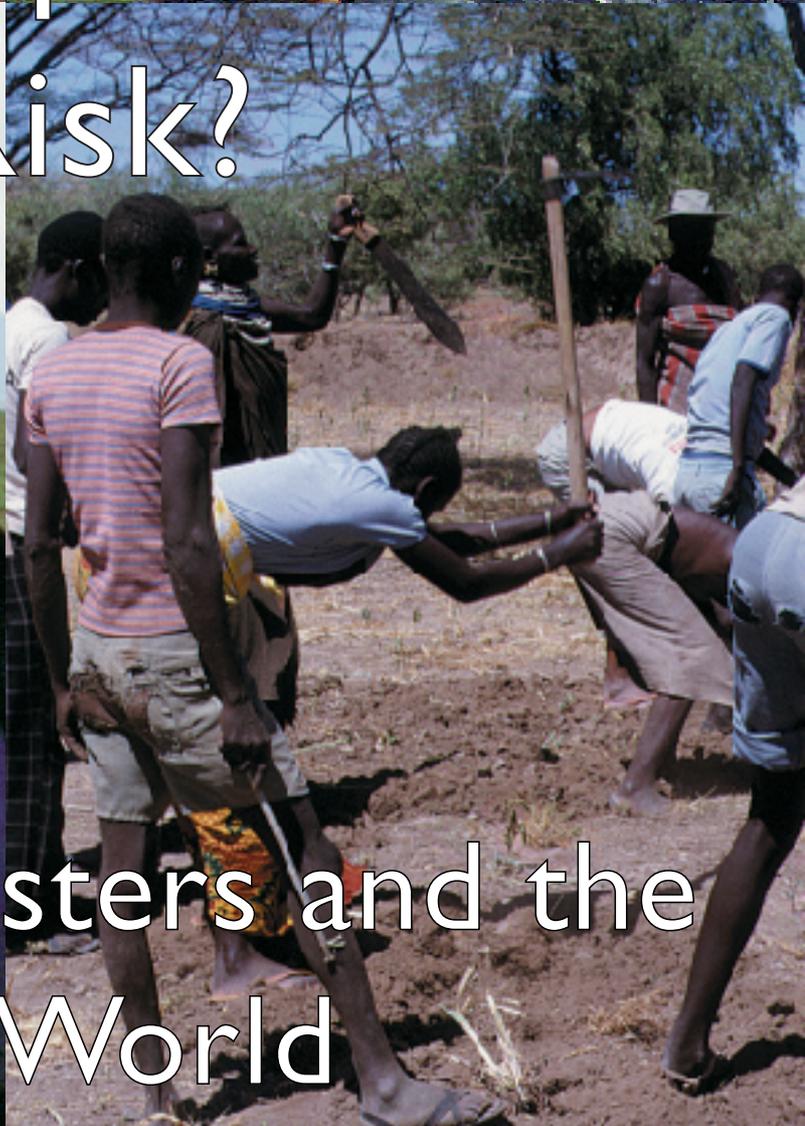




Development

at Risk?



Natural Disasters and the
Third World

Contents

Introduction	I
Disasters, development and vulnerability <i>John Twigg</i>	2
The cost of disasters <i>Charlotte Benson</i>	8
Protecting development <i>John Mitchell</i>	14
The International Decade for Natural Disaster Reduction <i>Tony Eades</i>	20
Further information and contacts	23

Photographs on the front cover (clockwise, from top left): Houses wrecked by an earthquake, Peru (IT/Rein Skinner). An inhabitant of a Manila slum that is often hit by typhoons (IT/Janet Boston). A community in the drought-prone Turkana District of Kenya building earth walls to trap scarce rainwater for growing sorghum (IT/John Young). Colombian schoolchildren's design for a new village, after their old one was destroyed by an earthquake and landslide (IT/Janet Boston).

Introduction

IT/janet Boston

Many people fail to see the connection between the natural disasters (such as droughts, earthquakes or hurricanes) that affect many parts of the Third World and those countries' long-term social and economic development.

Even if they are interested in Third World development, they feel that disasters should be left to the relief teams who fly out to offer emergency aid whenever disaster strikes.

In fact, disasters have a significant effect on development. They can damage it badly, at all levels from that of individual households and local communities through to national level. Moreover, development and its consequences are themselves a factor in disasters.

Many people also see disasters as unstoppable, as acts of God: we cannot prevent them, only deal with the consequences. In many cases this is not true. There is a great deal we can do, and much that is already being done, although not nearly enough to cope with the magnitude of the problem.

This booklet tries to explain these topics. It is an introduction to some of the key issues, not a comprehensive coverage of the subject. It contains four short essays by people working in this field.

The first two writers look at the scale and nature of the disaster problem.

John Twigg considers the effects disasters have on Third World communities, and the reasons why some people are more at risk than others. Charlotte Benson explores the economic impact of disasters and shows how this is often underestimated.

The two authors who follow deal with ways of overcoming the threat of disasters.

John Mitchell demonstrates that some attempts have been highly successful. He highlights the value of working with the communities who are vulnerable and making the fullest use of their own experience of living with natural hazards.

Tony Eades outlines the work of the United Nations International Decade for Natural



Acts of God? A church severely damaged by an earthquake in Colombia.

Disaster Reduction, now nearing its close, and the contributions of British organizations to these efforts.

Our aim is that, by publishing the booklet, we will raise awareness of these important questions and, in some small way, stimulate greater interest in overcoming disasters.

Disasters, development and vulnerability

by John Twigg

Impact

Disasters caused by natural hazards such as earthquakes, floods, storms, volcanoes and droughts are a major global problem.

Between 1971 and 1995 they caused each year, on average, more than 128,000 deaths and affected the lives of 136 million people. Every country is affected by natural hazards to some extent. However, most disasters occur in the poorer countries of the Third World: some 97 per cent of deaths and 99 per cent of people affected between 1971 and 1995 were in developing countries; and the economic consequences of disasters there can be massive.

To some extent this is an accident of geography: many Third World countries are in regions prone to the most severe hazards such as earthquakes, droughts, volcanoes, floods, landslides and cyclones.

This is only part of the story, though. Third World states find it particularly difficult to protect their people against disasters. Lacking the wealth, infrastructure and institutional capacity enjoyed by other parts of the world, they cannot afford the same levels of protection as countries in

The language of disasters

Natural hazard

The 'natural' physical event itself – earthquake, flood, volcanic eruption, cyclone, etc. Its intensity and impact can vary considerably.

Vulnerability

The extent to which a person, group or socio-economic structure is likely to be affected by a hazard (related to their capacity to anticipate, cope with, resist and recover from its impact); the strength of physical structures in standing up to a hazard.

Natural disaster

The impact of a natural hazard on a community. A disaster is usually defined as an event (causing death, injury, loss of property, economic damage, etc.) that overwhelms a community's capacity to cope.

Buildings nearly submerged by lahars (mudflows of ash and other volcanic debris) as a result of the eruption of Mount Pinatubo in the Philippines: the man with the ladder is walking on the lahar, at roof height.

Europe, North America and elsewhere, which have invested substantially in a wide range of preparedness and mitigation measures including scientific forecasting, safer buildings, regulations on the use of land, extensive emergency management systems and insurance cover.



Development at risk

Expensive long-term development projects are put at great risk if they do not take natural hazards into account. A housing programme can be shattered by an earthquake; a farming scheme ruined by a hurricane or flood.

Development resources have to be diverted to deal with the consequences of disasters. The World Bank, for example, diverted some \$2 billion of existing loans between the 1987 and 1988 financial years to fund reconstruction and rehabilitation after natural disasters.

Disasters also place a huge burden on international aid

budgets, to the detriment of development programmes.

Humanitarian (i.e. emergency) aid from the world's wealthiest countries – the members of the Organization for Economic Co-operation and Development's Development Assistance Committee – has more than trebled in the 1990s, from about \$1 billion in 1990 to well over \$3 billion in 1995. Most of this sudden increase is due to conflicts, but in the 1980s the rising impact of natural disasters such as the famine in the Horn of Africa was already pushing emergency budgets up rapidly.

Meanwhile, long-term development assistance from the same countries to the world's poorest has stagnated at around \$60 billion a year and is even falling in real terms.

As a proportion of aid overall, humanitarian assistance rose from 2 per cent in 1990 to just under 6 per cent in 1994. The British Government spent 2 per cent of its bilateral aid budget on relief in the 1982/3 financial year; but in 1992/3 it was spending more than 10 per cent.



Bangladesh: a river bank eroded by floods, with houses just beyond.

The poor often have to live in dangerous locations: these bare hills, and the houses built on them, are vulnerable to landslides.

Vulnerability

A 'natural disaster' is the result of a natural hazard – a flood or earthquake – striking people and property. The scale of the disaster is the extent to which it damages these. An earthquake in an uninhabited area or a cyclone in a remote part of the ocean are not disasters, merely geological or meteorological events.

Disaster statistics are hard to calculate with any accuracy or consistency. Nonetheless, all the evidence points to a steep and continuing rise in deaths and injuries from disasters since the 1960s, and there is a general consensus among researchers and insurers that the number of disasters is increasing.

This rise cannot be explained by a parallel rise in the number of earthquakes, cyclones and the like. What we are seeing is an increase in the effects of disasters on people – or, in other words, an increase in people's *vulnerability* to disasters.

It is the social, cultural, economic and political environment that makes people vulnerable. This is most apparent in the



IT/Janet Boston



A home is often a workplace too. This woman had to rebuild her house, where she runs a small sewing business, after an earthquake.

economic pressures that force many of the poor to live in cheap but dangerous locations such as flood plains and unstable hillsides; but there are many less visible underlying factors – social and political as well as economic – that affect people's ability to protect themselves against disasters or to recover from them.

Some groups are more vulnerable than others. Class, caste, ethnicity, gender, disability and age are all factors affecting people's vulnerability. Those who are already at an economic or social disadvantage because of one or more of these characteristics tend to be more likely to suffer during disasters.

Vulnerability is not just poverty, but the poor tend to be the most vulnerable. In 1976 an earthquake killed 1,200 people and made 90,000 homeless in Guatemala City. Almost all of them lived in slum areas and many of their homes were in dangerous ravines and gorges – these were the only places they could afford to live in. The rich, in better constructed houses and safer locations, were affected far less.

More recently the Red Cross of Viet Nam looked at flood victims in the Mekong Delta and found that the wealthier inhabitants were better able to withstand floods. They could afford to raise the foundations of their houses above the usual flood level, and because they did not depend on a daily wage for their economic survival their livelihoods were not so badly affected. The landless poor, on the other hand, had little room for manoeuvre: floods cut them off from food, fuel and income by stopping them

Poverty and disaster – a cyclone in India

A wealthy and a poor family live 100 metres apart near the coast of Andhra Pradesh in southeast India.

The wealthy family has six members, a brick house, six cattle and three acres of land. The head of the household owns a small grain business and has a truck.

The poor family (husband, wife and two children) has a thatch and pole house, an ox and calf, half an acre of poor land and sharecropping rights for another quarter of an acre.

When the cyclone strikes, the wealthy farmer has received a warning on his radio and leaves the area with his family and valuables in the truck. The storm surge (flood) partly destroys his house and the roof is taken off by the wind. Three cattle are drowned and his fields are flooded, destroying the crops. The youngest child of the poor family is drowned; their house is destroyed; both animals are drowned; their fields are flooded and the crops ruined.

The wealthy family use their savings to rebuild the house within a week. They replace the cattle and plough and replant their fields. The poor family does not have savings and has to borrow money for essential shelter from a local money lender, at exorbitant rates of interest. They manage to buy a calf but have to hire bullocks for ploughing their field, which they do too late since many others are in the same position and draught animals are in short supply. As a result, they go through a hungry period eight months after the cyclone.

from collecting wild vegetables, cutting firewood and working as day labourers.

The development process

The traditional view commonly held by people working in both emergency relief and long-term development was of development as a linear process leading to ever-improving standards of living, while disasters were temporary interruptions of that path to improvement. The task of relief workers, therefore, was to patch things up so that the process of development could start up again. Emergency relief would be followed by rehabilitation, leading in turn to renewed development work.

The 1980s and 1990s have shown that development has its ups and downs, its failures as well as successes. Closer study of natural disasters' impact has undermined the belief that victims' lives can soon return to normal. Moreover, it is now all too apparent that the development process itself makes people vulnerable to natural hazards.

There are many aspects to this. Population growth, governments' economic and other policies, and rapid urbanization, are among the major underlying causes of increased vulnerability.

In many Third World countries population pressure, coupled with the need to live close to places where work can be found, compels people to build their homes in places at risk from floods. Peasant farming in drought-prone areas can be undermined where governments choose to support other agricultural sectors that produce crops for export. Where social structures are weakened by political interference or economic forces, traditional collective efforts against disasters – such as the repair and maintenance of dykes as protection against floods – may be abandoned.

The most visible link between development and disasters is through environmental degradation. A recent World Bank publication estimated that 80 per cent of the poor in Latin America, 60 per cent of the poor in Asia and 50 per cent of the poor in Africa lived on marginal lands characterized by poor productivity and high vulnerability to natural degradation and natural disasters.

Our impact on the natural environment can heighten the risk of disaster in many ways. For example, cutting down trees causes soil erosion



This Filipino fisherman lives near the sea shore, where his home is exposed to typhoons; but he also earns his living from the sea.

and landslides that in turn can silt up rivers and cause flooding downstream. Building on flood plains reduces the amount of ground surface that can absorb rainfall: the rain then runs off much faster into rivers, putting pressure on river banks and thereby increasing the likelihood of flooding. Overgrazing and overcultivation can lead to soils becoming exhausted or to erosion and landslides. The removal of mangroves, to make way for hotels or commercial prawn farms, renders coastal communities more vulnerable to the strong winds and sea floods brought by cyclones.

IT/Janet Boston



A community in Colombia joins together to rebuild after a severe earthquake.

Living with risk

People do not willingly embrace the risk of death or economic devastation, but short-term pressures such as the need to earn money and feed a family may oblige them to take the more remote risk of a disaster.

A study of the Karakoram area in northern Pakistan in the 1980s found that houses tended to be sited in dangerous locations, against mountainsides and in the line of landslides and floods. Their owners were aware of the risk but chose to build there rather than use up precious agricultural land, of which little was available in this mountainous area. When asked about the risk of disasters such as flooding and earthquakes,

people said they had more pressing problems to face such as the lack of education and health, and the difficulty of selling crops at a decent price.

In the Indian city of Indore, many slums are found on the banks of the several rivers that run through the city, or on the floodplains. Slum dwellers live here for good economic reasons including proximity to markets and job opportunities in the centre of the city, the cheapness of the land and the better chance of getting funds for improvement because of the slums' visibility. They also see social benefits such as access to health services, schools, water and electricity (illegal connections are often made to water and electricity supplies), the presence of well established social support networks, and access to entertainment.

Fighting back

It is clear, then, that natural hazards are an important factor in development, and that, by making people more or less vulnerable, the process of development itself contributes to the impact of the disasters that are triggered by such hazards. Indeed, it can be argued that such 'natural' disasters are often not acts of God but acts of man.

More disaster terminology

Disaster work, like any other professional discipline, has its own terminology and jargon. These three terms are commonly used.

Disaster management

This term encompasses all aspects of planning for disasters and responding to them.

Preparedness

Measures to forecast disasters, take precautions when they threaten, and arrange for the appropriate response (e.g. organizing evacuation procedures, stockpiling food supplies, and training and equipping rescue services).

Mitigation

Any action to minimize the impact of a disaster. This ranges from physical measures such as flood defences or methods of making buildings more secure to training, legislation and raising public awareness. Mitigation can take place at any time before, during or after a disaster.

If this human factor adds to the problem, it also provides part of the solution. Those who make economic and development policy, and those who have to implement it on the ground, must be made more aware of issues of risk and vulnerability, as well as of ways of overcoming them, and they must be helped to incorporate disaster planning into their development programmes.

Disasters can be prevented, or at least their destructiveness can be minimized. This is certainly not easy, and we need to improve our expertise in this field. There is, moreover, plenty of debate about which methods of preparedness and mitigation are most effective in particular circumstances: much more effort is needed to identify and promote models of good practice. However, our understanding and skills are sufficient already to be put to good effect in aid and development programmes.

This ought to be straightforward enough but in practice it is harder to achieve. Entrenched attitudes and institutional separatism in government and aid agency circles, coupled with the general stagnation in budgets, have hindered the two worlds of disasters and development from drawing together. Closer integration is beginning, but we still have a very long way to go.

John Twigg is Project Manager at the Oxford Centre for Disaster Studies, having previously been Head Office Co-ordinator of Intermediate Technology's international disaster mitigation programme. He is a co-author of Disaster Mitigation, Preparedness and Response: an audit of UK assets and of several other articles on disaster mitigation and Third World development.

The people of Igbalangao on Panay Island in the Philippines use dough to make a map of their village, assessing the vulnerability of each household.



IT/Nick Hall

The cost of disasters

by Charlotte Benson

Rajendra Desai



Nearly 10,000 people were killed and 150,000 were made homeless by the earthquake at Latur in India in 1993.

Counting the cost

Natural disasters are a potentially serious shock to an economy. The United Nations estimates the total cost of disasters worldwide during the 1980s at \$120 billion (in constant (1990) US dollars). Moreover, there is clear evidence of a rising trend, with total costs increasing from \$70 billion in the 1970s and \$40 billion in the 1960s.

This trend looks set to continue: before 1987 there was only one case where the insured losses from a natural disaster exceeded \$1 billion; by 1995 there had been 14 instances.

Such figures are dramatic. Yet they are typically based on only the direct, visible, financial impacts of a disaster such as damage to homes, hospitals, schools, factories, infrastructure and crops.

The true costs of disasters, taking into account less quantifiable effects such as the loss of personal belongings or jobs, widening trade or government budget deficits, or the increasing scale and depth of poverty, are even higher.

However, many of these indirect and secondary effects cannot be captured in a single monetary figure. Instead, most assessments focus on the cost of direct physical losses alone. This implies that the costs of disasters may be considerably under-estimated, creating problems in alerting policy makers and funders of

development projects to the potentially serious consequences of natural hazards.

Economic vulnerability

The degree of severity and nature of impact of a disaster depend on a range of factors. These include the type of hazard, the size of the economy and its economic structure, and the sectors affected by the disaster.

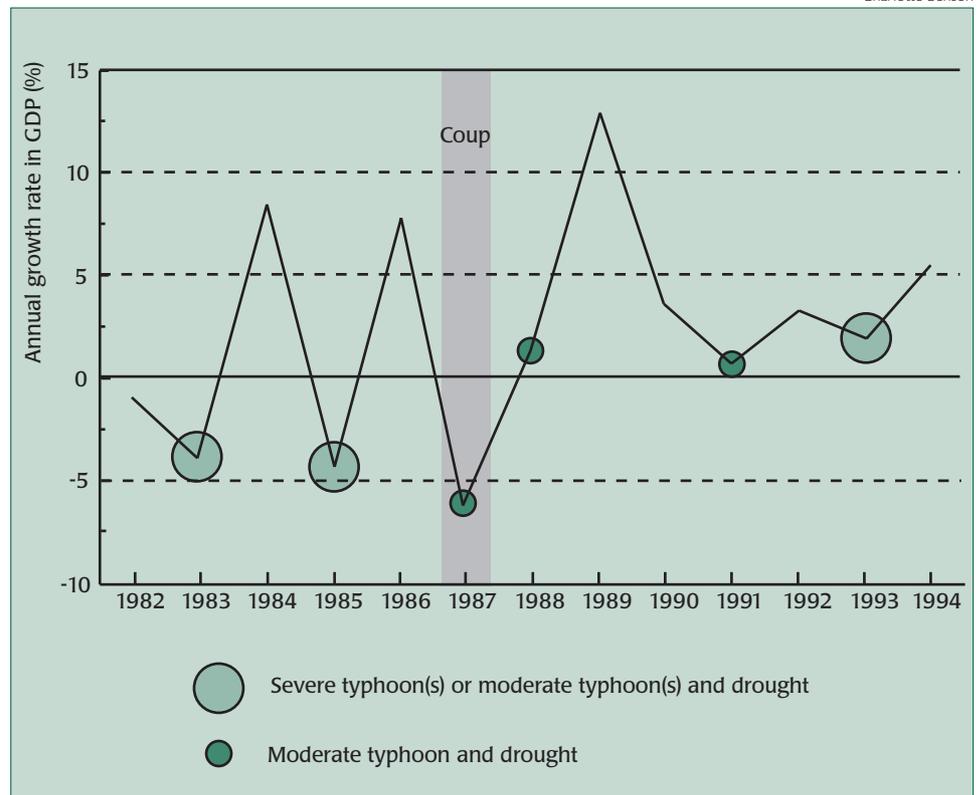
Looking at hazard types, we see that droughts do not damage buildings or physical structures but their lengthy duration creates other problems: for example, agricultural households may be forced into considerable debt following the loss of crops and livestock. In contrast, sudden-onset disasters such as floods or earthquakes have a direct impact on infrastructure and productive facilities and resources, as well as on social resources and infrastructure, especially housing.

The size of the economy is also relevant. The macro-economic consequences of disasters can be particularly dramatic in small island states (as the example of Fiji, illustrated on page 9, shows) and in the case of droughts affecting large geographical areas.

Some sectors of the economy are more vulnerable to hazards than others.

Charlotte Benson

Most obviously, the agricultural sector is potentially vulnerable, implying that countries which rely heavily on agriculture may be particularly threatened by hazards. However, even here, the types of crops cultivated and techniques for growing them play a role in determining the scale of vulnerability. As the Philippines has learnt to its expense, new hybrid varieties of coconut trees, while giving high yields, are much more vulnerable to typhoons than traditional varieties which have longer root systems and so are better able to withstand very strong winds. Many traditional root crops and coarse grains, such as millet and sorghum which are grown in parts of Africa, are more drought-tolerant than newer crop varieties. In terms of growing techniques, intercropping (mixing of different crops in the same plot) can give shorter plants better protection against high winds.



Fiji's gross domestic product (GDP) 1982-1994 (annual growth rates).

At the other extreme, some sectors or sub-sectors are largely immune to natural hazards. Mining operations in sub-Saharan Africa are typically unaffected by droughts. Namibia and Botswana have continued to maintain high levels of mineral exports even during years of severe drought.

Disaster-related damage in one sector can have implications for other sectors. Industries making food products depend on agricultural production, for instance, so that a drop in farm output could lead to reduced manufacturing output too. Droughts can also have severe implications for industries that supply agriculture, such as fertiliser manufacturers.

Economic performance in the period before a disaster, the international economic climate, the frequency and magnitude of other recent disasters, and government economic policy, can also be important in determining the impact of a disaster.

For example, a number of developing countries still rely on basic commodity exports, such as coffee or minerals, for a significant share of their foreign exchange earnings. Favourable world prices here can help offset the impact of a disaster, as in the case of Kenya in 1984 where high international tea and coffee prices helped sustain the country's export earnings and the value of its agricultural output at a time of severe drought.

The big picture

The economic costs of disasters can be broken down into three types.

Direct costs – relate to the capital cost of assets (such as buildings, other physical infrastructure, raw materials and the like) destroyed or damaged in a disaster. Crop losses are often included in such calculations.

Indirect costs – refer to the damage to the flow of goods and services. They include, for example, lower output from factories that have been destroyed or damaged; loss of sales income due to damaged infrastructure such as roads and ports; and the costs associated with having to purchase more expensive materials or other inputs where normal – cheaper – sources of supply are affected. They also include the costs of medical expenses and lost productivity arising from increased disease, injury and death.

Secondary effects – concern the short- and long-term impacts of a disaster on overall economic performance. These may include a deterioration in external trade and government budget balances, the reallocation of planned government spending and increased indebtedness. Disasters can also affect the pattern of income distribution or the scale and incidence of poverty.

The state of the environment also plays some role in determining the scale of a natural hazard's impact. There is clear evidence that a number of countries are becoming increasingly vulnerable to natural hazards as a result of environmental degradation, and the increased cultivation and occupation of marginal lands. Deforestation, for instance, is contributing to the increased incidence of droughts, flash floods and landslides in many parts of the world.

Global warming could also contribute to a rise in the number of disasters, although scientists are still debating its precise impact on the frequency and intensity of climatic hazards such as cyclones.

Developed and developing countries

As one moves along the spectrum from developing to highly developed economies, the nature of a disaster's impact alters. The absolute cost of physical damage increases, but its relative cost (as a proportion of national or local wealth) decreases; and the number of lives lost also declines.

For example, Hurricane Andrew struck Florida and Louisiana in the USA in 1992. Within a few

Disasters and Third World economies

- Recurring natural disasters may cost Bangladesh more than 5 per cent of its annual GDP.
- Losses from the Mexico City earthquake in 1985 added up to 3 per cent of Mexico's GDP; losses from the San Salvador earthquake in 1986 amounted to 24 per cent of El Salvador's GDP; and losses from the Nicaraguan hurricane in 1988 were 40 per cent of national GDP.

hours it had caused damage estimated at \$22 billion – equivalent to 0.3 per cent of gross domestic product (GDP) – but only 14 people lost their lives.

In contrast, a super-typhoon, Typhoon Angela, which struck one of the more densely populated parts of the Philippines in late 1995, caused damage of \$63 million – equivalent to 0.1 per cent of GDP but only 0.3 per cent of the damage caused by Hurricane Andrew – and resulted in 916 deaths. In the microstate of Niue in the South Pacific, the cost of repairing damage to government-owned buildings alone as a consequence of Cyclone Ofa, which struck the island in February 1990, was estimated at \$4 million – equivalent to a massive 40 per cent of GDP.

The rise in the cost of disasters reflects increases in the quality and quantity of property and infrastructure. Wealthier countries can also afford increasingly sophisticated early warning and communications systems, allowing people more time to move to safe places and resulting in fewer deaths and injuries.

Poverty and disasters

Poverty is a major cause of vulnerability to hazards, which, in turn, can throw households into even greater depths of poverty.

Natural disasters can have profound impacts on households

Traditional African crop varieties, such as these sorghum plants, are often more drought-resistant than newly introduced varieties.





resulting in the death or injury of family members and the loss of housing, possessions, food stores, crops and productive assets such as agricultural implements. Poorer families may be forced into increased debt in order to rebuild their homes, replace assets and meet basic needs until they are able to recommence income-generating activities. Yet poorer groups have also traditionally found it

Life on the 'Freedom Island' squatter settlement in Manila. Poor communities are particularly vulnerable to disasters – in this case to typhoons.

The Kobe earthquake in Japan in January 1995 caused billions of dollars worth of damage.

hardest to borrow from banks and other formal lending institutions: they lack collateral and are often regarded as a bad lending risk. They are forced instead to rely on money lenders who charge considerably higher rates of interest.

As long as much of a population remains highly vulnerable to disasters – for example, by virtue of the quality and location of its housing or sources of income – poverty will remain a problem. However, although many governments, as well as the international community, have attached particular importance to the alleviation of poverty, natural disasters have received relatively scant consideration in these policies.

More general developmental and social changes also alter the nature and degree of individual households' vulnerability to disasters.

It has been suggested on a number of occasions that increased provision of relief assistance to disaster victims over a number of decades has resulted in the development of a dependency syndrome and a decline in self-help efforts.

However, such comments may ignore the changing capacity



IT/Janet Boston



of individual households to support themselves during and in the aftermath of disasters. For example, shifts from traditional to modern housing designs and materials may increase the vulnerability of poorer households, who may only be able to afford lower-quality building materials

Thanks to her new sweet-making business, this Bangladeshi woman can afford to make her house more flood-proof and save some money against the threat of future disasters.

and who may mix traditional and modern building methods in a way that renders them more liable to damage.

Similarly, a tendency in a number of countries away from multi-crop farming and towards cultivation of just a few crops may, by reducing production of some traditional hazard-resistant species, increase the risk to agricultural communities.

Disaster mitigation

The level and nature of vulnerability to disasters is by no means in the lap of the gods, however. There are numerous opportunities for mitigating their impact at both national and household levels – using both structural and non-structural methods.

Structural interventions include – to take floods as an example – the construction of dykes to provide protection against river or sea floods. In Viet Nam, they have been building and maintaining such structures for some 2,000 years.

Non-structural measures are more wide ranging and comprise mainly non-engineered activities. Again, in the case of floods, they include reforestation of hillsides upstream to prevent

A stitch in time saves nine

- The World Bank and United States Geological Survey calculated that economic losses worldwide from natural disasters in the 1990s could be reduced by \$280 billion if \$40 billion were invested in preparedness, mitigation and prevention strategies.
- In China, \$3.15 billion has been invested over the past 40 years in measures to control floods: this is believed to have averted potential losses of \$12 billion.
- The Thames Barrier project to protect London from floods cost £730 million but this was considered a wise investment because the potential loss of property to a Thames flood was £3.5 billion – the flood was considered inevitable even though it might not take place for many years.
- The Anheuser-Busch company spent \$30 million on preparations to protect its brewery in the San Fernando Valley in California against earthquakes, which included making plans for alternative water supplies. When an earthquake hit the area, the company saved more than \$300 million because these measures enabled it to carry on production with only minimal interruption.
- The owner of a sweetshop in India, interviewed in 1994, said he had paid 25 Rupees to put stepping stones around his shop so that customers would not have to stand in flood water. Not to have done so would, he reckoned, have cost him 100–200 Rupees in lost business.

rainwater running off so quickly, the application of regulations on land use to minimize the danger to people and property in areas most at risk, and the construction of houses and grain stores on stilts. In other contexts, non-structural approaches encompass water conservation measures (against drought), improved forecasting and warning systems (against cyclones, floods or drought) and promotion of appropriate economic activities.

Such efforts do not lie in the domain of disaster prevention and mitigation projects alone. Long-term development projects could easily be amended to incorporate disaster-proofing features. For example, following repeated appeals for disaster assistance in the wake of typhoons in Viet Nam, the United Nations Scientific and Cultural Organization (UNESCO) organized a workshop and training course on the construction of disaster-proof school buildings, and mobilized a limited amount of resources to support further research and development of typhoon-resistant buildings for schools.

In practice, however, disaster prevention and mitigation measures have been largely concerned with costly technical solutions – such as forecasting methods and engineering structures. Meanwhile, the broader economic aspects of disasters, or even the threat they pose to individual development projects, have largely been ignored, sometimes resulting in heavy damage to such projects as a result of subsequent disasters. This reflects the incomplete and biased nature of most economic assessments of disasters' impact.

In addition, even in more hazard-prone countries, natural hazards are often not specifically identified in national economic plans as an obstacle to sustainable development. Efforts to minimize the economic consequences of disasters urgently need to be further investigated and stepped up.



Traditional buildings are often designed with natural hazards in mind: this bamboo house is braced against cyclones.

*Charlotte Benson is a consultant specializing in economic aspects of disasters. She was formerly a Research Fellow at the Overseas Development Institute, London, and co-editor of *Disasters: The Journal of Disaster Studies and Management*. She is currently carrying out research on the economic impact of natural disasters in Southeast Asia and the Pacific, and has previously been involved in similar work on the macro-economic impact of drought in sub-Saharan Africa.*

Protecting development

by John Mitchell

IT/John Young



Farming and herding communities in Africa employ a range of traditional 'coping' strategies to counteract the effects of drought.

Integrating disasters and development

Until recently, disaster relief and long-term development tended to be seen as distinct entities.

Relief was concerned with saving lives and was carried out in a 'top-down' fashion. Affected communities were often regarded as helpless victims and were rarely consulted about how best to organize relief operations. Instead, programmes were managed by outside experts who were 'parachuted' in and stayed only a few months.

Development, on the other hand, tended to be 'bottom-up' in approach, needing much time and patience. It was long-term and required the full participation of the communities involved.

Thus, diverse ministries, departments or officials tended to handle each area, with separate budgets and time frames, and generally with minimal or no reference to each other.

Such stereotypical attitudes failed to recognize that relief and development are inextricably linked and part of the same ongoing process. It is increasingly acknowledged that disasters can wipe out years of development and can dramatically increase vulnerability.

Now, disasters are beginning to be seen as opportunities to capitalize on the sudden inflow of resources for relief to promote longer-term development. In addition, disaster preparedness and mitigation are being built into many development programmes. This involves a wide range of activities that are tailored to meet the needs of specific situations, whether they be natural disasters such as cyclones or floods or more complex disasters involving famine and conflict.

Local capacities

Although the activities themselves can be very different, many of them are underpinned by common approaches and values.

One of the most important of these concerns building on local capacities. The rationale here is based on the recognition that local communities have developed their own, indigenous, preparedness and mitigation activities based on their extensive experiences of living with disaster (all too often in the past these have been overlooked or undervalued by disaster specialists from outside).

For example, many rural communities in Africa are vulnerable to food shortages as the result of drought; but they are able to prevent full blown famine by employing a variety of 'coping' mechanisms that allow them to ride out the hungry season until the next harvest. In northern Ghana, hundreds of young men travel south in the



The aftermath of flood and landslide in the Rimac Valley, Peru.

Organizing against disaster

The Rimac river runs down from the Peruvian Andes to meet the Pacific Ocean at the capital, Lima.

Every year, floods, landslides and *huaicos* (a local word for violent mudslides) occur in the Rimac valley, causing loss of life and destroying homes and farmland. Lima's water supplies and road and rail links are also affected.

Following particularly heavy rains and disastrous *huaicos* in 1983, a small Peruvian agency called PREDES began a project to help local communities protect themselves more effectively. To do this, it worked closely with a variety of community organizations and associations.

The project gave technical help and training in building defences such as terraces, walls and dykes. Wherever possible, these employed 'appropriate technologies' – that is to say, they used materials that were available locally and were based on traditional techniques.

Further training courses were arranged covering organizational methods, safe locations for housing, factors causing disasters, how to protect homes and settlements, and how to get assistance from government agencies. Educational sessions were held in schools and a weekly radio programme was broadcast.

Closer links were established between communities in different parts of the valley, with disaster experts and researchers, and with municipal authorities. Central government agencies provided funding and equipment for some of the measures undertaken but these measures were planned, managed and carried out by local people.

After two years a number of practical steps had been taken up and down the Rimac River to control floods, landslides and *huaicos*. Communities were much more aware of ways of mitigating the impact of such natural hazards and – crucially – had more confidence in their own capacity to take steps against disasters.

At the outset of the project, local organizations had been passive recipients of government relief. Two years later, local coalitions, running their own disaster mitigation projects, were able to negotiate successfully with central government officials for the resources they needed.

Low-cost flood protection structures built and installed by community organizations.



IT/Rein Skinner



Villagers near Cox's Bazaar in Bangladesh getting ready to repair a house damaged by the 1991 cyclone.

dry season to look for work in the cocoa-producing regions of Ashanti or the Ivory Coast. The value of the migration is that it provides a source of income that is not related to the economic problems arising from food crisis in the district from which they come.

In Zambesia Province in Mozambique the hungry season is between December and March, and the main coping strategy in that time, especially among the most vulnerable groups, is based on changing the diet and reducing food intake. As the season progresses, food stocks are used up and people reduce the number of meals from three to two a day. The quality and composition of the diet changes from a staple crop to fruit such as mango. Wild fruits are also available in the bush. *Nategua* (a local type of fungus) and *minamae* (wild tubers) are commonly found and eaten when all other food sources have been exhausted.

Seasonal food shortages develop into famine when, in extreme situations, community coping mechanisms are extremely eroded. In Ethiopia and Sudan in

Living with floods

Coping strategies used in flood-prone homes in the Indian city of Indore include: high internal shelving, raised storage platforms, electric connections at head height, floor-level storage and furniture made of metal (more durable and resistant to immersion in water), storing grain in metal containers on high shelves, ceiling platforms (for valuables, food and mattresses), and attaching corrugated iron roofing by weighting it down with rocks rather than nailing it down so that it can be removed if there is a risk that the house may be washed away. Water levels are watched carefully and constantly when flood threatens.

In severe floods all possessions are moved to higher ground in the following order: the elderly, children and animals first; electrical goods second; lighter valuables and cooking utensils third; clothes and sometimes mattresses last, since these are easiest to replace (and clothes are less damaged by immersion in water). Some families own trunks so that they can carry valuables away more easily.

There are sophisticated community support networks for the most serious times. Wealthy residents, local (religious) welfare organizations and local businesses provide food, blankets, clothes and medicines.

1984–5, for example, farmers were forced to sell all their livestock and other important assets in order to buy food; they were forced to eat seed normally kept for planting next season's crop; and finally, whole communities became destitute as they left their homelands in a desperate attempt to find work or food in other parts of the country.

Successful disaster prevention depends partly upon being able to predict these crises before they happen.

Famine early warning

Since the great African famines of the mid-1980s a lot of time and effort has been put into developing early warning systems which can predict and mitigate against famine.

Most famine early warning systems use a combination of indicators to help monitor food shortages.

The principle is based on supply and demand. For example, food scarcity can push up the price of grain in local markets. Thus, if the price of grain is much higher than expected for a particular time in the season, this probably means that food is in short supply. Conversely, if livestock prices are lower than expected for that time of the year, it may mean that many people are selling their animals to buy food, and prices have plummeted as a result.

A higher proportion of people leaving the area to look for casual work may also indicate food shortages. Regular monitoring of these and other indicators can help prepare communities and agencies, giving them enough lead time to prepare appropriate responses.

Local communities can be involved in the design and operation of early warning systems. Some non-government organizations (NGOs) have invested a good deal of time in working with



A community meeting to discuss a drought mitigation scheme. Projects involving local communities have the best chance of success.

communities, who help choose the most appropriate early warning indicators and are responsible for the collection of the data itself. Community members are often in the best position to help analyse the data as they have the deepest knowledge of local conditions. In some places Red Cross or Red Crescent volunteers have also been involved in the collection of early warning data.

IT/Rein Skinner



Hundreds of shelters like this have helped reduce deaths from cyclones in Bangladesh.

Strengthening livelihoods

One of the most important ways of reducing vulnerability is by strengthening livelihoods. Experience has shown that lives and livelihoods are linked inextricably – when livelihoods are at risk, lives are at risk.

In the past, the traditional response to food shortages and famine has been to distribute emergency food aid, aimed solely at saving life. While this is a worthwhile goal in itself, it does not address the underlying causes of the problem.

More enlightened interventions now focus on lives *and* livelihoods. For example, giving a cash grant instead of just food may give people the flexibility and choice to buy food in the market (if available) to protect their lives, and also to replace important assets such as poultry and seed so that they can regenerate their livelihoods.

Preventing famine – recent successes

The southern African drought of 1992 never became the famine that had been predicted and feared. Famine early warning systems alerted agencies to the impending emergency. The aid community was able to respond through projects aimed at strengthening local coping strategies, and

by placing emergency food supplies ahead of need in countries such as Zimbabwe.

In Ghana in 1992, community-based monitoring systems alerted local agencies to an impending famine. Here, the community had been involved in designing the system and analysing the data. The data itself showed escalating grain prices and declining livestock prices. The seriousness of the situation was emphasized further by earlier than normal migration of people to look for casual work in the plantations and gold mines.

Local NGOs were able to respond to the situation by bringing in grain from neighbouring Burkina Faso and giving cash grants to the poorest people in the area. This had the dual impact of offsetting hunger and allowing some rebuilding of livelihoods.

Protection against cyclones

In many countries, communities living near the coast are exposed to cyclones.

Cyclones (also known as hurricanes and typhoons in some parts of the world) are severe tropical storms which occur seasonally.

The most severe are characterized by extremely high winds and massive flood-surges of sea water, resulting in huge loss of life as well as

large-scale destruction of homes and assets. Water supplies become polluted by the seawater, which results in a very high incidence of water-borne disease.

The psychological effect of such tragedies is also great, and trauma and shock add to the difficulties of rebuilding for the future.

Many countries suffer from cyclones. One of the worst affected is Bangladesh, where a combination of poverty and high population density makes a large number of people vulnerable.

However, damage can be limited and life saved through a variety of activities. One is the construction of cyclone shelters in vulnerable areas, where hundreds of families can be secure against the high winds and floods of the cyclone. During the rest of the year the shelters can act as schools and community centres.

The Bangladesh Red Crescent is utilizing its extensive list of volunteers to create community-based first aid teams who tend to victims – medically and psychologically – after disasters. They are also responsible for relaying warning messages to remote communities. In addition to this, longer-term mitigation measures are under way, such as planting trees to act as windbreaks along the coast.

All of these initiatives are helping vulnerable communities get back on their feet, allowing them a better chance of carrying out longer-term development activities.

Hundreds of shelters have been built in Bangladesh since 1970, when half a million people died in a cyclone. This, together with the

establishment of better early warning systems and evacuation plans, is widely credited with the reduction of casualties in recent years. Three quarters of a million people were moved to safety before the cyclone of May 1994, and only 127 people were killed on land. Three years earlier, when a similar cyclone had struck, less than half that number had been evacuated and over 130,000 lost their lives. Even in 1991, the shelters and systems then in place prevented a much greater number of casualties.

Hope for the future

Millions of people around the world are vulnerable to various types of natural hazard but experience has shown that preparedness and mitigation do work and can provide hope for the future. We know that famines *can* be predicted and the effects of drought reduced; the damage caused by cyclones *can* be minimized if preparedness activities are in place.

There is little doubt that disaster preparedness and mitigation are worth investing in.

John Mitchell is Emergency Advisor in the Programme Advisory and Development Department in the International Division of the British Red Cross. He has 12 years experience in disasters (emergencies, preparedness and response) and has worked for a variety of international agencies. He is particularly interested in approaches to relief and development that involve community participation.

The International Decade for Natural Disaster Reduction

by Tony Eades

IT/Janet Boston



Practising an evacuation drill in the Philippines, which is hit by several typhoons each year.

Origins

In the late 1980s, there was increasing international concern about the growing vulnerability of people and property to natural hazards.

As a result of this concern, the United Nations General Assembly passed a resolution in 1989 designating the last decade of the twentieth century as the International Decade for Natural Disaster Reduction (IDNDR). The resolution stated:

The objective of the IDNDR is to reduce through concerted international action, especially in developing countries, the loss of life, property damage and social and economic disruption caused by natural disasters such as earthquakes, windstorms, tsunamis, floods, landslides, volcanic eruptions, wildfires, grasshopper and locust infestation, drought and desertification and other calamities of natural origin.

The General Assembly called on all governments to take appropriate measures and actions during the Decade, and in particular to:

1) formulate national disaster mitigation programmes

- 2) take part in concerted international action to reduce the effects of natural disasters
- 3) establish, where appropriate, national IDNDR committees (in co-operation with the relevant scientific and technological communities)
- 4) encourage support from the public and private sectors
- 5) take measures to increase public awareness of risk and the value of preventative measures

International progress

By 1994, over 150 countries had established national IDNDR focal points or committees which included representatives of governments, disaster 'professionals' and many non-government organizations.

Part of the value of this exercise was the stimulus it provided for all those involved in natural disasters to meet and discuss – often at an international level – the many issues in this highly complex field. This 'networking' has facilitated the transfer of knowledge to those countries and communities most at risk.

In addition, much effort has been put into new scientific and engineering developments. Typical

examples are work on hazard-resistant structures (houses, factories, bridges, flyovers, etc.), and the development of electrical measuring techniques to predict earthquakes.

In 1994 an international conference was held in Yokohama to look at the IDNDR's initial progress and chart a course for the remainder of the Decade. This brought many of the governments and other bodies active in the field together for the first time.

The conference demonstrated how much of the IDNDR's work was shifting from 'rapid-onset' disasters (for example, floods and landslides) to 'slow-onset' disasters (principally drought), more complex multiple disasters involving a range of hazards and causes, and the social consequences of disasters.

The UK's contribution

Britain is prone to a limited range of major natural hazards – in particular, to river and coastal flooding and occasional high winds.

Whilst much scientific and technical work in the UK has been devoted to reducing the threats of these hazards, considerable expertise has been developed in dealing with other types of disaster normally experienced overseas. Consequently, the focus of IDNDR efforts in the UK has been on providing assistance to reduce risks in hazard-prone developing countries.

The UK's immediate response to the UN resolution of 1989 was to set up a Science, Technology and Engineering Committee sponsored by The Royal Society and The Royal Academy of Engineering. In 1993 a National Co-ordination Committee was established, with the same sponsors, together with support from the Government through its aid department, the Overseas Development Administration (ODA), recently renamed the Department for International Development (DFID).

Seven IDNDR working groups have also been formed dealing with specific aspects of disasters, including earthquakes, droughts and windstorms.

The main purpose of all this effort has been to bring experts together, capitalize on their collective knowledge, and help transfer this expertise to those countries and communities that are most at risk. This has been achieved in a number of ways:

Organizing workshops, conferences and seminars

Many such events have been held. Topics covered include mitigating landslide hazard, medicine in the IDNDR, windstorms and the role of remote sensing. A major international conference was organized in 1993 on 'protecting vulnerable communities'.

Publications

There have been a number of publications. The most recent are an 'audit' and directory of UK experts and expertise in all aspects of mitigation and preparedness, and the UK IDNDR newsletter *At Risk* (details of how to obtain these are given on page 23).

Research

From time to time the UK Committee supports research projects. With funding from DFID it is currently backing a major two-year project to improve the effectiveness of forecasts and warnings of disasters in different locations and contexts.

Drought-prone communities in Africa will be among those who benefit from the UK IDNDR Committee's project to improve the effectiveness of forecasts and warnings.





A number of British experts have been working on ways to reduce the risk of disasters in the world's 'megacities' such as Bombay.

Public awareness

Each year a day in October is nominated as IDNDR Day throughout the world. To mark the day in the UK, public meetings and lectures are organized. Each IDNDR Day has a particular theme: in 1996 it was 'Cities at risk from natural disasters'. In 1997 the theme was 'Water: Too much... too little... Make your community safer before disaster strikes.'

In 1998 the theme will be 'Disaster prevention and the media'.

Plans for the future

The main aim of UK IDNDR work until the end of the Decade is to complete the project on forecasts and warnings. The research phase of the project should be completed in 1998, and several meetings and workshops will be held to promote its findings.

The seven working groups will continue with a variety of other networking and information sharing activities. This is complemented by an enormous amount of scientific, engineering, technical and social science work going on behind the scenes, in universities and other organizations.

Tony Eades is Secretary of the UK National Co-ordination Committee for the IDNDR. He manages the Industrial Secondment Scheme of The Royal Academy of Engineering. An economics graduate from Cambridge, he has worked for the Civil Service, Kingston University, the National Economic Development Office and the power industry.

Further information and contacts

Free magazines and newsletters

- *At Risk* is the four-page newsletter of the UK National Co-ordination Committee for the IDNDR. Published twice a year, it contains information about the activities of British agencies in disaster preparedness and mitigation.

For further details, and to obtain a copy, contact The UK National Co-ordination Committee for the IDNDR: the address is on page 24.

- *STOP Disasters*, a magazine published every two months on behalf of the international IDNDR Secretariat, is distributed in 150 countries and is available in several languages. It contains information on new initiatives, events, publications, networks and agencies.

To be put on the mailing list, contact
The IDNDR Secretariat,
c/o International Institute Stop Disasters,
via di Pozzuoli, I 10-80124 Naples, Italy
phone/fax 39-81-570-4665
email armauro@mbox.val.it

Books

The literature on disasters is voluminous and grows rapidly. Here we have selected a handful of books that cover the basics of the subject or contain other generally useful information, and can be read by non-specialists and experts alike.

- *At Risk: Natural hazards, people's vulnerability, and disasters* by Piers Blaikie, Terry Cannon, Ian Davis and Ben Wisner. Routledge, London, 1994. 284pp. Pbk. £16.99. ISBN 0 415 08477 6. A comprehensive study of natural disasters and what makes people vulnerable to them. The definitive text on the subject and well worth buying.
- *World Disasters Report 1997* edited by Nick Cater and Peter Walker. International Federation of Red Cross and Red Crescent Societies/Oxford University Press, Oxford, 1997. Pbk. £15.99. ISBN 0 19 829290 2. Now in its fifth year, the Red Cross's annual report on disasters and their impact contains a wealth of statistical information and discussion about disasters' impact and methods of countering them. A new report will be published in 1998.

- *Disaster Mitigation: a community based approach* by Andrew Maskrey. Oxfam, Oxford, 1989. 110pp. Pbk. £6.95. ISBN 0 85598 123 7. A thought-provoking book that looks at how people become vulnerable, and demonstrates the effectiveness of community-based approaches. Several good case studies illustrate the main arguments.
- *Disaster Mitigation, Preparedness and Response: An audit of UK assets* by David Sanderson, Ian Davis, John Twigg and Belinda Cowden. Oxford Centre for Disaster Studies/IT Publications, 1995. 144pp. Pbk. £12.50. ISBN 1 85339 331 2. Details of networks, training courses, information sources, donors, agencies and individuals working on different aspects of disasters, with an overview of UK-based capacity in this field. An improved second edition is due to be published in 1999.

All of these titles are in print and should be available from good academic/development bookshops. They can be obtained from the IT Bookshop, a specialist development bookshop which also supplies books by mail order:

103-5 Southampton Row,
London WC1B 4HH
phone 0171-436-9761
fax 0171-436-2013
email itpubs@itpubs.org.uk
URL <http://www.oneworld.org/itdg/publications>

The best introduction to and survey of this theme is now sadly out of print but it may be possible to find copies in libraries. It is *Natural Disasters: acts of God or acts of Man?* by Anders Wijkman and Lloyd Timberlake, published in 1984 by Earthscan and the International Institute for Environment and Development (ISBN 0 905347 54 4). As its title suggests, it looks at the human factors that increase vulnerability to disasters, and it is easily the most readable book on the subject.

IDNDR contacts

International

The IDNDR Secretariat in Geneva produces a considerable amount of information for the public on disasters and how to protect against them. For further details of its work and the materials that are available, contact:

Ms Natalie Domeisen, Promotion Officer,
IDNDR Secretariat, Palais des Nations,
CH-1211 Geneva 10
phone +41-22-798-6894
fax +41-22-733-8695
email idndr@dha.unicc.org
URL <http://hoshi.cic.sfu.ca/~idndr>

UK

The UK Committee can provide more information on activities in this country in support of the IDNDR. Contact:

Tony Eades,
Secretary of the UK National Co-ordination
Committee for the IDNDR,
The Royal Academy of Engineering,
29 Great Peter Street, London SW1P 3LW
phone 0171-222-2688
fax 0171-222-0054
email eades@raeng.co.uk
URL <http://www.oneworld.org/idndr>

Produced for, and sponsored by,



**The UK National
Co-ordination Committee
for the International Decade for
Natural Disaster Reduction (IDNDR)**

The production of this booklet was an initiative of the UK National Co-ordination Committee's Working Group on the Application and Implementation of Risk Reduction Measures.

Edited by John Twigg, Oxford Centre for Disaster Studies. Tel: 01865-202772

Typesetting by *My Word!*. Tel: 01788-571294

Printed by Neil Terry Printing. Tel: 01788-568000

Most of the photographs reproduced in this booklet were supplied by the Photographic Library at Intermediate Technology. Tel: 01788-661100
