Disaster Prevention and Management: A Geographical Perspective
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Geography and Disaster Prevention and Management

Today, 75 percent of the world’s population lives in areas affected at least once by earthquake, tropical cyclone, flood or drought between 1980 and 2000. 85 percent of the people exposed to natural disasters live in countries having either medium or low human development. The annual economic losses associated with such disasters averaged US$ 213.9 billion in the 1980s and US$ 659.9 billion in the 1990s. To some extent, rush for ‘development’ of countries having either medium or low human development is generating new disaster risks since most development policy and programming are not explicitly configured for risk reduction. Recently, multifarious and frequently occurred natural disasters have brought about massive economic and life losses to the affected regions and hindered the regional socio-economic development. Preventing and managing disaster situations effectively and ensuring sustainable regional development have attracted growing concerns of academic institutions as well as different levels of government. Does geography matter? What can the geographers do for these? In fact, geographers have had a longstanding role to play in understanding the full range of crises brought on through interactions of natural and social systems and the discipline is generally recognized as one of the founding disciplines of hazard as a field of study.

Geography, the science of place and space, has two main branches: human geography and physical geography. Human geography is concerned with the spatial aspects of human existence and physical geographers study patterns of climates, land forms, vegetation, soils and water (http://communicate.aag.org/seresies/scriptcontent/custom/gwis/cguide/explore_whatisgeog.cfm). In addition, geography is unique in bridging the social sciences (human geography) with the natural sciences (physical geography) (http://www.legs.org/GeographyToday/What+is+geography.htm) i.e. a discipline serves as an effective bridge between the physical and cultural worlds. Studying the linkages between human activity and natural systems, i.e., human-environment interactions, is one of the most important tasks of geographical research. That is to explain how people are shaped by their environment and how people also shape their environment. Sometimes, these interactions could be a singular event or a series of smaller events, but which may cause a more dramatic change over time.

In the aspect of disaster prevention and management, more attentions should be paid to the spatial features of disasters. Actually, disasters are inherently spatial-both in terms of the physical processes as well as the human implications. Hurricane tracks, the location of fault lines, how tornadoes are generated-these are patterns or processes that have or leave spatial footprints; where people live in relation to potential hazards or the societal impact left after a disaster can again be described in terms of spatial patterns. Within these patterns are human places, cultures and interactions. A disaster-devastated place is not just a landscape of damage, morbidity and mortality, but it also comprises lost (and recovering) neighborhoods, disrupted social networks, variations in resiliency and social and environmental (in)justice. To map, predict and ultimately understand these landscapes, geography characterized by its regional and integrative research methods can play an important role. Geographic methods have strong capacity to draw theories and empirical findings from other disciplines and mould them with a spatial perspective to explain, or to predict, the distributions and relationships of phenomena related to disaster prevention and management.

All of us are living on disaster prone areas, may be of different natures, types and intensities and the interesting fact is that disasters vary in terms of nature, type and intensity as per the geographical locations (http://www.i4doonline.net/aug05/disaster.pdf). Geography is a discipline, in principle, that should be most able to meet the demands for disaster prevention and management, an issue concerning space, time, environment, society and development.

Role of Geography in Disaster Prevention and Management
Assessing Human-created Vulnerability: To a great extent, disasters result from human-created vulnerability which is a consequence of our interacting with the environment by some human activities concerning rapid industrialization and urbanization such as designing and locating our infrastructure, exploiting natural resources, concentrating our population and so on. This distinction is well understood in the hazards community, increasingly so in government and non-government organizations, but generally poorly recognized by the general public. The methods of human geography research and geographic information system (GIS) are widely applied to vulnerability assessments aiming at disaster prevention and management. For example, the research focusing on social geography and disaster vulnerability in Tokyo demonstrates

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a well-marked spatial distribution of one of Tokyo’s social groups (elderly people) and often close relationship between that pattern and a geographical indicator of vulnerability to earthquakes (wooden housing) and suggests that some social groups and some areas of Tokyo are more vulnerable to earthquake disaster than others. Similarly, a model of social vulnerability among one marginalized group was developed to improve disaster planning and management among the homeless and other ‘special needs’ groups in megacities at risk throughout the world. In addition, there are also some researches concerning GIS-based integrated assessments of populations’ vulnerabilities for famine, agricultural drought vulnerability and economic vulnerability of households.

Dealing with Technical Disaster: The development processes of rapid industrialization and urbanization in developing countries usually bring about technological (or anthropogenic) disaster due to lacking adequate or effective countermeasures for risk reduction. In this field, geographical research mainly focuses on how to deal with the distribution and removal of poisonous waste (e.g. heavy metal) and their proximity to other land use, such as residential areas and farmland. Some researches include: assessing the concentration of potentially harmful heavy metals in the soil in order to evaluate the potential risks to residents and tourists; studying the distribution of trace metals in surface soils to assess the soil environmental quality; assessing soil heavy metal contamination and potential risk for human; heavy metals in soils and crops and related public health risk and environmental remediation related to heavy metal pollution.

Developing Disaster Monitoring and Simulation Systems: Remote sensing, GIS and related technologies have been utilized to provide real-time value-added data and information to authorities in areas of natural resources and environmental management and the role of GIS technologies in detecting, modeling and monitoring natural hazards is special. By using simulation system and technology, the simulation systems for major natural disasters and their emergency plans can be constructed according to the possibility of the occurrence of natural disasters and the principle of history recurrence. Taking advantage of 3S technology and network information management system, major natural disasters monitoring and situations assessment system and regional disasters reduction capacity assessment system can be established to prevent and manage diversified disasters.

Post-Disaster Recovery and Reconstruction: It is necessary for local post-disaster recovery plans to elicit positive recovery outcomes that the plans include a sound participatory process and establish a nexus between local needs and policy objectives. The above-mentioned discipline characteristics of geography show that the discipline has special advantages in this kind of plan. For example, the geographers in China played a vital role in the State Overall Planning for the Post-Earthquake Restoration and Reconstruction of Wenchuan (2008.05.12, M8.0) and Yushu (2010.04.14, M7.1). Resources and environment carrying capacity evaluation issued by Chinese Academy of Sciences is a significant part of the State Planning for Post-Wenchuan Earthquake Restoration and Reconstruction as well as that for Post-Yushu Earthquake. In addition, Atlas of Regional Eco-environment in Yushu Earthquake Affected Area issued by Chinese Academy of Sciences also exerted important role in the post-Yushu earthquake restoration and reconstruction.

Future

Since geographic work has been readily applicable to policy making needs, short-term decision making supported by the geographers and the geographic work are also important besides long-term planning. Equal importance should be given to both the guidance for the direction policies and specific recommendations concerning disaster prevention and management.

In many ways geography is quintessentially interdisciplinary. Undoubtedly, more concerns with the intersection of socio-economic, physical and technological and political/legal systems and more sharing areas of interest, knowledge and methods with many other fields of study, will make geography more powerful in the aspects of disaster prevention and management.

References


Natural Disaster Mitigation in India

The Indian subcontinent has a highly diversified range of natural features. The Himalayas, which are the young fold mountain and where the phenomena of stress release is very common together with the uncertain monsoon winds make the region highly prone to natural disasters. The region being the most populous in the world further adds to the damage caused by the natural disasters.

Drought, Floods, Cyclones, landslides and Earthquake are the major types of disaster phenomena occurring in the region. Almost all parts of India experience one or more of these disasters. Based on the frequency of occurrence and vulnerability to natural disasters, the entire country may be classified into three broad categories. The first is the Himalayan region spreading over 500000 square km. This region is prone mainly to Earthquakes, Landslides, Avalanche and Bush fire. The second category is the north and central Indian Plains. The region is having some great river systems and a rich source of water for drinking and irrigation. However, these rivers, during the monsoon period usually carry water in excess to their capacity causing flood phenomena. The same region also experiences droughts when the rainfall is less. The third category is the great coastline of India which is prone to devastating cyclonic winds emerging in the oceans. (Sources: http://nrdms.gov.in/natural_disaster.asp)