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Introduction to

Disaster Management

Satish Modh

PREFACE

Disaster management essentially deals with management of resources and information towards a disastrous event and is measured by how efficiently, effectively and seamlessly one coordinates these resources. The ability to effectively deal with disasters has become a challenge to modern technology.

It is apparent that disaster problems cut across various disciplinary lines. One cannot effectively address disaster management difficulties by focusing on the isolated problems of a single type. Effective disaster management is influenced by the activities of a host of independent organisations at national and inter-national level.

A book to teach disaster management would accomplish very little unless a broad spectrum of knowledge is imparted regarding effects of various types of disasters, their dimensions and characteristics, the role of United Nations in complex emergencies and the role of Indian government in prevention and control of disasters. Equally important is the knowledge about various international and national agencies involved in disaster relief and humanitarian assistance.

Disaster management at the individual and organisational level deals with issues of planning, coordination, communication and risk assessment. Accordingly, this book also covers these subjects to enhance their ability for better disaster response.

For the most part, the case studies in this book deal with various disasters to promote discussion on issues of disaster and development, national policies on disaster management across the world and problems in disaster management. The conclusions of these case studies must be interpreted with caution; because, actual disaster situations always brings surprises and are unpredictable.

This book has been divided into three sections, namely, Disaster and Development; Disaster Prevention and Control; and Disaster Risk Analysis and Management. Relevant cases on the subject have been given at the end of each sections.

An effort has been made to cover the subject according to the syllabus of couple of Indian Universities who have taken lead in introducing the Masters' Degree level course on disaster management. I hope that the content of the book meets the requirement of these 'would be' disaster professionals.

Disaster impact is often expressed in terms of the numbers of dead and injured and loss of property and resources. Therefore, the purpose of this book will be served if in the end it helps to minimize the economic losses and reduce injuries and death to the affected population.

Satish Modh

ACKNOWLEDGMENTS

Disaster Management is a new subject for institutions and universities in India. There is scarcity of textbooks which cover the syllabus in a systematic manner. Macmillan India has taken initiative in bridging this gap. I would like to acknowledge my deep appreciation for their effort to fulfil the demand of students and professionals of disaster management.

I have gone through various newspaper articles, books, Internet sites and other literature to collect information for this textbook. Some such books and Internet sites have been listed as further readings. Many other sources do not find mention here. I would like to thank all such named and unnamed sources that have helped me in understanding the subject. I would like to express my gratefulness to all of them.

My first lecture on disaster management was organised by Bombay Management Association (BMA), Western Centre just after I returned from my study tour of Gujarat Earthquake in 2001. I would like to thank BMA for initiating me into this long journey. Over the last 5 to 6 years during which time this book developed, there were many who helped and guided me with a sense of service to the society. I would like to thank all those who collaborated with me in conducting training sessions, organising lectures and discussion groups and interaction with volunteers.

I would like to thank Dr Yashavant Pathak who inspired me to visit Gujarat disaster zone, which changed my way of looking at a disaster. I also thank my fellow travellers Mr Ratan Sharda and Mr Ashok Motwani who helped me writing the report of our visit. I would also like to thank Mr Pradeep Malu who brought out my first booklet on disaster preparedness and Mr Vasant Tambe who published my second book in Hindi for trainers and volunteers. All these undertakings encouraged me to continue my labours in accumulating more relevant information for disaster mitigation.

I would like to express my gratitude to my family who cooperated with me while I was writing the book. I would like to show my appreciation towards my young children Ketan and Ria who had to forego important sessions of computer games while I was using the computer. My special thanks are also to my wife Sadhana who kept on telling me to keep in mind those students who have to finally read this book and pass examinations! If the book turns out to be useful, they know who is responsible for that.

Satish Modh

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Section I

Disaster and Development

Chapter 1

Nature, Humanity And Development

This chapter deals with issues related to understanding the impact of disaster on development process. Disasters and development are closely linked in that disasters can destroy development initiatives; but it also creates development opportunities. Development approach can both increase and decrease vulnerability.

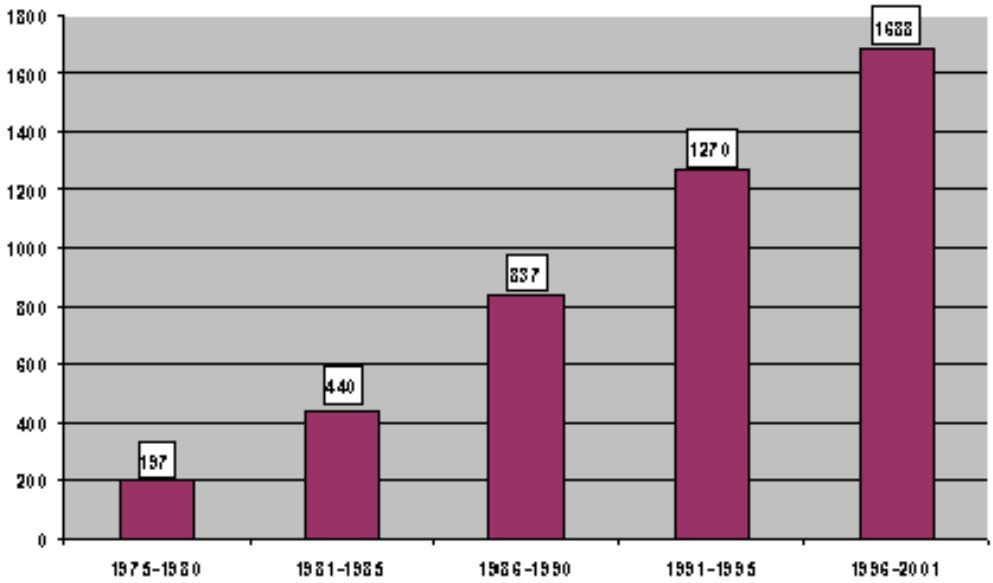
Mankind's relationship with nature has gone through several stages, starting with survival issues in primitive times, through a period of increasing mastery over nature since the industrial age. With development the vulnerability of the society to natural disasters reduced. However, the rapid material-intensive growth patterns of the twentieth century have adversely affected the environment, which in turn has made many groups (especially the poor), more vulnerable to disasters.

In the past couple of years, many people have been killed by earthquakes, tsunamis, volcanic eruptions, landslides, floods, tropical storms, drought, locust invasions, and other natural calamities. These disasters have also inflicted injury, disease, homelessness, and misery on many people, and caused colossal material damages.

In recent years the incidence of disasters has been increasing drastically in number as well as in terms of people affected and in magnitude of material losses. Figure 1.1 shows a trend of consistent increase in the incidence of disasters during the period 1975 - 2001. In the fifteen-year period (1975-1990) the incidence of disasters increased by more than four-fold. In particular, the final years of 1990s witnessed major natural disasters in several countries.

The number of people affected – injured, left homeless or hungry – tripled to almost two billion during the past decade, and those at risk have been growing by 70 to 80 million per year. Direct economic losses increased five times to US$629 billion in the 1990s. However, in the 1990s the number of people killed by disasters was 800, 000 compared to nearly two million lives in the 1970s. The decrease in fatalities, among other factors, is due to improved early warning and forecasting systems, preparedness programs as well as better communication systems in many countries.

Figure 1.1: Incidence of Disaster (Annual Averages) - 1975-2001



Source: EM-DAT: OFDA/CRED (2002) (http://www.cred.be/)

The incidence of hazards demonstrates considerable geographic variation as shown in Table 1.1. The data indicates that, during this period, Asia was disproportionately affected by natural disasters (with about 41 percent of all events) followed by Africa (about 30 percent) the Americas (16 percent), Europe (10 percent) and Oceania (3 percent).

There is a clear relationship between vulnerability to disasters and the level of economic, social and technological development. Between 1990 and 1998, about 94 percent of the world's 568 major natural disasters and more than 97 percent of all natural disaster-related deaths were in developing countries. The data further indicates that the incidence of disasters is higher in low-income than in middle-income countries. In particular, the incidence of hydro-meteorological hazards and drought is 3 times higher in low-income countries than in middle-income countries. An ongoing study on disaster vulnerability, based on multivariate statistical analysis, confirms a positive relationship between a higher level of economic development and reduced vulnerability to disasters.

A closer look at countries with a high proportion of their population undernourished shows that most of them continue to be affected by recurring natural disasters. At least fifty-one countries, of those classified as having 20 percent or more of their population undernourished, each suffered four to eight major disasters during the last two decades.

Table 1.1: Global Distribution of Disasters (by type and region– 1975-2001
Source: Data from EM-DAT (http://www.cred.be/)

Type of Disaster	Africa	Americas	Asia	Europe	Oceania	Total	% Share
Hydro-meteorological							**44.7**
Drought	263	82	123	23	22	513	*4.9*
Famine	45	1	16	2	0	64	*0.6*
Floods	331	485	759	245	71	1891	*18.0*
Wind Storm	113	538	738	228	163	1780	*16.9*
Wild Fire	15	79	52	68	21	235	*2.2*
Extreme Temperature	8	50	76	85	5	224	*2.1*
Geo-physical							**9.9**
Earthquake	25	114	278	114	34	565	*5.4*
Volcanic eruption	11	43	48	7	8	117	*1.1*
Tsunami/Wave/Surge	0	2	13	1	2	18	*0.2*
Landslide	19	82	167	53	13	334	*3.2*
Bio-hazards							**7.4**
Insect Infestation	52	3	10	1	1	67	*0.6*
Human Epidemic	386	74	191	32	8	691	*6.6*
Non-natural							**38.2**
Industrial Accident	60	149	360	134	4	707	*6.7*
Transport Accident	645	451	1166	349	22	2633	*25.0*
Misc. Accident	92	112	365	101	11	681	*6.5*
% share	*29.7*	*16.2*	*40.9*	*10.4*	*2.8*	*100*	**100**

Among such countries in Asia, Bangladesh suffered eight disasters with the number of people affected ranging between 11.5 - 73 million. Cambodia also suffered ten disasters; the people affected ranging between 0.3- 3.4. In Africa, Ethiopia suffered ten disasters with the number of affected people ranging between 3.8 - 10.5 million; Kenya suffered eight major disasters with the number of affected people ranging between 0.3 – 6.5 million. In Latin America, Honduras suffered four disasters with the number of affected people ranging between 0.048-2.1 million; and Nicaragua nine disasters with the number of affected people ranging between 0.08- 0.87 million. The food security situation in many of the countries affected by recurring disasters, particularly in Africa, was further aggravated by war and civil strife. The incidence of HIV/AIDS is also aggravating the compounded effect of structural problems and disaster shocks, worsening the food insecurity and poverty of households in many countries.

The increasing trend in the incidence of natural disasters is associated with the fact that more and more societies are becoming increasingly vulnerable to such phenomena, in part owing to human activities. The prevalence of massive poverty forces people to be engaged in income producing activities for survival, like deforestation or farming in marginal areas, which lead to resource degradation. In addition, some development activities such as clearing forests for timber or road construction, put at risk natural resource sustainability, and are among factors contributing to the frequency and intensity of natural disasters. Environmental degradation also contributes to lowering the potential of resilience and recovery from the effects of disasters.

NATURE AND DIMENSION OF THE CHALLENGE

Disasters are not aberrant phenomena. To the contrary, they are reflections of the ways human-beings live their normal lives, the ways that they structure their societies and allocate their resources. It is from this perspective that four dimensions of disaster phenomena needs to be considered:

1. Hazards as a central concern;
2. The dynamics of disaster-agents;
3. A global typology of hazards; and
4. A reconfigured development focus.

Hazards as a central concern: The number, types and impacts of disasters are increasing, as are the factors that cause them. There continues to be a steady increase in the range and effects of disaster events that take place around the world, and the agents of such disasters – be they natural phenomena, chemical, or technological. These events threaten the lives and livelihoods of more and more human-beings, and often have enduring effects on the socio-economic and political structures of states and regions.

There is a need to move disaster related issues from the periphery of policy-makers' and planners' perspectives to the centre. For example, the entire "Pacific economic rim" from Lima and Los Angeles to Tokyo and Taipei has an array of transportation, communication and economic nodes that lie on a map that features high seismic and volcanic activity along with coastal mountains that are vulnerable to landslides and the heavy precipitation that causes them. Nevertheless, planners and policy makers seem to be oblivious to the potential hazard risks.

The dynamics of inter-related disasters: Hazard threat may also result from the "synchronous failures of global social, economic and biophysical systems arising from diverse yet interacting stresses." This perspective is a long way from the age when disasters were perceived as "acts of God."

Insufficient attention is given to the ways that different types of disasters and disaster-agents inter-relate. Disaster causation and impacts feed off each other, and spill over into other sorts of disaster phenomena. The flood that intensifies the poverty of the affected which impacts upon livelihoods and ultimately may become the source of violent discontent reflects the sort of dynamic inter-relationships that increasingly needs to guide one's understanding of the hazards spectrum.

A typology of hazards. Closely related to the dynamics of inter-related hazards is that of a hazard typology. In that regard, there are probably four broad types and levels of interaction that are worth noting from a geographical perspective. The first concern those events in which the direct and immediate impacts are local, *e.g.*, the Kashmir earthquake. While acknowledging that even ostensibly local events may have far more extensive social, economic and political effects, their immediate impacts are normally within a relatively confined space, *e.g.*, a population centre. The second type of disasters spill across regional borders. Floods often generate this sort of impact, though over the last two decades the impact of chemical spills, burning of forests for agricultural land and Chernobyl suggest new dimensions of regional disasters.

Increasingly, there is a third type of disaster from a geographical perspective, namely, that which arises from events in one country that have global impacts. There is emerging concern, for example, that the Chinese government's efforts to divert major rivers within China will have effects on weather conditions globally. This same sort of potential impact has normally been associated with the destruction of the rain forests in South America. The fourth type of disaster in this geographical typology stems from global hazards. If one uses the example of global climate change and the disaster agents, *e.g.*, fossil fuels, the line between the third and fourth type can be very fine. Nevertheless, this fourth type can be seen in terms of pandemics and the consequences of global warming.

A reconfigured development focus: Over the past three decades, the belief that development and disaster prevention, preparedness and even response should be closely integrated conceptually and practically has been a recurring if not always persistent theme. In 1987, the Ethiopian National Disaster Prevention and Preparedness Strategy

recognised the need for development to underpin disaster prevention and preparedness, and for disaster analysis to be used as a criterion to test the sustainability of development. However, despite this awareness, there are few consistent mechanisms that promote such linkages. For the most part, development programmes and projects are not scrutinised in terms of the potential hazards that they might create, and conversely disaster response and preparedness – let alone transition and recovery -- programmes are rarely assessed in terms of their potential development linkages.

Now, however, given disaster trends, development-hazard linkages are increasingly being more regionally focused. This requires more than just complementary activities, but in many instances convergent and integrated programmes and projects which inevitably pose among other things challenging governance issues. Greater attention, too, has to be given to the ways that conflict prevention and resolution relate to development-hazard linkages – not merely for obvious "complex emergency situations" but also for those situations in which disaster agents spill across borders or directly impact upon the resources of neighbouring states.

LINKING DISASTERS AND DEVELOPMENT

Development requires institutional and structural transformations of societies to speed up economic growth reduce levels of inequality and eradicate absolute poverty. Over time, the effects of disasters can seriously degrade a country's long-term potential for sustained development and cause governments to substantially modify their economic development priorities and programs.

At the same time, disasters often provide opportunities for development. They can improve the atmosphere in favour of change and create a rationale to establish development programs such as job training, housing construction and land reform. However, poor management of the relief and rehabilitation responses may have severe negative implications for development for years to come, and may even increase vulnerability to future hazards.

The growing body of knowledge on the relationships between disasters and development indicates four basic themes. These four themes are given in Exhibit 1.1.

Exhibit 1.1: Relationships between Disasters and Development

1. Disasters set back development programmes, destroying years of development initiatives. This also gives an opportunity for infrastructure improvements e.g. transport and utility systems to be rebuilt when a flood destroys them.

2. Rebuilding after a disaster provides significant opportunities to initiate development programs. A self-help housing program to rebuild housing destroyed by an earthquake teaches new skills, strengthens community pride and leadership.

3. Development programs can increase an area's susceptibility to disasters e.g. probability of technological disaster may increase in an industrialized area. Therefore, the Environment Impact Assessment is mandatory.

4. Sustainable Development programs can be designed to decrease the susceptibility to disasters and their negative consequences. Housing projects constructed under building codes designed to withstand high winds result in less destruction during the next tropical storm.

Decision-makers who ignore these relationships between disasters and development do a disservice to the people who place their trust in them. Increasingly, around the world, forward thinking Government agencies with the support of United Nations and Non-Governmental Organization (NGO) officials are assessing development projects in the context of disaster mitigation and are designing disaster recovery programs with long-term development needs in mind.

SUSTAINABLE DEVELOPMENT

The concept of sustainable development has emerged after several decades of development efforts. Historically, the development of the industrialized world focused on material production. The earlier emphasis was on output growth and economic efficiency. But due to the large and growing numbers of poor in the developing world, and the lack of "trickle-down" benefits to them, efforts were made to directly improve income distribution. The development paradigm shifted towards equitable growth, and efficiency and equity became the twin objectives.

Protection of the environment has now become the third major objective of development. Therefore, the concept of sustainable development has evolved to encompass three major points of view: economic, social and environmental.

Natural disasters threaten all three dimensions of sustainable development. The economic approach to sustainability is based on preserving the stock of capital (or assets) that yields the maximum amount that a person or community can consume over some time period and still be as well off at the end of the period as at the beginning. Natural resources and the assimilative capacity of the environment, whether technologically induced or natural, are included as assets.

Thus, the loss of natural capital plays a crucial role in limiting development. Of course, the degree of productivity loss occurring as a result of natural disasters is also determined by the resilience of societies in the face of stress and shocks.

From this economic viewpoint, the rapidly increasing interconnectedness has worsened the spread of disaster vulnerability. The number of people affected by disaster damage worldwide is typically one thousand times the number of people killed by disasters.

For instance, losses could be propagated via capital markets, through capital flight, depreciation of domestic currency, greater indebtedness etc. Developing economies are sensitive to the vagaries of international capital flows, which makes them additionally vulnerable to disruption from natural disasters.

The key elements for economic growth include investment, effective governance and social stability -- unfortunately, disasters lead to exactly the opposite conditions. Loss of manmade and natural capital causes sudden disinvestments; post disaster relief increases both the financial and administrative burden on government. Finally, it can be said that disasters are socially destabilizing due to its impact on the community and loss of life.

Effect of Human actions and Behaviour

The social view of sustainable development indicates that vulnerability to natural disasters is definitely a function of human actions and behaviour. Thus, the resilience of socio-economic systems may be increased through mitigation efforts, and adaptation in anticipation of a perceived risk, and more generally, through greater economic development. Environmental vulnerability and poverty are mutually reinforcing. Developing countries face the most debilitating consequences due to natural disasters.

As the impacts of natural disasters fall disproportionately on the poor, the social view of sustainable development stresses the participation of at-risk communities in devising and implementing effective strategies to reduce vulnerability. The communities must have a voice in identifying site-specific solutions and assessing the efficacy of proposed measures. Local communities, the government, and industry best

perform the implementation of disaster planning jointly. Better community awareness is essential. There is a need to identify and understand people's perception of risk, to develop better channels of communication and popular consultation, and to rely on local resources. In many cases, the profound changes brought by urbanization have undermined the traditional support system for coping with crisis.

Decentralization of decision-making is important in the strengthening of organization for disaster preparedness prevention and mitigation, particularly given the need for rapid and localized responses in the face of swiftly occurring calamities.

The Environmental View

The environmental view of sustainable development emphasizes preserving the resilience and dynamic ability of biological and physical systems to adapt to change. While disasters may be beyond human control, the probability of their occurrence may be affected through human actions.

Accelerated changes in demographic and economic trends have disturbed the balance of ecosystems. The failure to limit environmental degradation resulting from human intervention increases the vulnerability to risks posed by natural hazards. Most of the cities in India are examples of uncontrolled urban development, combined with deforestation and dumping of wastes into rivers and canals, which have led to increased runoff and heavy flooding. Many of the same actions that preserve the ability of systems to adapt to change also increase resiliency to external shocks or extremes in the environment such as natural disasters. This interconnection between natural resource degradation and increased vulnerability to natural disaster emphasizes the need for preventive measures.

DISRUPTION OF DEVELOPMENT BY DISASTERS

Renewed interest in the political and economic aspects of disasters triggered by natural phenomena is part of a wider acceptance that development has failed in many parts of the world and that it is development failures that have led to an accumulation of disaster risks.

Disasters wipe out the hard-won results of decades of development in a very short time. Natural disasters are on the increase - floods, storms and droughts have doubled in number since 1996. Many are recurrent, or predictable. In the year 2005-06, approximately 256 million people were affected by disasters. Affected - that means that they have lost homes, livelihoods, providers - that they have become more vulnerable. The root causes are known: Environmental degradation, Global warming, Marginalization, Poverty. Poorer countries are more prone to disasters. 98% of last year's disaster victims live in countries of low or medium human development. True disaster recovery takes a long time. The interval between disasters is often too short to build resilience and to reinforce coping mechanisms.

There is a need to discuss the importance of considering the likely potential, risks and consequences of disasters as part of development program planning. One can prevent damage and disruption that arise, when disaster considerations are integrated into project planning for development. This discussion will increase our understanding if development/disaster linkages, broaden our view of intervention possibilities, and provide examples of how development planners can assess the costs and benefits of these types of programs.

Disasters can seriously disrupt development initiatives in several ways, including:

- Loss of resources
- Interruption of programs
- Impact on investment climate
- Impact on the non-formal sector
- Social and Political implications

Loss of Resources

Development resources are lost when a disaster wipes out the products of previous investment. The primary loss of development resources occurs from damage to capital stock and inventory. This is initially the most visible effect of sudden impact disasters. Tropical storms can destroy factories, fishing ports, power systems and telecommunications. Earthquakes damage and destroy buildings, transport, and public utilities. Disasters have a particularly destructive economic impact in areas where there are very few alternatives for assets, which are destroyed, or in areas where those assets are particularly critical.

There is a further loss of development resources from reduction in the production of goods and provision of services. This results from direct disruption by the disaster and its immediate local effects and, subsequently, disaster can disrupt development potential from the increased cost of goods and services, which then result. Income losses resulting from lost production have a particularly depressing impact on consumer ability to purchase goods and services. Lost productivity may also result in loss of export markets, for example, a coconut plantation in India lost to cyclone damage will take five years to regenerate during which time other coconut producing countries can increase market share.

The disasters affect development through:

- Impact on capital stock and inventory

- Loss of production and provision of services due to disruption and increased cost of goods and services

- The secondary effects of the disaster include inflation, balance of payment problems, increase in fiscal expenditure, decreases in monetary reserves

- Other indirect losses, for example: the impact on a country's debt position could be that as the debt service burden increases, the country has less resources available to invest in productive enterprises

- The outcome of these losses of resources include: loss of economic growth, delays to development programs, cancellation of programmes, and disincentives to new investment

- There may also be a shift in skilled human resources toward high visibility recovery activity-a diversion from long-term to short-term needs.

Interruption of Programs

Disasters interrupt ongoing programs and divert resources from originally planned uses. Interrupting ongoing programs to allow a shift in resources from long-term programs to highly visible short-term recovery and emergency response programs can also negatively impact development activity.

The secondary effects of a major disaster also disrupt the development process. These secondary effects of direct economic impact include inflation, balance of payment problems, increase in fiscal expenditures and decreases in monetary reserves. An increase in the country’s debt means that as the debt service burden increases, countries have fewer resources available to invest in productive enterprises. The outcome is usually the lowering of economic growth, delays to development programs, cancellation of programs and disincentives to new investment.

Impact on Investment Climate

Repeated disasters, in particular, have a negative impact on the incentive for further investment. A climate of stability and certainty is needed to encourage investors. At the individual level, repeated losses from hazardous events can discourage creative investment. Under conditions of uncertainty, both foreign and domestic investors will generally be very cautious about supporting entrepreneurial activity.

Developing countries in the Asian region are now being challenged to improve their investment climate, boost efforts to innovate and build skills, and protect those vulnerable to devastating shocks like health crises, job losses, and natural disasters. The threat of avian flu also presents a major uncertainty. Countries across the region are taking steps to manage possible outbreaks. Although avian flu has severely affected those connected to poultry farming, the impact has not spilled into the overall economy.

Impact on Non-Formal Sector

Disasters have special negative impacts on the non-formal sector. The costs of disasters are often underestimated because disruption in this part of the economy is not usually taken into account. In many societies the non-formal economy, while not usually included in national economic statistics, can involve a substantial portion of the total population. The non-formal sector is especially vulnerable to housing damage because houses often serve as sites of business activity. Once local business is disrupted, there will be indirect costs from lost employment and income. Small business in this sector may be especially sensitive to price increases.

Social and Political Implications

Throughout many parts of the world one type of hazard can trigger a domino effect of disasters. For example, a drought may lead to a famine, which in turn leads to civil conflict resulting in a mass displacement of the population. Another example includes flooding which may force people to seek refuge across international borders upsetting the balance of needs and resources and weakening the ability of the government to receive the added population growth. This in turn may lead to civil strife and disorder.

Such compound hazards and disasters need not occur sequentially; they can occur simultaneously. Thus, people may become caught between contending forces in a civil war and also suffer from a major drought with limited means to grow food or to receive outside assistance.

In a growing number of countries, complex disasters are also becoming more evident. Essentially a complex disaster is a form of human-made emergency in which the cause of the emergency as well as the assistance to victims are bound by intense levels of political considerations. The single most prevalent political condition of a complex emergency is civil conflict, resulting in a collapse of political authority. In such cases, at least one of three situations arise:

- The government's ability to assist their disaster-afflicted becomes severely constrained.

- The government becomes extremely suspicious of or uninterested in afflicted people who have fled from non-government to government held areas.

- The government or opposition groups actually create or compound a disaster through actions that generate refugees and the mass displacement of people.

In fact, many affected people live in areas outside of government control. These are often the people in the most need and yet, the most difficult to reach.

The disaster becomes "complex" because either the collapse or diffusion of political control makes assistance highly problematic. Solutions ultimately depend upon agreements with all parties involved in the conflict to permit assistance to be provided to recognized civilian noncombatants. These solutions may include agreements that are seen essentially as compromising fundamental aspects of sovereignty in exchange for humanitarian assistance. UN sponsored safe havens on corridors of tranquility are examples.

Displaced Persons And Refugees

One of the most serious consequences of compound and complex emergencies is the creation of populations of displaced persons. The term "displaced person" applies in several contexts. These include people who are:

- Forced to leave their homes as a result of drought, famine, or other disaster, usually in search of food, water and shelter.
- Non-combatant individuals and families forced to leave their homes because of the direct or indirect consequences of conflict but who remain inside their country.
- Forcibly resettled by their government if the resettlement is ethnically, tribal or racially motivated.
- Expelled from a country, forced out for economic or political reasons especially as an ethnic or national group.

Consequences and effects

The variety of possible situations generating displaced people makes generalizations difficult, but the following maybe experienced in varying degrees:

- Loss of means of livelihood.
- Communities becoming separated from services previously provided.
- Loss of normal sources of food.
- Lack of shelter and household necessities.
- Lack of fuel for cooking.
- Lack of potable water.
- Communicable diseases and over-crowding.
- Additional burdens for women, especially as heads of households.

- Large numbers of unaccompanied children separated from family.
- Loss of land and tenure.
- Possible communication and logistics problems.
- Insecurity due to tensions and military activities.

Not to be forgotten is the population that remains at home and, even though they are not "trapped in conflict areas," they may be in places that are hard to reach because of political, logistical and/or security reasons. This population group may end up suffering from many of the same problems as those affected by isolation from a national support structure or access to international humanitarian relief assistance.

Political Implications

Socio-political and cultural dynamics put into motion at the time of catastrophic 'natural' disasters create the conditions for potential political change - often at the hands of a discontented civil society. A state's incapacity to respond adequately to a disaster can create a temporary power vacuum, and potentially a watershed moment in historical trajectories. This generates a window of opportunity for novel socio-political action at local and national levels. Interventions may include maneuvers to entrench or destabilize current power-holders, change power-sharing relationships within recognized sectors, or to legitimise or delegitimise new sectors.

Disasters triggered by environmental phenomena do not cause political change, rather they act as catalysts that put into motion potentially provocative social processes at multiple social levels. The character of political change is influenced by the nature of the pre-disaster socio-political and cultural milieu, and the actions and reactions of popular and institutional actors involved in disaster response and reconstruction.

By analysing large natural disaster events from 1899 to 2005, seven premises regarding disasters and political change have been identified:

1. Disasters often hit politically peripheral regions hardest catalysing regional political tension.
2. Disasters are a product of development policies and can open to scrutiny dominant political and institutional systems.
3. Existing inequalities can be exacerbated by post-disaster governmental manipulation.
4. The way in which the state and other sectors act in response and recovery is largely predicated on the kind of political relationships that existed between sectors before the crisis.

5. Regimes are likely to interpret spontaneous collective actions by non-government sectors in the aftermath of a disaster as a threat and respond with repression.

6. In the aftermath of disaster, political leaders may regain or even enhance their popular legitimacy.

7. The repositioning of political actors in the aftermath of a disaster unfolds at multiple scales.

HOW DEVELOPMENT MAY CAUSE DISASTERS

The side effects of well-meaning development efforts sometimes have disastrous consequences. Development projects implemented without taking into account existing environmental hazards may increase vulnerability to natural disasters. For example, projects designed to increase employment opportunities, and thus income, usually attract additional population growth. Low-income people may then have to seek housing in areas previously avoided, on hillsides or in floodplains. The cost of relief assistance after a landslide or flood can easily outweigh the benefits to the economy of more jobs. Similarly, development projects may lead to negative political consequences that increase the vulnerability to civil conflict.

Some types of development projects commence without fully assessing their impact on the environment. This can occur even in programmes resulting from a disaster, such as reconstruction projects that increase demand for wood to fortify houses. The resulting deforestation can then bring increased vulnerability to mudslides and possibly long-term environmental changes.

Development projects may even consciously force a choice between reducing disaster vulnerability and economic vulnerability, between objects to be achieved and magnitude of risk involved. A project's design may require a trade-off between the two and force a decision between the lesser of two evils.

Development can contribute to vulnerability based on the following examples of negative consequences:

- Watershed erosion
- Deforestation
- Loss of biological diversity
- Lack of soil and land management
- Air and water pollution
- Inadequate urban sanitation and waste disposal

- Marine pollution and effect of coastal zone development

Table 1.2: High-risk areas and vulnerability

Sector	Development Activity	Results
Industry	Construction of chemical plant generating employment	Deaths due to inadvertent release of chemicals, increased health problems, hazardous or toxic waste accidents, damage to environment, air pollution.
	Introduction of new species to control pests	Uncontrolled expansion of new species into environment, bringing crop failure
Agriculture, Forestry and Fisheries	Irrigation schemes	Flooding where canals counter natural water flow, damage to environment
	Increase in pesticide or fertilizer use of augment crop yields	Contamination of potable water supplies, ground water, wells, destruction of aquifers
Natural Resources	Construction of hydroelectric dam	Displacement, salinization, loss of livelihood
	Drilling of water wells in marginal areas	Desertification due to population clustering around wells
Transportation, Communications	Road building in rain forests	Landslides, deforestation, soil damage
Education	School construction on earthquake fault line failure	Deaths/injuries due to structural collapse
Development Issues, Policy and Planning	Centralization of planning process	Famine due to lack of organization of local governments, la
	Concentration of tourist facilities on vulnerable coastlines, unstable hills	Exposure of large populations to risk of death/injury/loss in storm surge, high wind storms, tsunami, landslides

DEVELOPMENT OPPORTUNITIES AFFORDED BY DISASTERS

Disasters can be a vehicle for major development programs. The political impact of damage and disruption can be a real catalyst for change. Disaster inspired development initiatives are influenced in a number of ways, but two aspects are especially important. First, disasters can highlight particular areas of vulnerability, for example where serious loss of life has occurred, or where the economic damage is disproportionate to the strength of the impact. The outcome of this is usually to highlight the general level of underdevelopment. Second, for a few weeks or months, the political environment may favour a much higher rate of economic and social change than before, in areas such as land reform, new job training, housing improvements, and restructuring of the economic base.

The value of assistance given after disasters may partially compensate for economic losses, although the amounts are usually rather small in relation to the total loss. Early injections of aid rarely constitute more than ten percent of the overall losses, and are usually considerably less than that. In the following months and years, there may be additional longer-term development aid, which would otherwise not have been made available.

Development opportunities are often missed or compromised because of an excessive focus on relief assistance. Relief assistance may introduce substantial flows of resources, which may discourage independence and entrepreneurial activity.

The political impact of damage and disruption can be a real catalyst for change.

Incorporating Mitigation Measures into Regular Development

Development programs to decrease disaster vulnerability should be incorporated into every level of project preparation. Local people should be involved in integration measures as they are aware of the remedies available in the neighbourhood. There is a wide range of options for incorporating mitigation measures into regular development programs.

Strengthening of urban utility systems and industrial support infrastructure is a common aim of development projects. This can be achieved through a variety of inputs, including loans, technical assistance, and institution development support. Utility Systems like water, electric power, transport links and communications must be made more effective as well as more selectively resistant to particular hazards.

Investments in transport and communications also improve our ability to respond to, and recover from, a major disaster. For example, improvements in conditions of road will usually make evacuation and relief easier. Better communications will often lead to improved early warning and more effective preparedness and response measures. Investments in airports and bridges can help speed up the delivery of relief resources.

Mitigation is most effective as part of a medium to long-term development program which incorporates hazard reduction measure into regular investment projects.

VARIED IMPACT ON STATES IN INDIA

Hazards vary considerably in the scale of their impact, the geographical scope and the duration of effects; these may include river or coastal flooding,, landslides, tropical storms, earthquakes, drought, urban fires, civil conflict, or technological and industrial hazards. Each of these has a very different potential for disruption, depending on the intensity of the disaster impact, and its geographic relation to populations, economic assets, and the type of economic activity in progress.

Development is, in part, a process of investment and capitalization of economies over a long period. Every State has widely differing types of development, each subject to different processes and pattern of investment, institutional change and structural re-organization. Each State will exhibit a different sensitivity both in the short and long term to the impacts from various kinds of major disasters and hazard agents. This we have seen in the after effects of disasters in the States of Orissa and Gujarat.

In India we can divide States into four different types. The main purpose here is to focus on broad differential effects. The four types of State economies are given in Exhibit 1.2.

Using these four categories, we can begin to develop an overview of how the various types of States differ in their overall vulnerability to each type of shock.

Industrialized States

The economies of Industrialized States are less vulnerable to agricultural damage. They can usually withstand losses in this sector. There are, for example, often-sufficient financial reserves to provide food to victims of disasters on their own. There may also be more alternative sources of employment for agricultural workers. On the other hand, these states may be vulnerable to damage to infrastructure, e.g. power systems, transport, communications, and public utilities, by earthquake and cyclones.

Exhibit 1.2: Four Types of State Economies

1. ***Industrialized States:*** highly urbanized, with high-density urban populations.
2. ***Rural/Agricultural States:*** characteristic of less developed States like Bihar, Uttar Pradesh.
3. ***Small States:*** like Union Territories or the State of Goa. Economy may depend on single crop or single commodity economies
4. ***Highly Stressed States:*** like Jammu and Kashmir and the Northeast. These are highly vulnerable and can slip into economic decline quickly. The situation is worsened by public unrest or frequent terrorist strikes.

Rural/Agricultural States

These States are relatively immune to disasters of short and sudden impact. However, they are susceptible to disasters, which have extensive rural impact, particularly drought, flood, severe pest damage and Naxalite movements..

Small States

They are often highly dependent on unique commercial crops or tourism e.g. Kerala, Goa, Pondicherry. They are susceptible to natural disasters like Tsunami or technical or man made disasters.

Highly Stressed States

Generally, these States depend on large Central Aid. Populations in these States are under exceptional stress. They are vulnerable to disasters (Earthquake and terrorism in Jammu and Kashmir), widespread floods and insurgency (Assam). Almost any disaster-related shock has a frightening impact on these States.

Summary

- There is a clear relationship between vulnerability to disasters and the level of economic, social and technological development. The increasing trend in the incidence of natural disasters is associated with the fact that more and more societies are becoming increasingly vulnerable to such phenomena, in part owing to human activities.

- The prevalence of massive poverty forces people to be engaged in income producing activities for survival, like deforestation or farming in marginal areas, which lead to resource degradation. In addition, some development activities such as clearing forests for timber or road construction, put at risk natural resource sustainability, and are among factors contributing to the frequency and intensity of natural disasters. Environmental degradation also contributes to lowering the potential of resilience and recovery from the effects of disasters.

- Four dimensions of disaster phenomena needs to be considered:

    - Hazards as a central concern;

    - The dynamics of disaster-agents;

    - A global typology of hazards; and

    - A reconfigured development focus.

- Development requires institutional and structural transformations of societies to speed up economic growth reduce levels of inequality and eradicate absolute poverty. Over time, the effects of disasters can seriously degrade a country's long-term potential for sustained development and cause governments to substantially modify their economic development priorities and programs.

- Disasters can seriously disrupt development initiatives in several ways, including:

    - Loss of resources

- Interruption of programs
- Impact on investment climate
- Impact on the non-formal sector
- Social and Political implications

- Disasters can be a vehicle for major development programs. The political impact of damage and disruption can be a real catalyst for change.

Questions

1. Explain the linkages between disasters and development. Describe the nature and dimension of the challenge.
2. Comment – "Development failures have led to an accumulation of disaster risk." Explain various ways in which disaster can seriously disrupt development initiatives.
3. How development may cause disasters? Do you believe that disaster may also provide development opportunities? How?