▼ JAMES P. BRUCE

DISASTERS, DEVELOPMENT, AND ENVIRONMENT

In developed and developing countries alike, disaster proofing will require concerted efforts in this International Decade for Natural Disaster Reduction, and beyond.

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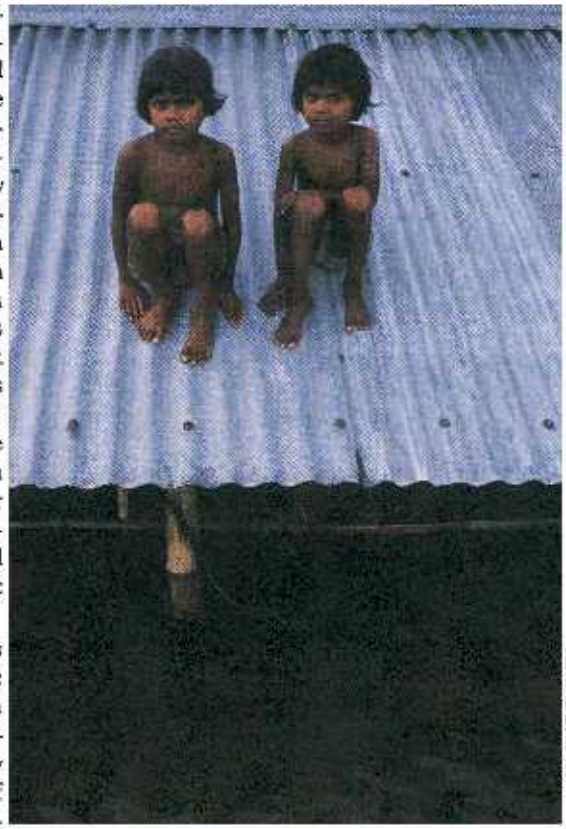
For many of the world's countries, achieving sustainable development requires a concerted effort to reduce losses from natural disasters. While the rapidly rising toll of economic losses from disasters has recently been fuelled by major storms and floods in Europe and the United States, both human and property losses have been far more devastating for developing countries.

The relatively larger burden imposed by natural disasters on developing countries is illustrated by data from the Centre for Research on Epidemiology of Disasters, Brussels (CRED). They show that the chance of an individual being affected by a natural disaster is as much as 500 times greater in some poor countries (GNP/capita < $500) as it is in developed countries (GNP/capita > $10,000) Figures 1 and 2 show the enormous difference in numbers of disaster deaths for African countries at low, medium, and high stages of economic development.



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Time after time, years of hard-won economic development have been wiped out by a major natural disaster We need only recall the experiences of Bangladesh, the Philippines, and other vulnerable countries to recall how devastating and discouraging this sequence of events can be.

Economic losses from natural disasters

In a press release issued in April 1993, Munich Reinsurance estimated total direct losses from natural disasters at over US$60 billion for 1992 In 1993, record-breaking floods in India, Europe, and America, a severe earthquake in India, and frequent cyclones in the Southwest Pacific and Japan may well add up to losses that challenge the figure for the previous year. But in constant dollar amounts, the 1992 rate of destruction was some 10 times higher than average annual losses in the 1960s. Indeed, the period from 1986 to 1993 has seen far more devastating disasters than the previous three decades, the period for which reliable records are available.

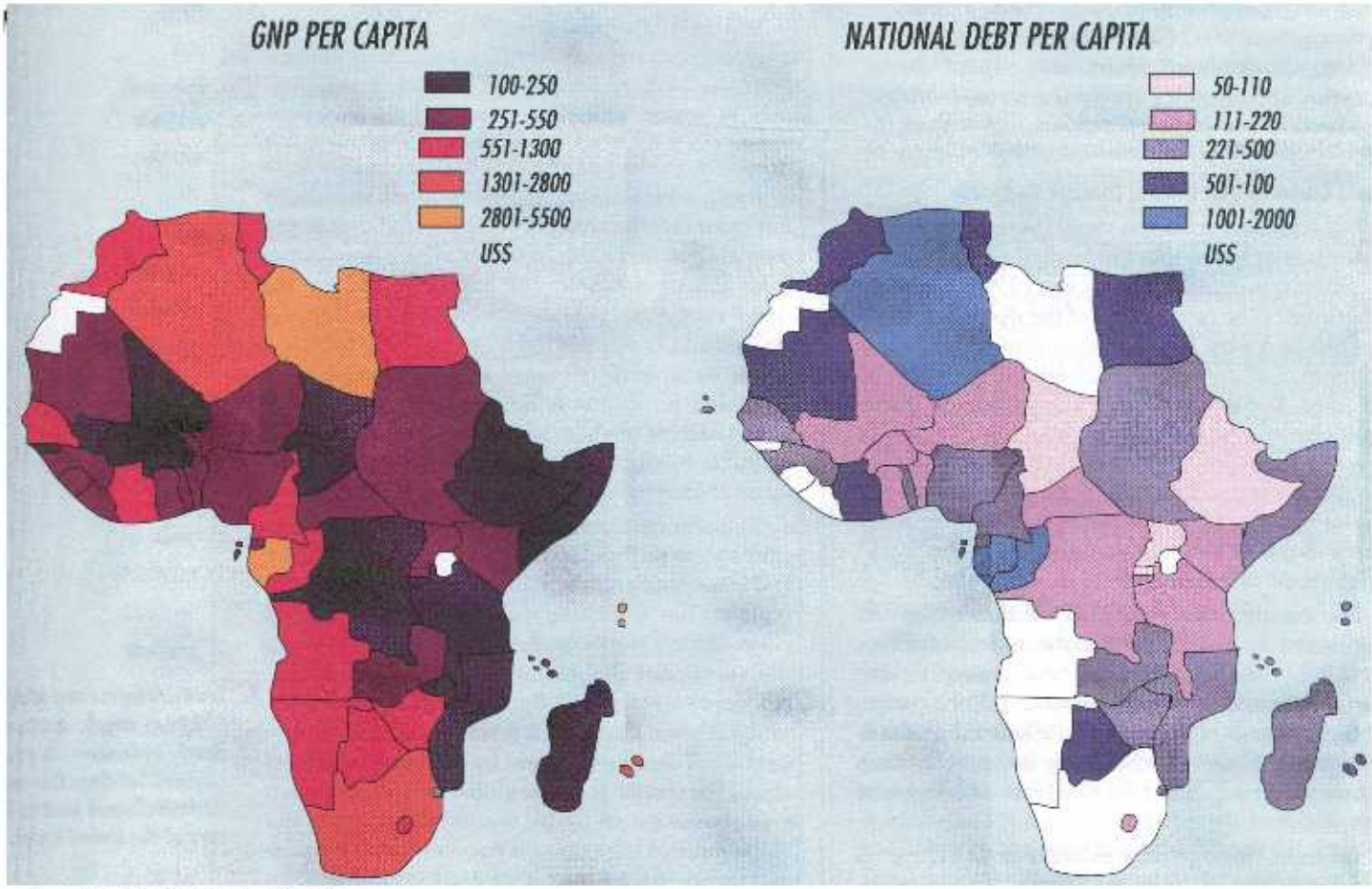
Human losses

As an index of human suffering, loss of life in proportion to total population for the 26 most affected countries from 1986 to July 1993 is shown in Figure 3. By this criterion, Peru, Bangladesh, Honduras, Guatemala, Iran, Chile, Nicaragua, Columbia, Solomon Islands, Ecuador, Vanuatu, and the Philippines are the most vulnerable dozen Over the past two decades in Latin America, the ratio of deaths to numbers of people injured in a disaster has been 3 to 800 Clearly, the enormous toll of human suffering caused by natural disasters is greatly understated by noting only the number of deaths.

About 95 per cent of disaster-related deaths occur among the two thirds of the world's population who occupy developing countries. note Burton et al in *The Environment as Hazard* (Oxford University Press). The trend in earthquake vulnerability illustrates the relative increase in exposure of developing countries. In the first half of this century, 70 per cent of 700,000 earthquake fatalities were in developing countries — a figure that rose to 99 per cent for the period from 1950 to 1992. Earthquake-resistant construction has saved many lives in developed countries, and could do so as well in developing regions at little extra cost.

Nevertheless, the threat of really devastating

Figure 1
ECONOMIC
INIDICATIONS-AFRICA



Source World Health Organization, Addis Ababa

earthquakes remains in industrially advanced countries. For example, the National Land Agency in Japan estimates that an earthquake of similar magnitude and location to that of 1923 would kill or injure 650,000 people in Tokyo if it were to occur tomorrow. Similarly, an earthquake of magnitude 6.5 in the Strait of Georgia could cause as much as $32 billion in damage in Vancouver, according to Munich Reinsurance of Canada. So while developed countries have achieved a great deal in disaster proofing, further efforts are needed there as well as in the much more vulnerable developing countries.

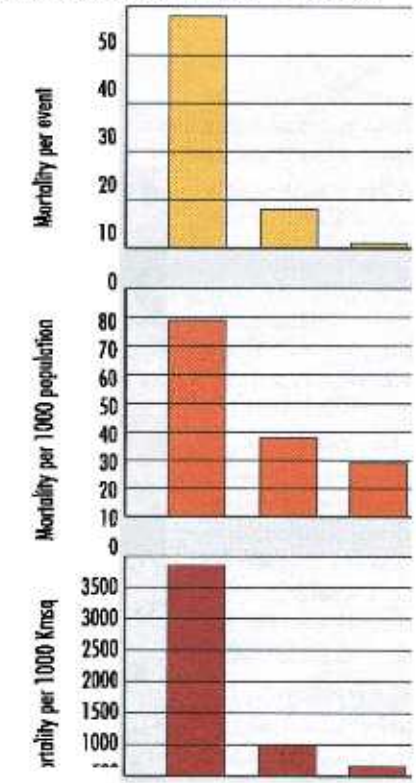
However, the fatalism that has long attended these natural hazards — floods, droughts, earthquakes, volcanic erupitons, tropical storms, and storm surges from the sea — is gradually giving way to a determination to take steps to reduce losses and human suffering. Minor structural adjustments to many buildings in the Caribbean and Asia would preserve them during earthquakes and tropical cyclones The use of strengthening straw in adobe-housing material would have saved homes and lives in a recent minor earthquake in Guatemala. Think of the thousands of lives that were saved in the Philippines with timely warnings of the Mount Pinatubo eruption. With more reliable tropical storm warning and a better shelter system, hundresds of thousands of lives could be saved in Bangladesh and elsewhere in the tropics. Appropiate flood-plain zoning, construction rules, and flood warning systems could help reduce flood losses by a large percentage. It has been demonstrated that people can overcome even severe drought conditions by using drought preparedness procedures; these procedures should be adopted much more widely.

International Decade for Natural Disaster Reduction

In the late 1980s, the UN General Assembly recognized the huge and rapidly rising toll of disasters and the positive steps that can be taken to reduce losses, both human and economic, by designating the 1990s as the International Decade for Natural Disaster Reduction (IDNDR). This decade is to be a period of concentrated effort to reduce disaster losses in all countries, but especially in highly vulnerable developing regions. In the early years of the decade, targets have been established to guide national efforts; 120 national committees or focal points have been designated; regional programs have been initiated; the scientific and engineering community has been

Figure 2

DISASTER MORTALITY IN RELATION TO DEVELOPMENT STATUS — AFRICA



mobilized to improve disaster mitigation techniques and warning systems; and extensive training programs have been launched. Some developing countries have taken action to incorporate disaster loss reduction measures into their national development plans, and several donor countries and agencies are taking steps to ensure that development projects reduce, rather than increase, vulnerability to natural hazards.

World Conference on Natural Disaster Reduction

But it is clear from the rapid increase in worldwide disaster losses that the level of effort in disaster mitigation expended in the early 1990s is grossly inadequate. The second half of the decade must be marked by a very large shift in attitude and commitment of all countries if IDNDR targets are to be achieved. The World Conference on Natural Disaster Reduction, to be held in Yokohama, Japan, in May 1994, can provide that critical turning point in the world's commitment to achieve enormous potential benefits from measures to reduce disaster losses. Some of the technical themes of the World Conference will demonstrate this potential.

For example, the session on safer buildings will emphasize the truism that "Earthquakes and storms don't kill - collapsing buildings do." Scientific and engineering techniques developed in Peru, India, Canada, and elsewhere will show how inexpensive changes in home and building design can keep people safe from all but the most rare and severe of hazards.

Drought management guidelines, building on the experience of India and some African countries, will show how science has made reliable drought warnings more feasible, and how such forewarnings can be turned to enormous advantage in reducing human suffering and economic losses due to drought. Even without good warnings, a great deal can be done to reduce drought impact.

The state of the art in flood, storm, and volcanic eruption warnings, as well as ways to use these warnings to minimize loss of life and property damage, will also be featured.

Other sessions will deal with especially vulnerable communities (such as small islands), the interrelationships between technological and natural disasters, the economics of disaster loss reduction measures and the role of the private sector, and regional co-operation for reducing disaster losses.

These sessions will be in addition to a stock-taking, by country and region, of progress in disaster mitigation, and the development of an effective program for the second half of the decade.

The environmental connection

But as a component of ensuring sustainable development, natural disaster reduction can be frustrated by environmental degradation, which in turn is often linked to poverty. In areas of overgrazing or removal of woody vegetation for firewood, the loss of ground cover inevitably leads to more severe floods, droughts, and landslides. For example, the citizens of Delhi, India, need 612 tons of firewood a day, much of which now comes from forests as far as 700 kilometres away. The removal of protective vegetation from the slopes of watersheds is not confined to regions where it is driven by poverty. In many basins in countries well advanced in economic development, denudation of watersheds has been all too prevalent in the 20th century, turning natural hazards such as heavy rains or excessive dry spells into serious disasters.

The observed small rise in sea level over the past century, as well as land subsidence due to natural and man-made causes in many critical coastal regions, has increased coastal losses due to cyclone-driven storm surges and tsunamis. Projections of climate change due to increased greenhouse gas concentrations in the atmosphere indicate a much higher rate of sea level rise in the coming century. These projections, by mathematical models, of the response of the global climate system to greenhouse gas radiative forcing also suggest that some natural hazards will become more frequent and severe in the future. One early indicator is that in many regions rainfall would increase, but not the number of rain days; thus heavier rains could produce more frequent floods. As well, storm frequency in Western Europe may well increase; droughts in tropical regions associated with the El Niño-Southern Oscillation phenomenon could be more intense; and other forms of climate extremes could be more frequent and severe.

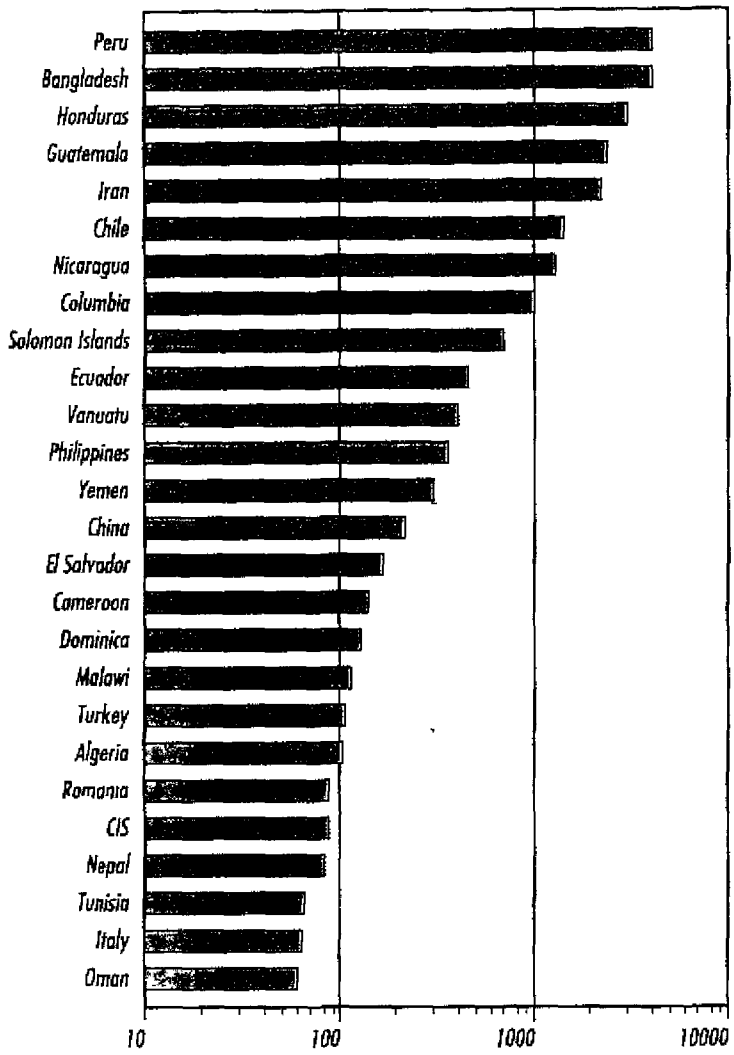
Economic losses caused by the 1994 Los Angeles earthquake clearly underscore the need to conceive buildings that can withstand earth tremors in this part of the United States.

Les pertes économiques causées par le tremblement de terre de Los Angeles de 1994 mettent en évidence le besoin de concevoir des infrastructures à l'épreuve des secousses sismiques dans cette partie des États-Unis.

Figure 3

DISASTER MORTALITY IN DEVELOPING COUNTRIES

DEATH TOLL/MILLION POPULATION, 1968-1993



The climatic records of the past decade are consistent with these model projections, but we do not have long enough records of climate extremes to be able to attribute part of the much greater storm, flood, and drought losses of recent years to greenhouse gas-induced changes with any confidence.

Rapidly growing disaster losses are largely due to economic development patterns over the past century. More than half the world's population now lives within 60 kilometres of the ocean coast. Coastal regions are especially susceptible to storms, storm surges, and floods at mouths of rivers. The sheer numbers of people exploiting coastal areas in turn reduce protective vegetation and corals, and this environmental degradation in turn increases disaster vulnerability. In short, while environmental changes have undoubtedly affected the severity and frequency of hazards, the largest share of the increased losses must be attributed to rapidly increasing population and human activity in coastal and volcanic zones and in earthquake-, flood-, and drought-prone areas.

Action needed by all countries

The need to interrupt the cycle of poverty, in which increased development in hazardous areas leads to environmental degradation, which in turn leads to increased disaster losses and back to increased poverty, was recognized at the Earth Summit in Rio in 1992. It was also the driving force behind the UN General Assembly's designation of the 1990s as the International Decade for Natural Disaster Reduction. Low-cost prevention and preparedness measures to reduce disaster losses have proven increasingly successful, and are essential to ensure that development is sustainable. The challenge of the next five years of the IDNDR is to deliver this message forcefully, and to have it acted upon in all countries. ■

SUMMARY

A concerted effort to reduce losses from natural disasters is needed if many of the world's countries are to have any hope of achieving sustainable development. Inhabitants of developing countries are up to 500 times more likely to be affected by a natural disaster than residents of developed countries; years of hard-won economic development can be wiped out almost instantly by a major natural disaster.

About 95 per cent of disaster-related deaths occur in developing countries worldwide. Economic losses in the 90's are at record high levels.

However, the threat of devastating earthquakes still remains in industrially advanced countries. The fatalism that has long attended natural hazards such as floods, earthquakes, and volcanic eruptions is gradually giving way to a determination to take steps to reduce losses and human suffering.

The International Decade for Natural Disaster Reduction (IDNDR) provides an opportunity to plan for disaster loss reduction in all countries, and especially in highly vulnerable developing regions. The World Conference on Natural Disaster Reduction to be held in Japan this May will be a critical turning point in the world commitment to achieve the enormous potential benefits of disaster loss prevention measures.

RÉSUMÉ

Un effort concerté est nécessaire pour réduire les pertes consécutives aux désastres naturels, si plusieurs pays du monde ont encore espoir d'atteindre à un développement viable. La population des pays en développeent court 500 fois plus de risques d'être affectée par un désastre naturel que celle des pays développés. Des années de laborieux efforts économiques de développement peuvent être anéanties presque instantanément par une importante catastrophe naturelle

Environ 95 % des mortalités dues à ces désastres surviennent dans les pays en développement. Nous devrions nous pencher non seulement sur le nombre de mortalités, mias également sur la proportion de blessés suite à ceux-ci.

La menace de tremblements de terre dévastateurs continuent néanmoins à planer sur les sociétés industrialisées. Le fatalisme qui a longtemps accueilli ces «actes de Dieu» comme les inondations, tremblements de terre, et éruptions volcaniques, fait lentement place à une détermination à prendre des mesures pour réduire les pertes et les souffrances humaines.

La Décennie internationale de la prévention des catastrophes naturelles (DIPCN) fournit l'occasion de planifier la réduction des pertes suivant les désastres dans tous les pays, mais spécialement dans les régions les plus vulnérables du monde en développement. La Conférence mondiale sur la prévention des désastres naturels, devant se tenir au Japon au mois de mai, constituera un point tournant de l'engagement mondial pour atteindre les énormes bénéfices potentiels retirés des mesures de prévention.