Comprehensive Analysis of Vulnerability to Natural Disaster: The Socio-Economic Component

(5500 words)

ABSTRACT February 1978

Large disasters are clearly eligible for international news coverage. Small ones are not, and large numbers of people killed are what makes a large disaster and what makes it newsworthy in the international scene. Although losses from a series of "small" disasters may accrue to more than those in a "large"disaster, it is only the few large ones we will read about in the international press and not the many more small ones. Our view of disaster occurrence has, therefore, become restricted and our understanding of their cause and effect correspondingly limited.

The two million made homeless in the Andhra Pradesh cyclone represent one-third of one per cent of India's total population of 550 million or 4.5% of the population of Andhra Pradesh. One million people were made homeless by the earthquake in Guatemala - one-fifth of the total population. The total population of Fiji, at 564,000, is about half the number made homeless in Guatemala. But in 1972 Hurricane Bebe caused 22% of Fiji's population to be made homeless - more than one-fifth of her total population. A larger national disaster, but less of an impact on international news because fewer people were involved. It is no coincidence that attempts at comprehensive preplanning strategies (as distinct from contingency plans) have been initiated by island countries, groups of islands or regional groups of island countries. A study of the special problems of the very small developing countries has stated that "the effects of a natural disaster on a small island can be overwhelming. In a large country, when a natural disaster strikes, it will normally affect only a part of the country, and resources will be available from other areas to help to make good the damage and economic loss. The whole of a small island may, however, be so affected".

Economic development, as it has come to be established and understood, aims to raise the socio-economic status. By making more readily available resources for emergency use, by increasing the capacity & facility for their distribution, by facilitating warning systems and improved communication, by permitting official or voluntary evacuation; in short, by increasing resources, awareness, options and mobility, socio-economic status is the key to improved strategies for disaster mitigation. Disaster preparedness is, therefore, a direct result of the normal development process. Disaster prevention, on the other hand, is a policy undertaking which must be recognised as an integral part of development programmes. Socio-economic status is, therefore, the key to protection, by removal of conditions which invite disaster and by the creation of capacity to absorb, ameliorate and recouperate.

If vulnerability to disaster could be analysed and assessed in specific locations, and if that analysis were able to take account of economic and social factors, as well as environmental ones, the results of such a study could be made to become the basis for comprehensive programmes of precautionary planning which would take into account both the need to reduce, by long term strategies, continuation of accrued vulnerability and the need to strengthen and assist existing resources for mitigation of eventual impact. Moreover, field analysis could automatically identify areas of specific vulnerability and reasons for its creation which it may then be possible to reduce or remove. Vulnerability is made up of environmental risk and experience of that risk by people. People experiencing risk are in a state of hazard, they are vulnerable. The degree of vulnerability is determined both by the degree of risk and by the justaposition, and concentration of people. Risk can be identified on the one hand. People's exposure to it creates a need according to their resources available for countering that risk.

How can a methodology for comprehensive vulnerability analysis be devised to take into account social and economic factors as well as environmental ones? What are "social and economic factors"? Moreover, how can they be recognised and assessed in the field and at local levels? The construction of a methodology is now part of continuing research and field-testing and reference to study of socio-economic factors as a potential component of vulnerability has provided some useful material from which a number of interesting conclusions can already be made. Theoretical analysis would suggest that it is general or overall socio-economic status that is the primary factor of vulnerability. Within that status, however, there are elements which have a bearing on secondary vulnerability and preparedness infrastructure. How, therefore, can overall socio-economic status be identified? What are the indicators of socio-economic status that can be recognised and assessed in the field as significant contributory factors to vulnerability.

Whilst GNP per capita may be the best single national indicator of difference in socio-economic status, it has to be supplemented by others; such as average expectation of life at birth, energy consumption per head, average literacy and provision of durable consumer goods (distribution of passenger motor vehicles). Alternative "non-monetary" indicators have been proposed where GNP estimates have not been available. Table One shows a selection of those national indicators with more obvious social significance (those with economic emphasis having been excluded for these purposes).

A report by the United Nations Research Institute for Social Development of a programme which was established to measure real development progress at the local level in developing countries states that "At the village level, . . . one can find real data, without extensive income or expenditure surveys that describe aspects of distribution (of) development."

Table Two shows the considerable range of proposed indicators of development, their appearance, disappearance, depletion or enlargement over time being the proposed measurement of progress. Their presence at any particular time being the indicator of socio-economic status at that time. For cases where communities are so small or rural for these indicators to be directly relevant, the subsidiary list of "distance to the nearest" indicator will become applicable. Indicators have been grouped as communal or domestic indicators; and in some cases have been repeated to serve both headings. Thus we now have national indicators, (which could be made to apply regionally if required to do so) communal indicators, and domestic indicators, for use according to the scale of vulnerability analysis and assessment to be assessed. Not all indicators will be applicable to any one location; some will appear to duplicate and replicate others, but all will serve for inclusion on check-sheets for vulnerability analysis field surveys.

The extreme irrelevance of some indicators to the subject to which this paper is addressed, disaster, is significant in its emphasis of the total overall state of socio-economic development that the study so far has sought to identify. What will also be obvious to specialists in disaster mitigation, however, is that many of the components of the socio-economic condition and many of the indicators themselves, will have a direct bearing, by their presence or absence, on the vulnerability of a community. Indicators are, in many cases, resources. By recognition of resources in the field so an indicator is identified and serves as a contributory factor towards overall assessment. The most significant case is in building construction. The construction of dwellings is not only an indicator of socio-economic development, it has a direct bearing on what impact the environmental factor of vulnerability will have. It becomes a factor in its own right not simply a contributory indicator.

Infrastructure for preparedness has been identified as being essentially resources and facility for logistic communication, radio and telephone communication, the provision of ambulances and fire-fighting equipment, landing facilities for boats and planes and hospital and medical facilities. The extremely close relationship between these aspects of preparedness, as a contributory element of vulnerability reduction, and field indicators of socio-economic status, is obvious. Indigenous resources have been recognised as a valuable constituent for disaster relief, and a working method for their pre-coordination and consequent effective deployment and therefore preparedness, was developed. The extremely close relationship between these resources as elements of one aspect of preparedness, and field indicators of socio-economic status (Table Two) is again obvious.

Whilst the indicators in Table Two are of overall socio-economic status and, as such, represent a factor of primary vulnerability; the opportunity can now be taken to extract those field indicators which have the greatest bearing on secondary vulnerability as well. These will be the elements of a "preparedness infrastructure" and are shown in Table Three - again under communal and domestic headings.

The relationship between development and both strategies for prevention and strategies for preparedness can now be seen. The difference between those aspects of strategy is, however, that, on the one hand, the relationship between the elements of preparedness and development is coincidental requiring only coordination between the products of the development process, the infrastructure of preparedness and the formulation of preparedness strategies. On the other hand, however, the relationship between prevention and development requires not only resources, either indigenous or from external aid, but also integration with preventive strategies from within the development process.

The inclusion of the socio-economic factors in the field assessment of vulnerability to natural disaster is clearly of paramount significance. By its inclusion it will become possible to:

a) analyse the direct vulnerability of people, and not simply the land they occupy,

b) recognise vulnerability as a changing state,

c) provide the medium for the monitoring of that change,

d) recognise and assess the potential in the development process for the long-term reduction of vulnerability,

e) recognise and assess the potential in the results of development for the provision and reinforcement of resources for preparedness infrastructure,

f) provide the basis for assessments of potential economic and social losses,

g) provide the basis for assessments of social needs,

h) provide the basis for assessments of locally available resources.

Whilst traditional international disaster relief can be mobilised by metropolitan governments and intergovernmental and non-governmental agencies from outside the stricken country, usually for large disasters, programmes for disaster mitigation must be initiated and mobilised from within each vulnerable country, region and community, albeit with external assistance, and become immediately applicable to frequent small disasters as well as for occasional large ones. Comprehensive vulnerability analysis will be at the commencement of the method for this strategy; and planned development programmes will be the medium for its implementation.