the patients were treated for lacerations, abrasions and exposure. It is interesting to note that in treating the lacerations, the degree of contamination was frequently misjudged, which in almost all cases necessitated reopening and additional treatment of the wounds.

An insufficiency of accurate epidemiological data regarding injuries and deaths caused by floods hinders appropriate relief assistance. Relief efforts in developing countries have typically been ad hoc, often providing large quantities of inappropriate medications, standard relief articles such as blankets and clothing, and surgical and anaesthetic teams (Guha-Sapir, 1991). In March 1982, the occurrence of the largest slow flood to date in Bolivia was caused by the overflow of the Mamore River. Telleria (1986) noted that the immediate national aid consisting of food, cooking and eating utensils, clothing blankets and medicine was largely unutilized because of weather conditions and the habits and customs of the residents. The author states that 'the delivery of health care to the affected zones was irregular and based entirely on local requests for assistance, rather than on real knowledge of public health requirements in the case of flooding' (p. 91).

In the past decade, there has been a move toward a uniform data gathering scheme in the case of longer term floods and their associated health effects. The publication, Assessing Needs in the Health Sector After Floods and Hurricanes, by the Pan American Health Organization presents a methodology for selecting the appropriate data based on the premise that, although
each flood has its own peculiarities, there are numerous common problems, tasks and needs. Such variables as medical personnel and supplies, water supply, sewage disposal, human settlement, nutrition, vectors, communication, transport and estimation of impact magnitude can be measured. Based on such information, one can determine when relief is needed in a particular area and the course of appropriate action. Compilation of such data will allow more protective relief in the short term; discovery of trends in morbidity and mortality will allow better relief planning for the long term.

A similar uniformity in data gathering is needed for injuries and trauma incurred in floods with more immediate impact. As discussed above, there are many accounts of flood events that lack specific data regarding injuries. Most morbidity studies focus on various infectious and nutritional diseases and acute morbidity is often lumped together in an 'injury' category.

More recently, the Centers for Disease Control (CDC) and the Missouri Department of Health (MDH) attempted to gather comprehensive data on morbidity and mortality for the Mississippi and Missouri floods that struck Missouri in 1993 (CDC, 1993). In the summer and fall of 1993, both flash flooding and slower riverine flooding occurred almost simultaneously on the Mississippi and Missouri Rivers and on other small rivers and creeks. Twenty-seven deaths were classified as flood-related; twenty-one resulted from drowning. The other six deaths were indirectly related to floods; two each were attributed to electrocutions that occurred during cleaning efforts in, or while re-entering, a flooded business or residence, stress-induced cardiac arrests and trauma from motor vehicle accidents in which usual traffic patterns were diverted due to flood waters.

The CDC and MDH investigated flood-related illness and injury with the use of active and passive surveillance of hospital emergency departments in the affected areas (Choi and Lee, 1993). Reasonably accurate information was documented regarding such flood-related injuries (Table 1) and illnesses (Table 2) in the state of Missouri. Additionally, these organizations developed and conducted pilot testing of a new surveillance tool (Golaz, 1993). The objective of this new surveillance system was to improve the detection of disease outbreaks or high frequencies of injuries in the population affected by the flood in Missouri. In a retrospective review of emergency department logs, it was determined that this new tool allowed more complete assessment of injuries than the state's current surveillance system.

A surveillance tool similar to that developed by the state of Missouri would be useful for injury assessment in the emergency sections of hospitals caring for disaster victims. We propose the use of a single page sheet that can accommodate data for five patients, allowing for facility and accessibility in its use (Figure 1). Most categories require that a box be checked, although in cases where multiple injuries

### TABLE 1

<table>
<thead>
<tr>
<th>Condition</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abrasion/contusion</td>
<td>27</td>
<td>11.0</td>
</tr>
<tr>
<td>Animal bites</td>
<td>6</td>
<td>2.4</td>
</tr>
<tr>
<td>Burns</td>
<td>4</td>
<td>1.6</td>
</tr>
<tr>
<td>Electrocution injuries</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Lacerations</td>
<td>60</td>
<td>24.4</td>
</tr>
<tr>
<td>Other injuries</td>
<td>27</td>
<td>11.0</td>
</tr>
<tr>
<td>Puncture wounds</td>
<td>21</td>
<td>8.5</td>
</tr>
<tr>
<td>Sprains/strains</td>
<td>86</td>
<td>35.0</td>
</tr>
<tr>
<td>Unknown injuries</td>
<td>12</td>
<td>4.9</td>
</tr>
<tr>
<td>Total</td>
<td>246</td>
<td>100</td>
</tr>
</tbody>
</table>

From Golaz (1993)
**FIGURE 1** Assessment form for flood-related injuries and illnesses (adapted from Golaz, 1993)

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<table>
<thead>
<tr>
<th>AGE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SEX M/F</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FLOOD RELATED CONDITIONS**

- Near Drowning
- CO Poisoning: 'M'oderate, 'S'evere
- Burn: '1'st, '2'nd, '3'rd Degree % Body Surface, Location
- 'L'aceration/"P'uncture*
  **Specify Location**
- 'S'nake Bite/'A'nimal Bite*
  **Specify Location**
- Musculoskeletal
  **Specify Location**
  - 'F'racture, 'D'islocation
    - closed fracture
    - open fracture
    - sprain/strain/contusion
- Vision 'I'mpaired/'B'blindness*
- Cardiac Event
  - arrest
  - arrhythmia
  - Other (specify)
- Respiratory Distress
  - intubation
- Gastrointestinal
  - hemorrhage
  - nausea/vomiting/diarrhea
  - acute/abdomen
- Genitourinary
  - urinary retention
  - renal failure
- Obstetrical
  - Spontaneous abortion
  - delivery
  - (other specify)
- Neurological
  - coma
  - focal deficit
  - paraplegia
  - quadriplegia
- TREATMENT
  (brief description)
  
  (R = resuscitation), IV = IV access
  W = wound care, C = consultation, O = other

**OUTCOME**

'D'ischarged, 'H'ospitalized, 'F'atal

For each patient, place an 'x' in the box that fits the ED diagnosis

*Enter the appropriate code letter for these conditions as indicated in quotes.*
exist in a single category, numerical answers are requested. In the event of burns, lacerations, or animal or snake bites, documenting the location of the injury on a body diagram could also be useful. Five such diagrams could be printed on the reverse of the dataform. Compilation of data collected would allow the formation of a comprehensive picture of the types of injuries resulting from floods.

With accurate knowledge of injuries sustained, it should be possible to determine supplies and equipment necessary to treat specific medical problems. For instance, it is known that drowning accounts for the greatest number of deaths in flash floods. If a significant number of near-drowning casualties were also noted on data collection, an increased availability of ventilators and defibrillators could be arranged in future events.

The assessment form we propose could be used to gather data in either prospective or retrospective fashion. A small team of experts from an international relief organization, travelling to the scene of the flood disaster, could supervise and collect such data. Relief plans based on such data should improve subsequently. Ideally, needs should be anticipated before a disaster rather than assessed afterward. A uniform reporting scheme should also permit the prediction of morbidity trends in the future, thus guiding efforts to plan both local response and external aid during a flood disaster.

### TABLE 2

**Categories of flood-related illnesses**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Frequency</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest pain</td>
<td>13</td>
<td>5.7</td>
</tr>
<tr>
<td>Carbon monoxide poisoning</td>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>Dehydration and exhaustion</td>
<td>8</td>
<td>3.5</td>
</tr>
<tr>
<td>Exacerbation of chronic illness</td>
<td>13</td>
<td>5.7</td>
</tr>
<tr>
<td>Gastrointestinal illness</td>
<td>39</td>
<td>17.1</td>
</tr>
<tr>
<td>Heat-related illness</td>
<td>29</td>
<td>12.7</td>
</tr>
<tr>
<td>Rashes and dermatitis</td>
<td>38</td>
<td>16.7</td>
</tr>
<tr>
<td>Respiratory illness</td>
<td>24</td>
<td>10.5</td>
</tr>
<tr>
<td>Unknown conditions</td>
<td>62</td>
<td>27.2</td>
</tr>
<tr>
<td>Total</td>
<td>228</td>
<td>100</td>
</tr>
</tbody>
</table>

From Golaz (1993)

**References**


**Address for correspondence:** Douglas A. Rund, Department of Emergency Medicine, The Ohio State University, Columbus, OH 43210, USA.
The European University Diploma in International Humanitarian Aid

ECHO (European Community Humanitarian Office)

BACKGROUND

The need has recently appeared to create a link between humanitarian law studies, which are promoted at present by the International Federation of Red Cross and Red Crescent Societies, and the training of field workers, which is undertaken directly by aid organisations. It has become more and more evident that, on the one hand, students wish to follow a more specialised course in the various aspects of humanitarian aid and, on the other, that one of the main conditions for the operational effectiveness of aid agencies is the professional training of their staff. In the absence of a recognised degree in humanitarian aid, whether at the national or European level, the European Community Humanitarian Office (ECHO), in collaboration with the Task Force for Human Resources, Education, Training and Youth (TFRHEFJ), has taken the initiative to develop a postgraduate multi-discipline degree, embracing five universities of the European Union: Université d'Aix-Marseille III (France), Ruhr-Universität Bochum (Germany), Universidad de Deusto-Bilbao (Spain), Université Catholique de Louvain (Belgium) and the University of Oxford (UK). The programme has been named the 'Network on Humanitarian Assistance' (NOHA).

ORGANISATION

The degree, which started in September 1994, is organised under the ERASMUS programme of exchanges between students and teachers. The university year has been divided into four phases: (1) an intensive two-week programme at the beginning of September in one of the universities of the network, where students can meet counterparts from other European Member States (in 1994 this took place in Oxford); (2) a general course in the university of origin from 1 October to the end of January; (3) a specialised course in one of the universities of the Network from 1 February to the end of April (specifically, an ERASMUS period abroad); and (4) a professional traineeship in an international organisation, NGO or national administration concerned with humanitarian matters, from 1 May to the end of June.

The syllabus is divided into five subject areas: Law, Geopolitics, Management/Logistics, Anthropology, and Medicine/Epidemiology. A reference handbook has been prepared for each subject area and translated into four languages. The handbooks, each of which have been prepared by specialists from two different universities, are divided into two parts: a general discussion of basic concepts, scope and
methodology and a selection of relevant readings and documents. The specialisations to be offered by each university during the ERASMUS period are as follows:

- Aix-Marseilles: Law;
- Deusto-Bilbao: Law, Administration and Logistics;
- Bochum: Law and Medicine;
- Louvain: Medicine and Geopolitics; and
- Oxford: Anthropology.

Successful students will receive a diploma from the university of origin and a certificate from the university where he or she spent three months as part of the ERASMUS programme.

PARTICIPATING UNIVERSITIES

(1) Institut für Friedenssicherungsrecht und Humanitäres
Völkerrecht Ruhr-Universität Bochum
Universitätsstr 150
D-44780 Bochum
Germany
Tel.: (49) (0) 234 709 77 90
Fax.: (49) (0) 234 709 41 33

(2) Universidad de Duesto-Bilbao
Apartado 1
E-48080 Bilbao
Spain
Tel.: (34) 4 445 32 00
Fax.: (34) 4 445 07 04

(3) Centre d’études et de Recherches Internationales et Communautaires
Université d’Aix-Marseilles III
Pavillon de Lanfant 346
Routes des Alpes
F 13100 Aix-en-Provence
France
Tel.: (23) 42 96 45 50/42 23 57 94
Fax.: (33) 42 23 09 71

(4) Département des Sciences Politiques et Sociales
Université Catholique de Louvain
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B-1348 Louvain-La-Neuve
Belgium
Tel.: (32) 010/47 42 77
Fax.: (32) 010/47 29 97

(5) Refugee Studies Programme
University of Oxford
Queen Elizabeth House
21 St Giles
Oxford OX1 3LA
UK
Tel.: (44) (0) 1865 270 722
Fax.: (44) (0) 1865 270 721

The response to the new diploma has surprised all the participants in the NOHA programme. It may prove necessary, in the light of the first year’s experience, to extend the network of participating universities. Universities of the Member States interested in the NOHA diploma may contact ECHO or the TFRHEFJ for further information.

Address for correspondence: European Community Humanitarian Office (ECHO), Rue de la Loi 200, B-1049 Brussels, Belgium.
Damage to Urban Infrastructure and Other Public Property from the 1989 Loma Prieta (California) Earthquake

STEVEN P. FRENCH, Georgia Institute of Technology

This research project investigated the damage to public property caused by the 1989 Loma Prieta earthquake. The claims filed by state and local governments, special districts and non-profit organizations under the Federal Emergency Management Agency's (FEMA) disaster assistance program were analyzed to understand better the pattern of damage caused by the earthquake. These claims accounted for nearly $600 million. The damage distribution was very skewed with eleven agencies claiming more than 70 per cent of this total. Non-profit agencies accounted for a surprisingly large portion of overall damage. Heavy damage was concentrated in relatively few areas. The extent of damage in an area was a function of concentration of property, site conditions, characteristics of building stock, and distance from the epicenter.

The Loma Prieta earthquake that struck northern California on 17 October 1989 was one of the most costly earthquakes in the state’s history, both in terms of human life and damage to property. Total earthquake damage to public and private facilities, excluding California Department of Transportation facilities and business interruption losses, is estimated at over $6 billion (Plafker and Galloway, 1989). This earthquake resulted in substantial damage to urban infrastructure systems scattered over an eight county region of California. Much of the damage tended to be clustered in several locations. As might be expected, the Santa Cruz County area (including Watsonville), which was closest to the epicenter, experienced some of the most severe damage. Yet, over 60 miles away from the epicenter, the Marina District of San Francisco and the Cypress Street area of Oakland also experienced very severe damage due to previously documented unstable soil conditions and heavy urbanization. Studying the distribution and nature of the damage presents a unique opportunity to improve our understanding of how urban systems respond to major earthquakes.

DAMAGE ASSESSMENT METHOD

It is difficult to study all the damage caused by the Loma Prieta earthquake because of insufficient data on many types of damage. The claims submitted to the Federal Emergency Management Agency (FEMA) for reimbursement under the
Disaster Relief and Emergency Assistance Act (Public Law 100-170, 42 USC 5121–5202) provide a uniquely accessible source of cross-sectional damage data that can provide a better understanding of the characteristics of earthquake damage. The research reported here analyzed the damage claims submitted under this Act to understand the damage to public property and various types of public facilities. After a federal disaster is declared, state and local government agencies and certain types of non-profit corporations that experienced damage submit Damage Survey Reports (DSRs). These reports describe the damage and estimate the cost of repair in much the same way as an insurance claim. Each DSR is intended to represent one project, but projects often include a number of different items. As each DSR is received, FEMA creates a record in an electronic database. This database provides a rich source of data to study the types and amounts of damage caused by the Loma Prieta earthquake.

While the FEMA disaster assistance records provide a unique source of detailed data, they also have some inherent limitations. The first is that privately-owned property is not included in the database. Thus, these records do not include damage to any commercial or residential structures. Furthermore, they do not include damage to privately-owned infrastructure systems. These include most gas, electric and telephone systems, which are owned by public utility companies. The FEMA database does include damage information on publicly-owned water, sewer and drainage systems. Another limitation is that the disaster assistance process does not cover damage to federal-aid highways. They are covered by a separate program administered by the US Department of Transportation (DOT). Comparable statistics from the DOT were not available. It is clear that there was significant damage to transportation systems, most notably the collapse of the Cypress Structure and a section of the Bay Bridge. The FEMA database does include damage to local streets, roads and bridges. The road damage reported here includes only city and county maintained roads. However, FEMA’s records account for the majority of the infrastructure damage caused by the Loma Prieta earthquake, with the exception of highways.

As with any self-reported claim, there may be a tendency to overestimate damages in DSRs. Where claims are found to be totally unwarranted, FEMA creates a ‘deobligation’ which negates the claim. Therefore, the tendency to overestimate damages is at least partially offset by FEMA’s management control.

The size and scope of the Loma Prieta earthquake posed some unique problems. Because there was so much damage over such a large area, the disaster assistance process was extended over a long period. Some DSRs were still being filed as late as two years after the earthquake. This time lag is unusual. The database used here was complete as of December 1991, and all major claims are thought to be included.

To begin this analysis, a database file was obtained from FEMA that contained 9,633 DSRs submitted by state agencies, local governments, special districts and non-profit agencies. Based on the FEMA data, we constructed a database that incorporated damage from each jurisdiction in a common format. The database includes a record for each case of damage to roads, bridges, water and sewer systems and public buildings, as well as some that represent service costs to local governments. Each damage occurrence was entered into a database which includes the type of property damaged, the type of failure experienced and the repair or replacement costs of the incident. FEMA uses a seven category (A–G) system to classify types of damage. To get more detail on urban infrastructure damage, we
developed a more detailed typology of failure modes (e.g. water line breaks) and used it to classify each particular damage occurrence for local governments and special districts, the principal owners of public infrastructure systems.

To augment this electronic database, a supplemental printout of DSR claims submitted to FEMA was obtained. This report contained expanded descriptions of the damage and costs for each DSR. By interpreting these written descriptions, we classified damage reported by cities, counties and special districts into twenty more detailed categories. For example, it allowed us to distinguish between damage to water lines and water pump stations. For this summary report we will group these detailed categories into general classes of infrastructure damage.

THE DISTRIBUTION OF DAMAGE

The total value of the 9,633 DSRs submitted to FEMA by cities and counties, special districts, the State of California and miscellaneous non-profit organizations as of December 1991 was $591,435,729. The damage distribution is very skewed, with a small number of agencies having extremely large amounts of damage. As shown in Table 1, more than a quarter of the agencies had total damages of less than $5,000 and more than half were under $20,000. At the other extreme, there were eleven agencies that experienced more than $10,000,000 in total damages. These agencies accounted for more than 70 per cent of the total damage.

Table 2 lists those agencies that experienced more than $10 million in damages. Figure 1 shows the location of these eleven high-loss agencies. Three of the agencies are departments of state government. The Office of Emergency Services submitted the largest claim of the state agencies. Most of its costs were associated with emergency services administration and with temporary personnel.

Two cities and one county accounted for approximately a third of the total submitted by the high-loss agencies. Oakland experienced the heaviest damage among the general-purpose local governments. Much of Oakland's total was due to severe damage to its historic City Hall. Two special districts — the Port of Oakland and San Francisco Airport — each incurred just over $25 million in damages. The fact that non-profit agencies — two hospitals and a university — accounted for over $165 million in damages was somewhat surprising. Most of these agencies' damages were to buildings and contents. This

<table>
<thead>
<tr>
<th>Amount of damage ($)</th>
<th>Number of agencies</th>
<th>Total claimed</th>
<th>Percentage of total damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5,000</td>
<td>179</td>
<td>1,453,415</td>
<td>0.3</td>
</tr>
<tr>
<td>5,000 - 100,000</td>
<td>310</td>
<td>9,066,427</td>
<td>1.5</td>
</tr>
<tr>
<td>100,000 - 1,000,000</td>
<td>107</td>
<td>33,981,729</td>
<td>5.7</td>
</tr>
<tr>
<td>1,000,000 - 10,000,000</td>
<td>42</td>
<td>123,624,374</td>
<td>20.9</td>
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<tr>
<td>&gt;10,000,000</td>
<td>11</td>
<td>423,309,784</td>
<td>71.6</td>
</tr>
<tr>
<td>Total</td>
<td>649</td>
<td>591,435,729</td>
<td>100.0</td>
</tr>
</tbody>
</table>

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A cursory analysis suggests several things. First, there is a very high degree of damage concentration, with just eleven agencies accounting for nearly three-quarters of the total damage claims. Damage to a few high value buildings accounted for the majority of this damage. Figure 1 shows that damage was concentrated in four areas: San Francisco, Oakland, Santa Cruz County and Stanford University. Wide areas of the region relatively close to the epicenter (e.g. Santa Clara and San Mateo Counties) experienced relatively little damage.

STATE OF CALIFORNIA AND NON-PROFIT AGENCIES

State and non-profit agencies account for nearly half of the damage eligible for disaster assistance. These types of agencies incurred damage to their buildings and costs associated with emergency services, most notably temporary facilities and staffing. A large number of non-profit organizations filed relatively small claims. If we remove the damage sustained by the six agencies in these two categories that had major damage (Table 2), the other 355 agencies combined accounted for only $65 million in damage.

State agencies incurred $79.5 million in damage or about 13 per cent of the total damage claims. Using the FEMA damage categories, Table 3 shows that state agencies suffered the most damage to public buildings and to park and recreation facilities. The park and recreation facilities category includes any damage that occurred in a state park, including buildings, infrastructure and roads, as well as tennis courts, seawalls and emergency use of Park and Recreation personnel. Emergency and protective services also accounted for nearly a quarter of the damages experienced by state agencies. State agencies incurred relatively little damage to urban infrastructure systems outside of state parks.

The disaster assistance program provides support for non-profit agencies involved in public service activities. Damage to hospitals, private educational institutions and a wide variety of

<table>
<thead>
<tr>
<th>Agency</th>
<th>Damage ($ million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California Office of Emergency Services</td>
<td>26.7</td>
</tr>
<tr>
<td>California General Services Department</td>
<td>14.0</td>
</tr>
<tr>
<td>California State University</td>
<td>10.9</td>
</tr>
<tr>
<td>City of Oakland</td>
<td>89.7</td>
</tr>
<tr>
<td>City and County of San Francisco</td>
<td>48.8</td>
</tr>
<tr>
<td>Santa Cruz County</td>
<td>16.1</td>
</tr>
<tr>
<td>Port of Oakland</td>
<td>25.9</td>
</tr>
<tr>
<td>San Francisco Airport</td>
<td>25.5</td>
</tr>
<tr>
<td>Stanford University</td>
<td>100.0</td>
</tr>
<tr>
<td>Watsonville Community Hospital</td>
<td>50.5</td>
</tr>
<tr>
<td>Merritt Peralta Medical Center</td>
<td>15.1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>423,309,784</strong></td>
</tr>
</tbody>
</table>
FIGURE 1  Agencies incurring damage of over $10,000,000
TABLE 3
State agency damage

<table>
<thead>
<tr>
<th>Agency</th>
<th>Total damage ($)</th>
<th>Percentage of category total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris removal</td>
<td>1,019,979</td>
<td>1.28</td>
</tr>
<tr>
<td>Emergency protective services</td>
<td>21,046,862</td>
<td>26.49</td>
</tr>
<tr>
<td>Highways, roads, streets</td>
<td>1,523,909</td>
<td>1.92</td>
</tr>
<tr>
<td>Water control facilities</td>
<td>23,327</td>
<td>0.03</td>
</tr>
<tr>
<td>Public buildings and equipment</td>
<td>29,376,324</td>
<td>36.97</td>
</tr>
<tr>
<td>Public utilities</td>
<td>96,285</td>
<td>0.12</td>
</tr>
<tr>
<td>Parks and recreation facilities</td>
<td>26,366,707</td>
<td>33.19</td>
</tr>
<tr>
<td>Total</td>
<td>79,453,393</td>
<td>100.00</td>
</tr>
</tbody>
</table>

community organizations is covered. Non-profit agencies incurred $199 million in damage or just over 33 per cent of the total. Table 4 shows the types of damage incurred by non-profit agencies. Buildings and equipment account for the vast majority of the damage experienced by these entities. Most of the remainder was in the form of emergency and protective services. It is interesting to note that an earthquake insurance plan for buildings would have covered much of the damage to both state and non-profit agencies.

LOCAL GOVERNMENTS AND SPECIAL DISTRICTS

Because local governments and special districts are the principal owners of urban infrastructure, we developed a more detailed classification scheme to categorize damage to these types of agencies. Special

TABLE 4
Non-profit agency damage

<table>
<thead>
<tr>
<th>Agency</th>
<th>DSR count</th>
<th>Total damage ($)</th>
<th>Percentage of category total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debris removal</td>
<td>73</td>
<td>378,148</td>
<td>0.19</td>
</tr>
<tr>
<td>Emergency protective services</td>
<td>437</td>
<td>7,851,047</td>
<td>3.95</td>
</tr>
<tr>
<td>Highways, roads, streets</td>
<td>23</td>
<td>123,395</td>
<td>0.06</td>
</tr>
<tr>
<td>Water control facilities</td>
<td>13</td>
<td>23,271</td>
<td>0.01</td>
</tr>
<tr>
<td>Public buildings and equipment</td>
<td>1112</td>
<td>185,427,212</td>
<td>93.18</td>
</tr>
<tr>
<td>Public utilities</td>
<td>143</td>
<td>4,496,298</td>
<td>2.26</td>
</tr>
<tr>
<td>Parks and recreation facilities</td>
<td>64</td>
<td>694,901</td>
<td>0.35</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>198,994,299</td>
<td>100.00</td>
</tr>
</tbody>
</table>

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districts are limited-purpose local government agencies. This breakdown will detail more precisely how various urban infrastructure systems performed in the earthquake.

Claims submitted to FEMA by local governments totalled $210,074,879, or 35.5 per cent of the total claims submitted by all types of agencies. Again, the distribution of claims is skewed by a small number of relatively large claims. The average total damage per jurisdiction was nearly $2.5 million, but two cities (San Francisco and Oakland) had totals of over $40 million each. Thus, as in the overall damage pattern, a few severe cases dominate the damage incurred by local governments.

While emergency services account for nearly 30 per cent of damage incurred by local governments, public buildings and utility systems are relatively more important than for the state or non-profit agencies. We will look more closely at the composition of the utility system damage. The more detailed damage classification in Table 5 shows that, among local governments, roads and bridges and sewer systems accounted for nearly 10 per cent of the damage. Water treatment and distribution systems were less important, accounting for just over 2 per cent of the local government damage.

Figure 2 shows the spatial distribution of damage to cities and counties. Damage was highly concentrated in relatively few pockets. Severe damage was not widespread across the entire Bay Area. Interestingly, San Francisco and Oakland, which dominate the local government damage, also contain several of the extreme loss non-profit and special districts. Special districts are particularly interesting because many are primarily owners of urban infrastructure, such as water and sewer systems. Two special districts, the Port of Oakland and the San Francisco Airport Commission, incurred extremely heavy damage.

Table 6 shows that, even for this type of agency, damage to public buildings and emergency services were the major costs. Damage to most urban infrastructure systems represented only a marginally higher proportion of total damages for special districts than for general-purpose local governments. In fact, roads and

<table>
<thead>
<tr>
<th>City/county damage</th>
<th>DSR count</th>
<th>Total damage ($)</th>
<th>Percentage of category total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public buildings/Building contents</td>
<td>1250</td>
<td>86,947,019</td>
<td>39.70</td>
</tr>
<tr>
<td>Roads/Bridges</td>
<td>443</td>
<td>9,886,062</td>
<td>4.51</td>
</tr>
<tr>
<td>Sewer lines/Sewer treatment/ Sewer pump</td>
<td>293</td>
<td>11,091,875</td>
<td>5.06</td>
</tr>
<tr>
<td>Water lines/Reservoir/ Water pump</td>
<td>325</td>
<td>4,514,602</td>
<td>2.06</td>
</tr>
<tr>
<td>Port facilities</td>
<td>15</td>
<td>1,084,546</td>
<td>0.50</td>
</tr>
<tr>
<td>Electrical lines/Gas lines</td>
<td>79</td>
<td>752,503</td>
<td>0.34</td>
</tr>
<tr>
<td>Storm drains</td>
<td>31</td>
<td>375,132</td>
<td>0.17</td>
</tr>
</tbody>
</table>

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FIGURE 2 City and county damage claims
sewer systems were slightly less important components of overall damage. Thus, the damage to special districts was similar in type to that experienced by local governments.

CONSOLIDATED DAMAGE PATTERNS

To some extent, the absolute amount of damage is a function of the amount of property at risk at a particular location. The large concentration of damage in San Francisco and Oakland is not, therefore, surprising. This explanation is not adequate, however, to explain the spatial distribution of the damage. San José and the other Silicon Valley towns of Santa Clara County contain large inventories of public buildings and urban infrastructure. Here, damage was considerably more moderate. The relatively heavy damage in the small towns of Santa Cruz County are, of course, due to their proximity to the epicenter.

To standardize for the amount of property at risk in a particular city or county, Figure 3 shows the spatial distribution of this standardized damage ratio. Here we see the higher damage figures generally in the epicentral region. The most notable exception is Oakland, which still falls into the highest range. This highlights the importance of the age and type of the building stock and of local soil conditions and secondary hazards in determining the distribution of damage. These factors tended to increase the damage experienced in Oakland well beyond what would be expected given the value of its building inventory and its distance from the earthquake epicenter.

CONCLUSION

It should be remembered that this analysis is based upon damage eligible for disaster assistance. This accounts for only about 10 per cent of the total damage caused by the Loma Prieta earthquake. Analysis of this subset of damage does reveal some interesting insights as to the overall damage pattern. Damage caused by the Loma Prieta earthquake was widespread. The cities

| Public buildings/Building contents | 1022 | 44,355,976 | 42.27 |
| Roads/Bridges | 101 | 4,072,833 | 3.88 |
| Sewer lines/Sewer treatment/Sewer pump | 69 | 3,397,592 | 3.24 |
| Water lines/Reservoir/Water pump | 137 | 3,130,257 | 2.98 |
| Port facilities | 38 | 1,088,369 | 1.04 |
| Electrical lines/Gas lines | 26 | 609,774 | 0.58 |
| Storm drains | 58 | 362,112 | 0.35 |

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FIGURE 3 Damage as a proportion of assessed value
of San Francisco and Oakland sustained large amounts of damage, even though they were relatively distant from the earthquake. These large amounts of damage were due in part to the concentration of property in these cities, but also to site conditions and the characteristics of their building stocks. The damage is dominated by several large claimants. In the case of Loma Prieta, just eleven agencies accounted for over 70 per cent of the damage claim amounts. The fact that this distribution is so skewed suggests that significant administrative efficiency could be achieved by having a threshold necessary for claims to qualify. For example, three-quarters of the claimants would have been eliminated by a $100,000 'deductible', yet only 2 per cent of the damage claims would have been eliminated.

Non-profit agencies accounted for a surprisingly large proportion of the overall damage. High value structures such as hospitals and universities were particularly hard hit and increased the overall damage costs considerably.

Publicly-owned infrastructure systems performed very well overall. Damage to all types of infrastructure systems accounted for only about 15 per cent of the total damage costs covered by the Disaster Assistance program.¹ This should not be taken as an excuse to disregard these 'lifeline' systems. Their importance in emergency response and restoration far exceeds the direct dollar value of the damage they sustained. The Loma Prieta earthquake again highlights the random nature of earthquake effects. The distribution by damage type and location was not what would have been predicted for an earthquake of this magnitude and location.

Notes

This research was undertaken with support from the National Science Foundation (Grant Number BCS-901134). The author wishes to thank the Federal Emergency Management Agency for its cooperation and Paul Jacks of the California Office of Emergency Preparedness for his outstanding assistance with data processing operations necessary to put the FEMA data in a useable form for this analysis. Tom Bott, Jeffrey Bowers, Michael Jaffe, Elizabeth F. Meyer and Steven White also assisted in this research.

1. This is much lower than in the 1987 Whittier Narrows earthquake where water reservoirs and electric lines were much more significant components of the overall damage.

References


Address for correspondence: Steven P. French, City Planning Program, College of Architecture, Georgia Institute of Technology, Atlanta, Georgia 30332-0155, USA.
Millions of households today find their world chaotic, disordered and dangerous. Nationalist and/or ethnic identities have been used to spark and feed many of the civil wars that are now rampant. The cost of these civil wars has been tremendous: they tend to last much longer than inter-state wars, destroying economies and causing massive social trauma for innocent civilians. Bosnia-Hercegovina provides an example of such intra-state violence. Tens of thousands of people have been forced from their homes, or continue to live in areas where their physical well-being is threatened constantly (Glenny, 1993; Malcolm, 1994; Vulliamy, 1994).

Most research conducted on nationalist and ethnic violence approaches the problem from the perspective of inter-state relations, exploring the impact of these conflicts on the world order. This strategy, however, often ignores the fact that war has a severe impact on communities and thus on the basic unit of those communities — the household. A critical question often left unaddressed, therefore, is: how do households maintain their access to basic needs, such as food, water and cooking fuel, when they are attacked because of their ethnic or nationalist identity? It is assumed here that violence which is organized and perpetuated around ethnic identity shatters the economic and social networks that households normally employ during times of crisis. Coping strategies in response to deadly violence and war, therefore, differ from those employed during famines, because the community is no longer available as a safety net for the household.

Famine and war are clearly different types of crises. Famines, for example, often have natural causes, while war is absolutely caused by man; famines are often slow in forming and thus ultimately expected, while wars can be sudden and unanticipated; and famines are likely to occur over a broad geographical area (Ali, 1984), while deadly violence and war can just as easily occur in a concentrated, tightly bound space. Famine and war are similar, however, in the stress they put on households themselves. In both instances, household economic security may be critically damaged because the ability to produce or otherwise generate income is severely damaged, thus reducing the consumption of basic needs.

Inadequate entitlement, furthermore, seems to lead to a number of similar responses — for example, long- and short-term migration, the sale of household goods and the depletion of productive assets and savings. Famine coping strategies, about which there now exists a considerable literature (e.g., Corbett, 1988;
Devereux, 1993b; de Waal, 1990), may offer a solid framework within which to begin to understand the coping strategies of households expelled from their communities because of their ethnic identity.

The research reported on here was undertaken in March and April 1994. The respondent households were Bosnian Muslim refugees living in a refugee camp in Croatia. The obvious dangers of undertaking research in war zones has historically limited the gathering of data on household coping (de Waal, 1993, p. 40). Although it would be preferable to do field research in war zones, talking to recent refugees who have fled provides a way of collecting some data.

COPING WITH FAMINE

Famine coping strategies are a set of activities undertaken by a household in a particular sequence in response to external shocks that lead to the declining availability of basic needs (Davies, 1993). The long-term objective of these strategies is for the household to maintain its economic and social viability after the crisis has passed. Much of the research done on coping strategies has been associated with household response to famine, while very little has been completed on the coping strategies of households who are violently attacked because of their ethnicity.

Households evince fairly specific coping tactics that respond to the three stages of famine; that is, the pre-crisis, progression and nadir of a famine. The objective of the household is to maintain its economic and social viability after the crisis has passed. Much of the research done on coping strategies has been associated with household response to famine, while very little has been completed on the coping strategies of households who are violently attacked because of their ethnicity.

All women and children from respondent households either fled or tried to flee. Katja, a young woman from Banja Luka in northwest Bosnia, immediately left university with the first threat of violence, joining her mother and sister as a refugee in Croatia. Fahira, a woman from Sarajevo, fled with her two children to her husband’s mother’s home on the coast of Croatia near Split. Fatima and her four-year-old daughter went to the Croatian island of Hvar where refugees were being housed in a hotel in March 1992, staying until February 1993 before returning to
Mostar because of fear that she would not see her husband again. Men were left behind to protect homes and communities. Some joined the Bosnian Army. Others hoped that continuing to live in their houses would deter vandalism and other damage.

An alternative initial response was to enlarge the household size. Before the war, the basic household unit consisted of the nuclear family: ego, and spouse and offspring if ego was married. Belma, a married woman with two children, moved from Bosanski Brod to live with her husband’s brother and his wife, her sister and her family, and her husband’s parents in Trnjan. Adis split his time between maintaining his own apartment and living with his parents and younger sister. With the death of his father, he then spent the majority of his time with his mother and sister. These extended families allowed a pooling of resources and, in the case of Fatima and Fahira, provided a source of trusted child-care. Household enlargement also occurred later in the war. For example, Fatima and her young daughter originally fled from Mostar. But when she returned because of her fear for her husband’s life, she moved into the home of her husband’s parents along with her husband and their daughter.

All households experienced varying levels of loss of income because their prewar jobs were no longer available. They thus had to pick up odd jobs when safe to do so, sell consumer goods far below market value, and search for money from outside sources. Belma’s husband could no longer travel to the factory where he had worked for several years because Muslim men were targeted for harassment, physical abuse, and possible imprisonment when on the street or at the workplace. He was able to pick up odd jobs in Trnjan and the surrounding area, the small village that they moved to when fighting came to Bosanski Brod. The odd jobs did not approach his previous earning level, but none the less allowed Belma to purchase some food in the shops, although she still depended heavily upon combining her husband’s income with that of the other adult members of the extended household. Eventually, even these job opportunities for Muslims ceased.

Most men were not able to pick up such jobs. Fatima’s husband also lost his job because Muslim men in Mostar were similarly targeted. Before the war, Amila was Chief Accountant at the courthouse in Prijedor. Her husband, Katja’s father in Banja Luka, and others also experienced job loss. All households sold commodities, such as televisions, video recorders, carpets, furniture, fixtures and other household goods, to replace lost income. The sale of these commodities was almost always far below their market value, even as used goods. Finally, three of the households received remittances from relatives who had fled former Yugoslavia completely.

The most difficult problem faced by Bosnian Muslims in many areas was the actual ability to buy food when it was available in the marketplace, even though many had some means with which to purchase it. In Prijedor, for example, Amila explained that most shops carried signs stating that Muslims were not allowed to purchase bread or flour. Moreover, many vendors in the marketplace would not sell their wares to Muslims, demanding to see the identity card of buyers as a way to screen their customers. Amila would try to get around this by pretending, at great personal risk, that she had lost her identity card. On one occasion, the vendor did not believe that she had lost her card, and hailed a policeman. Amila was summarily taken to the police station. She was certain that, at a minimum, she would be beaten and raped. Another policeman at the station
who had known her as an employee of the courthouse, however, stepped in on her behalf. A yelling match ensued between the two men, but Amila was eventually released unharmed.

While entitlement failure was generally the rule, there was one offsetting latent entitlement: some households received smuggled food from their non-Muslim neighbours. Vedada has four children and her husband spent many months in Omarska (often described as one of the worst concentration camps in Bosnia). She explained that her Serb neighbours, whom she had only known for one year, would sometimes leave food on their doorstep in the middle of the night, at great personal risk to themselves. Like Vedada, Fatima also had neighbours, Bosnian Croats, who would smuggle food to her in the middle of the night. Fatima, by her account, was one of the small number of Muslims who managed to stay in the Croat sector of Mostar when most Muslims were rounded up and forced to move across the River Neretva to the eastern side of the city.

For those living in the Mostar ghetto, the situation was much worse, as the consumer market completely failed because the Bosnian Croat Army strictly controlled the flow of goods into the Muslim sector. Originally, Bosnian Croat and Muslim forces fought together against the Serbs. Muslim soldiers such as Adis were then paid in bags of flour, beans and other dried goods. But once the Croats and Muslims started fighting each other in the summer of 1993, the town was divided into Croat and Muslim sectors. Access to the Muslim sector was then completely controlled by the Croats. Any commodities going into the Muslim sector had to be vetted by the Bosnian Croat forces, who were fighting against the largely Muslim Bosnian Army. In addition, water became difficult to obtain; piped water to the Muslim sector was cut, forcing people to rely on the River Neretva. As in Sarajevo, however, sniper fire made it very difficult to collect water safely from the river.

In June and July 1993, the Army became responsible for the provision of food to the Muslim sector. Negotiations with the Croat forces allowed some small flow of humanitarian aid. This was so small, however, that there was not enough for household distribution, so the Army set up public kitchens instead and provided cooked meals.

In other cities, what could be purchased in the marketplace was supplemented with humanitarian aid, along with vegetables from gardens. In Prijedor, aid to Bosnian Muslims was distributed by a few non-government organizations, such as Merhamet. In Trnjaní, for example, Belma was able to get flour, oil and beans from the Federation of Red Cross and Red Crescent Societies. Reports of gardens ranging in size from pots on balconies to small plots of land came from Sarajevo, Bosanski Gradiška and Bosanski Brod.

FAMINE AND WAR COPING STRATEGIES COMPARED

The first stage of famine coping is the pre-crisis stage. None of the Bosnian Muslim households seems to have prepared for the coming war and their subsequent exclusion from community networks. Many respondents claimed that they were taken unawares, that they were shocked by their seemingly overnight inability to purchase basic needs without fear of violent persecution. The pre-crisis stage of famine coping, then, does not seem to be relevant in this instance. A second noticeable difference is that during famine young children begin to miss meals during the period of absorbing risk (Devereux, 1993a), while in Bosnia that was considered a last resort. Vedada explained that, even while her family lived in the ghetto and had to purchase United Nations humanitarian packets from the
Serbs, everyone else would go without meals before even reducing her son's intake, who was between two and three years old at that time. Thirdly, the consolidation of households is not a coping strategy reported in the famine literature, much of which comes from sub-Saharan Africa where households tend to consist already of extended families.

Other war coping strategies do seem to follow closely those of households affected by famine. Work migration, the search for credit, the selling of productive assets, using latent entitlements and distress migration all figured heavily in respondent household coping strategies. All households sold some consumer goods. Each household also exhausted its long-term productive asset — savings — to purchase food, fuel and other necessities, such as soap and clothing. Amila, for example, expended all of her household's college tuition savings for her two daughters (16 and 17 years old), as well as the savings from the previous sale of a house.

Amila and her family also depended heavily upon a latent entitlement in order to feed her family and provide shelter. When the war came, she lost her job and when she reported for work the last time, her former colleagues — mainly Serbians — humiliated her. Those that took over her job, however, apparently did not understand how to do it and she was asked, over a space of several months, to come in and do the work that she had done previously, as well as the work of her former colleagues. In exchange, her family was allowed to move to the Trnopolli ghetto and she was given a day pass once a month in order to travel to Prijedor to do her work. Finally, when all Muslims were forced to leave Trnopolli (although they had nowhere to go, since their homes were now occupied by Serbs), Amila was given a small, two room apartment. During this time — a period of over one year — her husband Senna had to remain indoors constantly, or risk being taken to one of the concentration camps, such as Omarska. He could not, therefore, contribute to his family's well-being.

Severe, life-threatening physical risk, almost impossible living conditions and extreme isolation due to their ethnic identity combined finally to push many Bosnian Muslims out of their former communities. The last coping strategy employed by many, then, was distress migration of women, children and men — also identified as the final famine coping strategy. It should be noted, however, that distress migration was not always an option even when desired. For example, the cost of gaining the required papers and clearances from Bosnian Croat or Bosnian Serb officials seemed to range from DM 200 for a mother and child in Mostar to DM 10,600 for a family of six in Prijedor. These costs were well out of the reach of many.

CONCLUSION

This report is an initial attempt to look at coping strategies used during war. It is critical to understand how these groups are affected by the violence that constantly faces them for two main reasons. First, there is a growing humanitarian regime whose primary task is, increasingly, to provide assistance to people internally and externally displaced because of war. The international community is struggling to cope with increasing demands on its scarce resources. The efficacious use of these resources requires a sound understanding of how the victims of civil violence respond themselves when their economic and social networks are destroyed.

Second, any peace settlement must consider who gains and who loses from war. This understanding will be crucial to negotiating a peace that will be as fair and equitable as possible in order to ensure
that groups do not hold grudges against others, which might once again flare into violence in the future. Post-war development programmes cannot be adequately designed and implemented unless planners understand the impact of the crisis on household producers and consumers. Although preliminary, the research reported on here illustrates the complexity of strategies employed by households during war. It is hoped that further research will build upon this initial attempt, thus increasing the efficiency of humanitarian aid, guiding negotiations for peace and encouraging appropriate recovery programmes.

Notes

The views expressed in this article are the author’s and are not necessarily those of the Congressional Research Service or the Library of Congress. The author wishes to thank Drs Wendy James and Barbara Harrell-Bond for their comments on earlier versions of this report. Any errors remain the author’s.

1. The names of respondents have been changed.

2. Respondents usually called these concentration camps, but their descriptions are more reminiscent of World War II ghettos. Moreover, there were concentration camps, such as Omarska, where hundreds of people, largely men, were killed.

3. Although Merhamet aided Bosnian Muslims, several refugees charged that the organization was corrupt, with some workers taking food and clothes for themselves. One woman told me, for example, that Merhamet was known as ‘the Mafia’ in some places. There were also Serbian organizations, such as the Circle of Serbian Sisters, that provided aid to non-Muslims in Bosnia.

References


Research Committee on Disasters, XIII
World Congress of Sociology, Bielefeld, Germany, 18–22 July 1994

Research Committee No. 39, ‘Sociology of Disasters’, hosted ten sessions during this week-long Congress, convened by the International Sociological Association (ISA). There were 49 papers listed in the program, reflecting the work of 68 authors and co-authors. Authors and session organizers represented 15 different countries. Although the USA was over-represented (57 per cent), two or more program participants were from Armenia, Australia, Canada, Germany, Greece, Italy, Russia, Sweden or Switzerland. Countries represented with a single entrant were Bangladesh, Great Britain, New Zealand, Japan and Venezuela.

Session titles, with respective chairs, were as follows: ‘Communication and Crisis’ and ‘Risk Communication and Perception’, Kathleen Tierney (Disaster Research Center, University of Delaware, Newark, Delaware 19716, USA); ‘Theories of Disaster’, Wolf Dombrowsky (Katastrophenforschungsstelle, Christian-Albrechtse Universitat, Olshausenstr. 40, 24098 Kiel, Germany); ‘Disaster Recovery: Social System Studies’, Frederick R. Bates (Department of Sociology, University of Georgia, Athens, Georgia 30602, USA); ‘Emergency Planning: Needs, Emergency Research Center Assessments and Approaches’, Nicholas Petropoulos (Emergency Research Center, 9 Saripoulou, Athens 10682, Greece); ‘Disaster Response’, Neil R. Britton (Emergency Management Office, Wellington City Council, PO Box 2199, Wellington, New Zealand). I chaired the Business Meeting and three substantive sessions entitled ‘Disaster Recovery: Social Psychological Approaches’, ‘Disaster Mitigation’ and ‘Methodological Issues and Research Applications’. Space limitations prohibit discussion or listing of every paper, but complete information is available from the session organizers or the ISA Secretariat, Faculty of Political Sciences and Sociology, University Complutense, 28223 Madrid, Spain. The following issues and ideas were of special interest.

Theory
Numerous observations were offered regarding the sociological conceptualization and measurements of risk, e.g., George Rogers (Hazard Reduction and Recovery Center, Texas A & M University); Stephen Couch (Department of Sociology, Pennsylvania State University); Steven Kroll-Smith (Department of Sociology, University of New Orleans) and Kathleen Tierney. In contrast to exploring these issues, Robert Stallings (Program in Public Policy, University of Southern California) used a social constructionist perspective to link ‘... definitions of risk to the type of people who make claims about the earthquake threat, to the arenas in which claims are presented, and to the resources and strategies used in the claims-making process’. E.L. Quarantelli (Disaster Research Center, University of Delaware) pressed all there to go beyond asking and answering questions posed by practitioners. While such work has social value, he argued that science has never progressed through such efforts. Instead, new directions and methods should be encouraged. Like what? Among his numerous proposals were: (1) to work analyses of social time and social space into evacuation studies; (2) return to enemy attack analyses for review of the methodologies used, not their content; (3) focus on international and regional disasters rather than smaller scale events; (4) examine the role of religion in disaster recovery; and (5) seek more rigorous conceptualizations of disaster.

Mitigation
Peter May (Department of Political Science, University of Washington) outlined work he
had completed with Ray Burby (Department of Urban and Regional Planning, University of New Orleans) wherein they compared efforts by state governments to motivate local municipalities to implement disaster mitigation programs. Their case examples were from the USA, Australia and New Zealand. It is clear from their work that a mix of strategies is required, i.e., neither cooperative nor more coercive approaches provide the sole answer. These issues were explored further, although limited to data from the USA, by Barbara Vogt (Oak Ridge National Laboratory, Oak Ridge, Tennessee) who documented the fragmentation and denial found within state level agencies regarding mitigative policies focused on potential rises in the sea level. These assessments revealed the complexity of mitigation initiatives and the inexorable linkage between both political and social processes and technical or engineering work. These tensions were illustrated further by Nicholas Petropoulos who examined responses to earthquake prediction technology. It is clear from all three of these studies and others presented at the Congress that disaster mitigation requires concentrated work by social scientists.

Response

Emergent norm theory was extended by Russell Dynes's application to situational altruism. Long documented by disaster researchers, Dynes's penetrative analysis of the social processes that underpin such responses should be required reading for personnel in all disaster relief agencies. After dissecting individual and kin responses, Dynes argued that: 'Contrary to the perception that local organizations are incapacitated, the major expression of situational altruism comes through rather conventional organizational means'. He highlighted four different adaptive strategies that skilled managers use to increase their capacity to provide assistance, e.g., utilization of volunteers. Common difficulties stemming from the emergence of situational altruism were also noted, e.g., loss of autonomy in established organizations.

Warning response and evacuation modelling has reached new levels of precision and sophistication. Michael Lindell (Department of Psychology, Michigan State University) summarized a paper he co-authored with Ronald Perry (School for Public Affairs, Arizona State University) wherein a new model — the protective action decision model — was outlined. 'This model links prior personal beliefs, source characteristics and message content to individual responses by means of individual perceptions of the characteristics of the threat and of alternative protective actions'. In turn, the outcomes of this model are indications of specific attributes of the hazard that are likely to be important determinants of individual perceptions of threat. John Sorensen (Oak Ridge National Laboratory, Oak Ridge, Tennessee) expanded on these themes in a summary of ongoing research in a paper entitled 'How Effective are Warning System Technologies?' He emphasized that disaster studies, and the relationships among theoretical constructs, must be integrated carefully. One of the variables often overlooked are warning technologies that differ widely across threats and among communities. He displayed the results of his recent 'diffusion modelling' whereby alternative warning technologies can be assessed in this way so as to provide decision makers with much clearer pictures of the consequences of their choices, both in the selection of a particular technology and in the speed with which they make a decision to warn threatened populations.

Two other new developments in evacuation response research were summarized. First, Shunkichi Kosaka (Department of Civil Engineering, Tokyo Metropolitan University, Japan) displayed the results of his questionnaire survey involving 4,200 citizens in three Japanese cities after the 1987 Chibaken-Toho-Oki earthquake. His results amplified the linkage between the location of individuals with regards to the seismic intensity perceived with specific modal behavior profiles. That is, the type of actions taken covaried with the intensity of the shaking experienced. Second, I summarized my recent studies of the tourism industry wherein a vulnerability of catastrophic potential has been documented. This research provides baseline markers regarding the extent of disaster preparedness and the predictors that account for the marked variation found within the industry.

The usefulness of emergent norm theory
was validated further by Dennis Wenger (Hazard Reduction and Research Center, Texas A & M University) who summarized findings from interviews he and two HRRC associates (Benigno Aguirre and Gabriela Vigo) conducted with persons working at the World Trade Center in New York City. Following a terrorist-induced explosion in the basement of the building (26 February 1993), Wenger and his associates divided the building into a series of 'neighborhoods' for sampling purposes. Detailed accounts of victim exodus from the building and ensuing search and rescue efforts provided evidence of the utility of merging principles from collective behavior and complex organization perspectives. Through their research on this unusual event, emergent norm theory will be advanced significantly.

Recovery
Andrew Coghlan (Australian Emergency Management Institute, Mount Macedon, Victoria, Australia) presented a paper he co-authored with Philip Buckle (Department of Geography and Environmental Science, Monash University, Victoria, Australia). Based on their analysis of recovery efforts following extensive flooding in Northeastern Victoria, they concluded that such actions are most effective when managers are involved from the outset. Failure to do so resulted in many difficulties and required extensive work to obtain greater role clarity. This was especially true in this flooding which did not receive comparable levels of media attention in comparison to earlier bushfires in the same area. External resources were fewer and insurance did not cover most losses. Hence, many victims experienced a sense of abandonment which made recovery more difficult.

Consequences of the Chernobyl disaster continue to be documented further by numerous researchers. Among the many papers at the Congress on this topic were those presented by Alla Mozgovaya (Institute of Sociology, Russian Academy of Sciences, Moscow, Russia), Brit-Marie Drottz-Sjöberg (Center for Risk Research, Stockholm School of Economics, Stockholm, Sweden) and Maxim Kiselev (Department of Sociology, Yale University). All of these papers focused on specific aspects of the longer term impacts of this event. Mozgovaya documented heightened alienation from social institutions among victims who have not received adequate levels of social support. In contrast, Drottz-Sjöberg summarized results from extensive surveys (i.e., 996 Russians, 1,015 Belarusians and 1,056 Ukrainians) of health habits, concern and worries, perception of risks and benefits, etc. Results indicated depressed levels of trust regarding official information. Furthermore, her data indicated a generally bad health status, low personal ability to influence the situation and low expectations of future improvements. By working as a teacher in a small town in Belarus, Kiselev obtained a unique perspective on the perceptions of children. He emphasized that he was surprised at the denial these children voiced which encouraged certain risk-taking behavior like continuing to eat contaminated mushrooms. A profound sense of helplessness pervaded among those he encountered. There was lively discussion among the session Congress attendees regarding interpretations, methods used and ethical issues in these and similar studies.

All of these matters were highlighted again in a presentation by Jane Mocellin (Disaster Research Institute, University of Manitoba, Winnipeg, Manitoba, Canada) who reported on her experiences in Somalia. Interview and questionnaire data from four different research sites provided evidence of the coping strategies used by women who were victims of the war-caused famine. Among her many conclusions were the following. 'In Mogadishu, an ongoing war zone, 80 per cent of women are in need of mental health care (as measured by depression, crying, nervousness, psychosomatic ailments and loneliness); followed by 45 per cent of women in Baidoa, an area formerly severely affected by war, drought and famine. Conversely, only 15 per cent of women from Bosaso, a town hardly touched by fighting and only moderately by famine, were in need of mental health assistance'.

Finally, returning to more theoretical issues, Ino Rossi (Department of Sociology and Anthropology, St John's University, Jamaica, New York) expounded upon his 'dialectic theory of structure and agency'. He used selected disaster studies to illustrate his theoretical framework which rests on three key
elements: ' (1) the fundamental importance of the horizontal and vertical ordering of social relationships before and after disaster; (2) the role of cultural resources in the reconstruction of the social system; (3) a partial redefinition of cultural principles in cases of severe disruptions at the two lower levels of information (socio-political and economic)'. Using these principles, Rossi argued that his reformulation of the continuity principle can be used to predict the speed and modal patterns of post-disaster recovery.

Future activities

Although the site of the 1998 World Congress of Sociology has not yet been announced, interested individuals should establish contact with the Research Committee which continues to solicit manuscripts for its prime publication, The International Journal of Mass Emergencies and Disasters. Co-editors of the Journal are Ronald Perry (processes all USA manuscripts), School for Public Affairs, Arizona State University, Tempe, Arizona 85287-0603, and Wolf Domlowsky (receives all non-USA manuscripts), Katastrophenforschungstelle, Christian-Albrechts-Universität, Olshausentr. 40, 24098 Kiel, Germany.

The membership elected new officers for the 1994—98 period. Information about Research Committee activities, membership and the 1998 meeting can be obtained from the new President, T. Joseph Scanlon, School of Journalism, Emergency Communications Research Unit, Carleton University, Ottawa, Canada K1S 5B6.

Thomas E. Drabek, Department of Sociology, University of Denver, Denver, Colorado 80208-0209, USA

Workshop on ‘Development in Conflict’, Harborne Hall, Birmingham, UK, 1—3 November 1994

The 1994 Human Development Report produced by UNDP estimates that, during 1993, 52 major conflicts were underway in 42 countries and another 37 countries were experiencing political violence. Of the 79 affected countries, 65 were in the developing world. Conflict has become more prevalent, as have instability and ‘turbulence’ — the term favoured by ACORD. Attempts by the international community to address the humanitarian needs created by conflict are largely responsible for the dramatic growth in expenditures on humanitarian aid and disaster relief of recent years. What factors are contributing to the upsurge of conflicts? What are the implications of this upsurge for NGOs and development agencies both in responding to conflicts and for their traditional development activities?

Sponsored by two NGOs (ACORD and Responding to Conflict) and the School of Public Policy at the University of Birmingham, this workshop brought together approximately 40 individuals representing a range of practitioners and academics. The plenary sessions comprised presentations on ‘Analysing and Understanding Conflict’, ‘Strategies for Working with Conflict’ and ‘Organisational Adaptation in Conflict Situations’, while the smaller working group sessions provided for more focused discussion of particular questions and the experiences of some of the participants. A paper prepared by Mark Adams (ACORD) and Mark Bradbury (School of Public Policy) ‘Organisational Adaptations in Conflict Situations’ formed a useful background paper for participants.

Throughout the workshop there was ample evidence that the increase in the number of conflicts and attempts to provide relief directly in conflict situations, which was largely responsible for the dramatic growth in expenditure on humanitarian aid, are raising profound ethical, operational and organisational issues for relief and development agencies. NGOs, UN agencies and donor organizations are being forced to question their objectives and operational methods and structures as never before. For me, the current period amounts to a crisis of identity, particularly for NGOs.

In operational terms, the crisis manifests itself in the following ways. Firstly, by working in zones of conflict, agencies are putting the lives of their staff at considerable risk and having to develop mechanisms for dealing with traumatic stress disorders among staff. Secondly, humanitarian assistance is increasingly seen by warring parties as a key resource to be prevented from entering the territory.
controlled by opponents and manipulated to their own particular advantage. Notions of 'neutrality', which previously underpinned actions by relief agencies, are being exposed as illusory and almost impossible to sustain in practice. Thirdly, the effectiveness of humanitarian aid operations in zones of conflict is being increasingly questioned as unprecedented sums are expended on the provision of assistance, a substantial proportion of which may be diverted, delayed or destroyed.

Fourthly, the growing realisation that the provision of humanitarian aid may of itself actually prolong conflicts, by sustaining combatants and non-combatants, is profoundly unsettling for agencies committed to humanitarian ideals. Fifthly, in providing humanitarian assistance in conflict zones where UN or regional peacekeeping/enforcing forces are operational, agencies are forced to choose between operating within the framework provided by the military (with its promise of greater security but reduced operational flexibility and stress on subcontracting modes of operation) or retaining their freedom of action by operating outside the framework but at considerably greater risk to their operation and their staff.

In organisational terms, the crisis can be seen, firstly, in the unprecedented rate of growth in the budgets and scale of operations of many relief agencies (the 1994 budget of the IFRC Rwanda operations is currently greater, for example, than the total IFRC budget for 1992), which is placing considerable strain on their management capacity and allowing little opportunity to consider the full implications of decisions. Secondly, much of this budget growth is accounted for by funding from bilateral and multilateral donors and the dependence upon such sources of funding appears to be constraining the autonomy of NGOs and their ability to criticise the policies of the international community and individual donor organisations. Thirdly, a combination of an increased dependence upon donor funding and responsibility for meeting the assistance needs of millions of people raises difficult issues of accountability for individual agencies and the relief system as a whole. Fourthly, the realisation that the mobilisation of the international community at a political level is an increasingly necessary part of effective humanitarian action, is resulting in many agencies increasing their advocacy activities and in some agencies, which have not previously engaged in advocacy work, beginning to work in this area. Questioning their effectiveness in providing assistance in ongoing conflicts and the risks posed for their staff, some agencies are seriously considering withdrawing from the provision of assistance and concentrating their efforts on advocacy instead. Fifthly, agencies which have traditionally focused upon development activities are being forced to question their objectives and effectiveness in the face of increased conflicts. Tension reduction and conflict prevention are emerging as the new concerns of development agencies and drawing them closer to the human rights agencies and peace groups. Sixthly, agencies that have traditionally maintained a distinction within their organisations between their 'relief' and 'development' activities are finding such distinctions increasingly irrelevant to their operations in countries experiencing chronic instability. Seventhly, the project and project cycle approach to funding and the management of activities is being exposed as ill-suited to the flexibility and sustained, multi-component programmes of assistance demanded by conflicts.

Perhaps as a result of the level of uncertainty associated with this current period and the enormity of the problems confronting many agencies, the workshop was notable for the frankness of exchanges between participants — displaying a degree of openness which is not usually witnessed in gatherings of personnel representing agencies which often compete against each other for limited resources. It is apparent that relief and development agencies are making organisational adjustments to the current demands. These are presently ad hoc, however, and often undertaken in response to external pressures. As yet, no clear trends or strategies have emerged. The workshop itself was unable to make much headway in identifying strategies by which agencies might respond to the current period, though given the enormity and complexity of the issues involved, this was hardly surprising.

Some agencies appear more comfortable (or perhaps it would be more accurate to say less uncomfortable) than other agencies in being drawn into a much closer relationship with
donor organisations and foreign ministries. For the first time in my experience, the term QUANGO (Quasi-Autonomous Non-Governmental Organisation), which is usually reserved for use in describing government-funded agencies in the UK, was used by some participants to distinguish agencies engaging in a particularly close relationship with donor organisations and foreign ministries from the widely accepted notion of what constitutes an NGO.

The workshop was perhaps overly occupied by the problems posed by conflict for humanitarian agencies rather than the causes of conflict and the factors contributing to the present surge in the number of conflicts. Whilst this surge appears to be related to the ending of the Cold War, it would be wrong to see all conflicts in terms of ethno-nationalist tensions welling up following the removal of USSR-backed instruments of central control. Some of the current conflicts and areas of instability (e.g., Afghanistan, Somalia, Angola, Cambodia) are largely the product of Cold War confrontations and arms build-ups which are being carried over into the post-Cold War period. For others, such as Rwanda, Liberia and Sri Lanka, it is necessary to look further back to events during the colonial or even pre-colonial era and to the failures of the civil society in those countries to resolve the potential conflicts at an earlier stage.

A recurring notion during the workshop was that conflict is part of, some would argue an inherent part of, the process of change and development itself. Material or status gains for some groups inevitably alters their relationship with other groups, possibly contributing to tensions between them. Examples of how the development process itself had contributed to such tensions were cited by participants, including land disputes in Tanzania associated with agricultural schemes and the influx of migrant farmers on a large irrigation scheme in eastern Sri Lanka, exacerbating tensions between the Sinhalese and Tamil communities. Some participants spoke of the role of economic recession and the structural adjustment process in weakening many of the component institutions of civil society and enhancing the relative strength of certain groups such as the armed forces. Others spoke of weak policing and judicial institutions, coupled with the introduction of comparatively inexpensive automatic rifles and the rise of banditry in some countries.

Whilst many social tensions and conflicts do not escalate to the level of armed violence and open warfare, some do. It is important for development agencies to recognise the potential for conflict which exists within all societies and understand the processes by which they may escalate to armed violence. They should ensure that they do not exacerbate such tensions but, rather, seek to support those components of a civil society which are capable of mediating and resolving tensions and conflicts before they escalate to armed violence.

**Note**

Thanks to Jo Macrae and other participants in the workshop for help in distilling ideas from the papers and discussions.

**John Borton**, Relief and Rehabilitation Network, Overseas Development Institute, Regent's College, Inner Circle, Regent's Park, London NW1 4NS, UK

This book is a contribution to the current debate about the needs and resources of refugee women. The author begins by discussing the meaning of refugee status for women and by emphasising the need to recognise that women are a critical resource in the refugee population. It is correctly pointed out that women are major losers in times of civil disorder and that protection, both legal and physical, is a critical need for them. Sensitivity to the needs of women should thus be a primary concern for any serious interventionist programme. This is in line with the assumption that the successful planning and implementation of a project depends on the involvement of target groups in the assessment of their own needs. In many refugee situations, women are not involved in the identification of their needs, nor, therefore, in projects aimed to help them. Only very few women's projects provide long-term economic self-sufficiency for the participants.

In discussing 'durable solutions', the author addresses the issue of 'sustainable development' (i.e., the improvement of local capacities and the reduction of vulnerabilities). This reflects, perhaps, the move from relief to development in refugee assistance. It is interesting, however, that most institutions and agencies fail to treat women as a resource in the process of change. Critical as this shift may be, its effect on refugee women is not tackled adequately in the book. Of particular concern is the ongoing debate about the need to shift the emphasis from humanitarian agencies, such as UNHCR, as the 'main players' in refugee assistance, to organisations that are largely motivated by economic principles of maximisation and profit, such as the World Bank and the International Monetary Fund. A likely consequence of such a change in emphasis is the marginalisation of humanitarian agencies and/or the further marginalisation of women, as their needs continue to be treated as peripheral to established institutions and programmes.

The section on responses and solutions, which includes an analysis of the structural system within which refugee women find themselves, is particularly noteworthy. What emerges from the discussion of responses (by, for example, the United Nations, the Commission on the Status of Women and NGOs) is the need to operationalise various guidelines relating to refugee women. Needless to say, 'durable solutions' for refugee women are dependent on sensitivity to two major issues: protection during their time in exile and their involvement as equal, if not primary partners, in decisions affecting them.

There is a good discussion of the need to provide women with help to meet the challenges of resettlement and practitioners will find the Annexes a particularly useful aspect of the book. (Annexe 1, for example, gives advice on ways of organising meetings and workshops.)

This book provides a useful foundation for any serious research on refugee women. As claimed in the Foreword, it is indeed a basic guide to an important subject.

Monica Kathina
Refugee Studies Programme
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This is a useful primer on migration, in the Routledge series 'Introductions to Development'. The book is amply illustrated with clear maps and diagrams, and its arguments are supported by a great variety of useful case studies.
The author is a geographer at the University of Hull, with experience in southeast Asia, from which region is drawn much of his case material — apposite because dynamic economies like those of Malaysia and Thailand are emerging as new poles of attraction for migrants in this region. The southeast Asian material is balanced with cases drawn from most other parts of the world.

The book is not intended as an exploration of new theoretical ground, but as an introduction to some of the issues surrounding migration. Summaries of each chapter's key points are provided, together with selected readings, drawn largely from the geographical literature.

Parnwell attempts a typology of population movements, drawing on their spatial, temporal and motivational dimensions, and usefully distinguishing between mobility, movement and migration. Under the rubric of motivation, he considers the difficult distinction between 'voluntary' and 'involuntary' migration, rightly highlighting the continuum between options to move and little or no choice. He suggests an intermediate category of 'impelled migration', in which he says the individual has some, albeit circumscribed, degree of choice as to whether to move or not.

Parnwell then considers in a single chapter various forms of population movements in the 'Third World'. 'Culturally-determined' forms of movement are considered, such as journeys as rites of passage and pilgrimage. Hunting and gathering, shifting cultivation, nomadism and transhumance are grouped under the rubric 'ecologically determined movements'. These two 'traditional' forms of movement he puts in his category 'impelled' migration, largely determined outside the will of the people concerned. Under 'involuntary population movement', he considers refugees and resettlement — the latter as a result of infrastructural projects or of attempts at state-directed population redistribution. Under 'voluntary forms of population movement', the author considers international migration — emigration (or permanent settlement), illegal migration and international labour migration. The latter is divided into Third World—First World, Third World—Middle East and Third World—Third World migration. Internal migration, rural—urban migration and other movement within a national territory are examined in three later chapters.

Parnwell handles the issues of motivation by considering macro-, meso- and micro-level perspectives. The macro-level includes structural imbalances between rich and poor countries and within the 'Third World'; rural 'push' factors and urban 'pull' factors are considered as the meso-level; and the micro-level encompasses household decision-making and what is known as step, chain or relay migration based on kin and social networks.

His treatment of the effects of migration focuses on the source areas — dealing with impacts on labour supply, the transfer of resources through remittances, and the development of 'human resources' through education, acquisition of skills and experience. Treatment of the effect of migration on destination areas is briefer, with a focus on urbanisation in the Third World. Another brief section deals with migrant adaptation, organisation, integration or assimilation.

A final chapter on policy and planning divides approaches to migration into four types: negative approaches, which assert the undesirability of migration and seek to erect barriers to it; accommodative approaches, which accept migration as inevitable and seek to minimise disintegrative effects in both source and destination areas; manipulative approaches, which accept the inevitability of migration but seek to channel or divert it; and preventive approaches, which purportedly try to deal with the causes of migration rather than its symptoms. Most of the policies considered apply principally to rural—urban rather than international migration.

One might easily argue with the author's various taxonomies — as with many other categorisations of migration — but at least they have the strength of an attempt at comprehensiveness. The use of the term 'Third World' in the context of migration — as elsewhere — is, however, problematic (as the author himself hints in his preface). If the Middle East is (rightly) not categorised as 'Third World', why should migration to (and from) Singapore be placed in the 'Third World—Third World' section? Moreover, important new movements in southeast and east Asia do not figure in this categorisation: Japan, Korea and Hong Kong have become prime destinations for migrants.
Is Malaysia, now a major recipient of migrants — one million compared with a population of 18 million — to be considered within the 'Third World—Third World' rubric? These conceptual problems highlight the doubtful utility of the term 'Third World', which is no longer nuanced enough (if indeed it ever was) to handle the diversity of development, particularly in the context of migration.

The book's referencing is deliberately light, but the reader is occasionally left hanging with an author cited unreferenced. The Guardian newspaper seems a curiously second-hand source for movements in Africa of refugees and displaced people (p. 43), when other sources, such as the US Committee for Refugees' World Refugee Survey, are cited elsewhere. Similarly, citation of an unpublished Masters thesis for the case study on Vietnamese boat people (pp. 45–47) seems curious, when other more accessible sources are available.

These quibbles aside, the book meets the Routledge series criteria of being concise and providing a broad perspective, presenting the diverse debates on migration in a very useful and accessible way.

Nicholas Van Hear
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This manual is an attempt to guide policy makers and planners who are responsible for developing or executing programs related to disaster mitigation. Disaster mitigation can be approached in several ways, but it is crucial to know the risk to which a given country or area is subject. Depending upon resources available, planning for disaster mitigation needs to be built into development plans. Further decisions will have to be made by planners and policy makers on the choice of measures for implementation in a given situation. The manual defines the basic objectives of disaster mitigation and draws the attention of administrators to the need for risk reduction.

The focus of the manual is on developing countries where there is an urgent need for the application of disaster mitigation techniques. It emphasises a step-by-step technique of loss reductions. Only natural hazards, like floods, tropical cyclones, earthquakes, volcanoes and landslides are discussed. The manual does not go into technical details, but provides simple explanation for ease of understanding by administrators. Emphasis is placed on the preparation of different kinds of map, indicating hazards and vulnerability, and simple techniques are proposed for carrying out such mapping. Where relevant, different loss reduction options are recommended. In the area of structural mitigation measures for a particular hazard, only non-engineered structures are covered. This may be justified, as most damage during a disaster in less developed and developing countries is to non-engineered structures. Due to a general lack of data on the cost of risk reduction measures, however, the manual is unable to shed much light on this topic. It is left for the planner and policy maker to make the best use of the available literature.

Satyendra P. Gupta
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Twelve years after the famous geographer P. Gourou published his rather optimistic view of the Tropics (Terres de Bonne Espérance, Plon, Paris, 1982), another French study has appeared of the same subject. Jean Gallais, a professor at the University of Paris-Sorbonne, is a specialist in tropical and Sahelian Africa who also has a wide experience of the rest of the tropical world. Between the two publications, and during the International Decade of Development, a growing disillusionment has set in, the Tropics now seeming to be dogged by misfortune, whether of a ‘natural’ or man-made variety.
It is a well-established fact that the poorest areas of the world are located within the Tropics, but no comprehensive theory can explain this apparent correlation, at least on the basis of geographical characteristics. Natural hazards are not by any means limited to the Tropics. The effects of droughts, tropical cyclones, floods and even of earthquakes and volcanoes (the least predictable of risks) can be significantly aggravated by human activity. Natural hazards in the poorer countries are part of a syndrome of crisis, their effects being combined with, and modified by, the local social and political circumstances. The general weakening of state authority results in structural crises and conflicts, involving various forms of violence. Key political posts are nevertheless coveted at a national level, for authority, even if undermined, means power and money. The weakening of central authority in peripheral and less accessible areas results in illegal border trade and secessionist tendencies. Local customs are threatened by the rapid, deep and often violent changes that have affected the tropical world, particularly in recent decades, whether through the ending of colonial rule, the dramatic increase in population or the development of trade and other contacts with the developed world. Nomadic pastoralism, which has been studied in detail by the author, a specialist in Sahelian nomads, offers a striking example of this process.

Drastic changes taking place in tropical countries have also triggered unprecedented urban development. Central and local governments, unable to cope with the acute social inequalities in their countries, seem powerless to halt urban expansion. Most of the tropical mega-cities share the same public health problems, mainly related to the poor quality of drinking water. The proliferation of AIDS is also connected with urban development. While shanty towns are becoming increasingly autonomous, any comprehensive programme to curb the anarchic expansion of the cities and improve the standard of living of the majority of their inhabitants seems an unrealistic hope.

Can tropical countries escape a future plagued by more violence and more confusion? The crises that they are now experiencing are usually more cumulative than recurrent, as is demonstrated by, for example, their environmental problems. Although the situation in Africa is by far the most serious, there are worrying if less desperate examples of the same problems in tropical America, Asia and Oceania. Strengthening regional solidarity, curbing population growth and improving the moral standing of politicians all seem prerequisites for a brighter future.

This gloomy survey, the idea of which was suggested to the author by the oversimplified yet excessive information provided by newspapers and television on the catastrophic events occurring in the Third World, is neither complacent nor intentionally dramatic. It is carefully backed up with a wealth of examples taken either from the author's own field of experience or from the direct experience of research students in Africa, south Asia and tropical America. The central idea is to consider crises, resulting from various hazards, as dynamic, autonomous entities. The theory of hazard, disaster and risk has, however, already been explored by various English-speaking geographers and it is surprising that the author seems to ignore the work of such scholars as Burton, White, Hewitt and O'Keefe.

This book is a valuable, humanistic contribution to a better knowledge of natural and man-made hazards in the tropical world. Although clearly pessimistic, it is not without all hope and makes an urgent appeal for more justice, more public morality and more dedicated action.

Jean-Francois Dupon
The French Institute of Scientific Research for Developing in Cooperation (ORSTOM) Paris
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