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CRISIS MANAGEMENT

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CRISIS MANAGEMENT

Index

CRISIS MANAGEMENT

Introduction

What is Crisis?

The meaning of the term **'crisis'** is 'an unstable or crucial time or state of affairs in which a decisive change is impending'; In the context of public policy, an event or occurrence can be termed as a crisis situation if it poses a threat to human life and property or causes or threatens to cause large-scale disruption of normal life.

This emergency situation may arise suddenly or it may be an outcome of a problem, which was not 'nipped in the bud.' A crisis may degenerate into a disaster if it is not properly managed resulting in avoidable loss of human life and property.

Preparedness and quick response can save lives protect property and lessen disruptions. This calls for a coordinated response of the entire governmental system as also civil society. The response should not only incorporate traditional coping mechanisms but also involve meticulous planning and coordination. Cumulative experience with crisis management over the years points to an urgent need for putting in place a holistic and effective response mechanism which is professional, result-oriented, innovative and people-centric.

Terms of reference of the Report pertains to the following aspects of crisis management:

1. To suggest ways to quicken the emergency responses of administration.
2. To suggest ways to increase the effectiveness of the machinery to meet the crisis situation and enhance crisis preparedness.

This Report primarily deals with

1. Natural and man-made disasters (for example earthquakes, industrial accidents, etc.) but has used the terms 'crisis' and 'disaster' interchangeably as relevant in the context. Crisis situations caused by hostile elements like terrorists and extremists involving taking of hostages or severely disrupting public order and administration are dealt in Report on 'Public Order'.
2. The policies, operational issues and institutional contexts relevant to crisis management.

ARC has also drawn upon **international declarations and best practices**. Such as -

1. The 'Yokahama Declaration' of 1994, enunciated during the International Decade for Natural Disaster Reduction signalled a radical shift from the earlier practice of being responding to acute emergencies to a more 'holistic' approach embracing all aspects that is response, prevention, mitigation and preparedness.
2. The prevention and mitigation are the keys to minimize distress caused by natural disasters and thus form the bedrock of integrated disaster management.
3. A comprehensive prevention and mitigation strategy, with the ultimate goals of protecting people and structures from disasters and increasing the effectiveness of response and recovery.

Crisis Management - An Overview

"In the old days, we had famine codes and drought codes but now there are many more sources of uncertainty, disorder and turbulence. Therefore, one should pay adequate attention to understanding the processes of this disorder and how our

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administrative system has the primary responsibility to come to the help of our people in these times of difficulties, stress and strain"

History of Crisis Management

Natural disasters and crises have been an integral part of human history right from the dawn of civilization. The rise and fall of the Indus Valley and Babylonian civilizations are a testimony to this. In the early days, individuals and communities would lead the response to crisis. In the traditional disaster management approach, the focus was on emergency relief and immediate rehabilitation. Society deemed these measures sufficient as anything more was considered 'unaffordable'.

Current Challenges

With the emergence of the modern welfare state and the 20th century trends of globalization, urbanization, large-scale migrations of human population and climate changes, the nature of crises has increased both in magnitude and complexity.

1. The increasing **population densities and urbanization** have resulted in greater impact on human lives and property.
2. In the field of public health, while science has secured a major victory over epidemics, new strains of viruses and drug resistant micro-organisms have emerged raising the sceptre of **global pandemics** of new and more deadly diseases.
3. Similarly, while frequency of wars has declined, modern weapons and mass urbanization have increased manifold the human crisis caused by such **conflicts**.
4. The scourge of **terrorism** has created new types of crises and increasing dependence on communications and computer networks have increased the threat of newer emergencies in case these are disabled by accident or design.
5. Phenomena like **modernization, information explosion, transnational migrations, and the economic interdependence** among nations have all contributed to extending the impact of crisis situations over larger areas.

Types of Crises

On the **basis of the causes** crises situations can be classified into the following categories -

1. **Acts of nature**. These can further be divided into the following sub-categories:
   a. Climatic events: cyclones and storms (associated sea erosion), floods and drought
   b. Geological events: earthquakes, tsunamis, landslides and avalanches;

2. **Environmental** degradation and Ecological disturbance

3. Accidents
   a. Industrial and nuclear mishaps
   b. Fire related accidents

4. **Biological activities**: public health crises, epidemics etc;

5. **Hostile elements:** war, terrorism, extremism, insurgency etc;

6. **Failure of major infrastructure facilities** including communication systems, large-scale strikes

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7. Large **crowds getting out of control.**

Each crisis situation can be analyzed according to specific features like **Early Warning Possibility, level of Community preparedness, and duration of disaster, area affected, mitigation measures possible and rescue required.**

Distinction between Hazard and Disaster

"Strictly speaking, there is no such thing as a natural disaster, but there are natural hazards, such as cyclones and earthquakes. The difference between a hazard and a disaster is an important one. A disaster takes place when a community is affected by a hazard. In other words, the impact of the disaster is determined by the extent of a community's vulnerability to the hazard. This vulnerability is not natural. It is the human dimension of disasters, the result of the whole range of economic, social, cultural, institutional, political lives and the environment that they live in."

Scale of Crises

Depending on its scale, intensity and area of impact, a crisis situation may be labelled as local, sub district, district, state or national level and accordingly determines the nature and level of response.

- The **Union Government** has to step in for major disasters by way of providing financial, material and human resources support.
- In case of certain specific crisis situations, which affect the national interest, a **national level response** is necessary.
  - For example terrorist incidents like hijacking of an aircraft, suicidal attacks, sabotage, attacks on important installations/buildings or community symbols; hostage crisis; threat or actual use of nuclear/ chemical/biological weapons; war or war-like situations; mutiny; migration/infiltration/; breakdown of important services like Railways; chemical/biological disasters and those relating to major mines-mishaps; oil spills; cyber terrorism etc.

Crisis Management

In the recent times a 'Welfare State' entails wider responsibilities meaning thereby that in addition to relief and rehabilitation, governments address the factors leading to the crisis, that ideally prevents their occurrence, or reduces their ill effects. It is necessary to recognize that often a crisis does not emerge suddenly as it has a life cycle, which may take days, months or even decades to develop depending on its causative factors.

This 'life cycle' of crisis management may be divided broadly in three phases - pre-crisis, during crisis and post crisis.

3-PHASES of Crisis Management

Phase 1 - Pre-Crisis: (Preparedness and Risk Management)

In this period the potential hazard risk can be assessed and steps taken for preventing and mitigating the crisis and preparing for actual occurrence.

1. **Long-term prevention measures** like construction of embankments to prevent flooding, creating or augmenting irrigation facilities and adopting water shed management as drought proofing measures, increasing plantations for reducing the occurrence of landslides, construction of earthquake resistant structures and sound environment management.
2. **Short term measures** which reduce or modify the scale and intensity of the threat, for example, better enforcement of building codes and zoning regulations, proper maintenance of drainage systems, better awareness and public education to reduce the risks of hazards etc.

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For different types of disasters, mitigation measures may vary but what needs to be emphasized is the priority and importance to be attached to various measures. In order to do that, an appropriate legal and operational framework is essential.

Phase 2 - During Crisis – (Emergency Response)

When a crisis actually occurs, those affected by it require a speedy response to alleviate and minimize suffering and losses.

- In this phase, certain 'primary activities' become indispensable such as evacuation, search and rescue, followed by provision of basic needs such as food, clothing, shelter, medicines and other necessities essential to bring the life of the affected community back to normalcy.

Phase 3 - Post-Crisis: (Recovery and Rehabilitation)

1. ***Recovery:*** *In this* stage provisions are made to achieve early recovery and reduce future risks. It comprises activities that encompass two overlapping phases of rehabilitation and reconstruction.
2. ***Rehabilitation:*** Includes provision of temporary public utilities and housing as interim measures to assist long term recovery.
3. ***Reconstruction:*** Includes construction of damaged infrastructure and habitats and enabling sustainable livelihoods.

Elements of Crisis Management

A crisis management should aim at:

1. Legal and Institutional Framework
2. Vulnerability Analysis and Risk Awareness
3. Planning
4. Community Resilience
5. Knowledge Dissemination

Current Shift of Focus on Disaster Risk Reduction Strategy

In the past there was lack of coherent disaster reduction strategies and the absence of a 'culture of prevention' which were identified as the major causes for the disturbing crisis phenomenon.

Disaster risk reduction has been defined as the 'systematic development and application of policies, strategies and practices to minimise vulnerabilities, hazards and the unfolding of disaster impacts throughout a society, in the broad context of sustainable development'.

Disaster Risk Reduction Strategy

1. **Legal and institutional framework** - Creating appropriate legal and organizational framework is the first step towards Disaster Risk Reduction
2. **Vulnerability Analysis and Risk Awareness** - Appraisal of likelihood and intensity of hazards and analysis of vulnerabilities thereto of the community with making government organizations, local bodies, communities/groups and individuals at all levels aware of the risk of potential natural and man-made hazards.

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3. **Planning** - Building of institutional capabilities and meticulous long and short term planning with effective implementation of plans and enforcement measures.

4. **Implementation of Plan and Community Resilience** - Community preparedness is the next step. Building resilience of the communities to face crises and ensuring their full participation through inputs like education, training and urban planning, infrastructure building and logistics. Crucial to all these efforts, however, is the existence of a **'safety culture'** in societies.

5. **Knowledge Creation and Dissemination -** Knowledge plays an important role in disaster reduction. The traditional knowledge available with the community has to be used along with knowledge acquired through research and past experiences. Research in the field of disaster management has contributed in predictions with a fair degree of accuracy (earthquakes are an exception), and this has led to establishment of efficient Early Warning Systems. The information is growing at a rapid rate, which, calls for its processing and sharing. The challenge is to ensure that the community and the decision makers are empowered with this knowledge. Therefore, disseminating it to the larger population is the final element in effective Disaster Risk Reduction efforts.

World Conference on Natural Disaster Reduction, Yokohama, 1994

Yokohama Strategy and Plan of Action for a Safer World

- Risk assessment
- Disaster prevention and preparedness
- Prevention and preparedness should be considered integral aspects of development
- Early warnings and their effective dissemination
- Preventive measures
- Application of proper design and patterns of development focused on target groups
- Share the necessary technology to prevent, reduce and mitigate disaster.
- Strong political determination required to make efficient use of existing resources

India's Key Hazard, Vulnerabilities and the Crisis Response Mechanism

Future Projections of Disasters

The Intergovernmental Panel on Climate Change (IPCC) came to the conclusion that the frequency and magnitude of all types of natural disasters are on the rise worldwide. Such as -

- Discernible changes in weather with a general increase in temperature (or a decrease in the number of cold days)
- Increase in the frequency of heavy precipitation events.
- Frequency and intensity of droughts have increased over the past few decades.
- The number of 'hot' and 'very hot' days will continue to rise.
- The intensity and frequency of extreme precipitation events will increase over many areas, resulting in floods and landslides.

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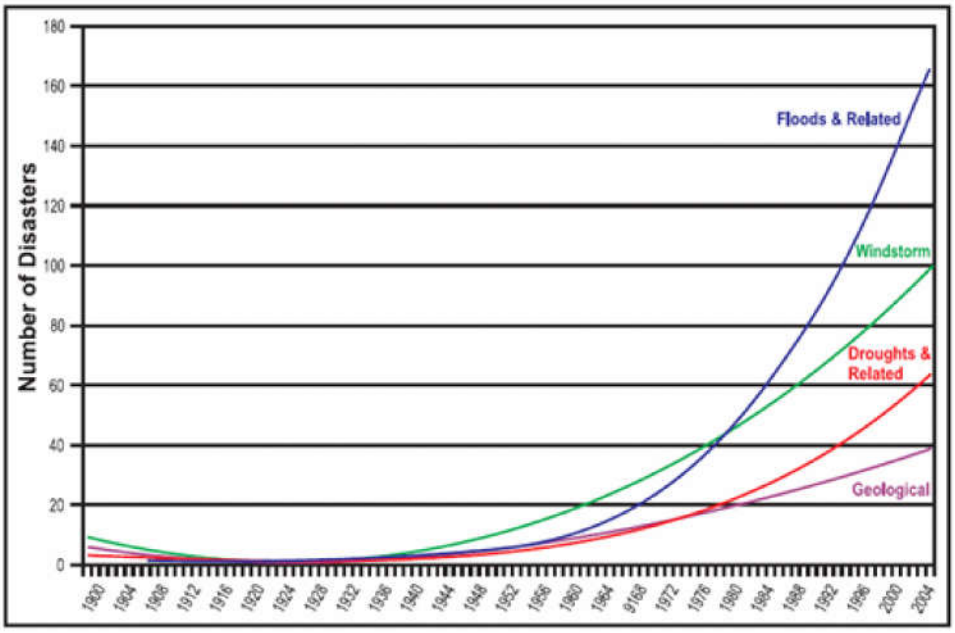

Such increasing trends in natural disasters will inevitably create crisis situations.

India's Vulnerability Profile

India is very vulnerable to natural hazards because of its unique geo-climatic conditions. Disasters occur in India with grim regularity causing enormous loss of life and property.

- Almost 85% of the country is vulnerable to single or multiple disasters and about 57% of its area lies in high seismic zones.
- Approximately 40 million hectares of the country's land area is prone to flood, about 8% of the total land mass is vulnerable to cyclone and 68% of the area is susceptible to drought
- Of the 35 states and union territories, 27 are prone to one or more of these 'events'.
- Some areas are also vulnerable to industrial, chemical and biological disasters.

Damage and Losses

The magnitude of loss of human lives and livelihood in our country due to such disasters is excessive by any modern standard.

- Earthquake measuring 6.9 on the Richter scale in Gujarat caused 13,805 deaths, 11, 67,000 injuries, 2, 22,035 houses destroyed, and 917,158 houses damaged while earthquakes of similar measurements in USA or Japan have had relatively little impact.
- Tragedies like the Bhopal gas leakage (the gas was Methyl Iso-Cynate) and regular outbreaks of floods and droughts in different parts of the country every year indicate that much more needs to be done to achieve holistic disaster management in the country.

Cost Incurred

In terms of erosion of resources, disasters have proved frightfully expensive.

- According to a recent study by the World Bank, 2.25% of the GDP and 12.15% of the revenue of the country were lost due to natural disasters during 1996-2000.

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- The Eleventh Finance Commission provided an amount of Rs. 11007.59 crores for the Calamity Relief Fund (CRF) for the period 2000-2005. Besides, a further amount of Rs. 8041 crores was spent under the National Calamity Contingency Fund (NCCF).
- The Twelfth Finance Commission has further enhanced the allocations of CRF to Rs. 21333.33 crores for the period 2005-2010.

Lessons Learnt

The bulk of such expenditure could have been avoided with better planning, and measures for prevention and mitigation. Several cross-country studies have shown that investment in disaster prevention and mitigation is highly cost effective: for example, every dollar spent on mitigation saves three to five dollars on relief and rehabilitation.

A Brief Description of Some Major Crises/Disasters:

Although the broad principles of crisis management are applicable to different types of disasters, each disaster category has its peculiar features, which need to be factored in crisis management efforts.

Earthquakes

Vulnerable zones:

1. **The Himalayas** – the youngest among the mountain ranges are still evolving and adjusting to tectonic movements. Existence of two major fault lines located on its west and east has resulted in very severe earthquakes in several parts of the Himalayan and surrounding regions. This makes the entire region covering fourteen states (located in western and central Himalayas, northeast, and parts of Indo-Gangetic basin) highly prone to earthquakes.
2. **Other Regions -** Hilly regions of the rest of India are also prone to earthquake-induced landslides. The other seismically active regions of the country include the Gulf of Khambhat and Rann of Kutch in Western Gujarat, parts of peninsular India, the islands of Lakshadweep and Andaman and Nicobar Islands.

Mitigation Strategy:

In our present state of knowledge, earthquakes can neither be prevented nor predicted in terms of their magnitude, or place and time of occurrence. Therefore, the most effective measures of risk reduction are pre-disaster mitigation, preparedness and preventive measures for reducing the vulnerability of the built environment combined with expeditious and effective rescue and relief actions immediately after the occurrence of the earthquake.

Cyclones

Vulnerable zones:

- More than 8000 km of coastline in the east and the west face the hazards of tropical cyclones, and associated storm surges and heavy rainfall, before and after the monsoon.
- Post monsoon cyclones are usually more intense both in numbers and intensity. It has been estimated that over 58 per cent of the cyclonic storms that develop in the Bay of Bengal approach or cross the east coast in October and November. Only 25 per cent of the storms that develop over the Arabian Sea hit the west coast.
- In the pre-monsoon season, corresponding figures are 25 per cent over the Arabian Sea and 30 per cent over the Bay of Bengal.

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The **'super cyclone'** that hit the coastal areas of Orissa on October 29, 1999 had wind speeds of 270-300 km per hour accompanied by torrential rains for the next three days. Sea waves that hit the coast were 7 m high. The super cyclone caused extensive damage killing about 10,000 people and lakhs of livestock population. Over 2 million houses were damaged. The economy, infrastructure and environment were devastated.

Mitigation Strategy

An effective cyclone disaster prevention and mitigation plan requires:

- Efficient cyclone forecast and warning services
- Rapid dissemination of warnings to the government agencies, particularly marine interests like ports, fisheries and shipping and to the general public
- Construction of cyclone shelters in vulnerable areas, a ready machinery for evacuation of people to safer areas and community preparedness at all levels to meet the exigencies.

Cyclone Shelters: One of the most successful ways of reducing loss of human lives during cyclones is the provision of cyclone shelters. In densely populated coastal areas, where large scale evacuations are not always feasible, public buildings can be used as cyclone shelters. These buildings can be so designed, so as to provide a blank façade with a minimum number of apertures in the direction of the prevailing winds. The shorter side of the building should face the storm, so as to impart least wind resistance. Earth berms and green belts can be used in front of these buildings to reduce the impact of the storm. *(Source: Website of IMD)*

Tsunamis

Tsunamis are large waves generated by sudden movements of the ocean floor that displace a large volume of water. Although usually associated with earthquakes, tsunamis can also be triggered by other phenomena like submarine or terrestrial landslides, volcanic eruptions, explosions or even asteroid, meteor and comet impacts. Tsunamis have the potential to strip beaches, uproot plantations, and inundate large inland tracts and extensively damage life and property in coastal areas.

Vulnerable Zones

- The Indian coastal belt had not recorded many tsunamis in the past although the earthquakes of 1881 and 1941 over the Bay of Bengal had caused some damage in the Andamans region. The earthquakes of 1819 and 1845 near the Rann of Kutch also created rapid movements of water in the Arabian Sea. The 1945 Makran earthquake (Magnitude 8.1) generated a tsunami of 12 to 15 meters height causing some damage in the Gulf of Cambay and Mumbai.

Damage and Loss

The phenomenon of tsunami that usually occurs near seismically active spots in the Pacific Ocean was uncommon in India till it hit the east and west coast in December 2004. The waves that struck our mainland were 3-10 m high and penetrated 300 metres to 3000metres inland causing severe damage to life and property in the coastal areas of Andhra Pradesh, Tamil Nadu, Pondicherry, Kerala and Andaman and Nicobar Islands, devastating and crippling the coastal economy as never before.

- The confirmed death toll in India was 12,405.
- Seventy five per cent of the fatalities were women and children
- As many as 1,089 villages were affected

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- 7, 30,000 individuals had to be evacuated.
- The total estimated value of damages is Rs.11, 300 crores.

Floods

Vulnerable Zones

Floods occur regularly in India affecting about 10% of area. The term flood is generally used when the water-flows in rivers, streams and other water bodies cannot be contained within natural or artificial banks.

During monsoon months, all states are prone to floods, including even Rajasthan. The severity of flooding at any location is a function of factors such as intensity and extent of rainfall and antecedent conditions of catchment area, physical characteristics of the river, topography etc.

In many cases, the natural process of flooding is aggravated by man-made hindrances to free out-flow/ absorption of floodwater both in agricultural areas and particularly in urban areas with unplanned or unauthorized construction activities; sudden large releases from upstream reservoirs, which often is more than the carrying capacity of the basin results in massive destruction of river embankments and downstream flooding.

Damage and Loss

Increasing pace of urbanization, population growth and development have all led to pressures on the flood plains magnifying the damage caused by floods. The incidence of floods in urban areas such as Mumbai, Surat and Vadodara is symptomatic of this trend and is the direct result of unauthorized construction activities in flood plains and river beds, poor urban planning and implementation, lack of investment in storm water drainage and sewerage for several decades as well as inadequate planning and response mechanisms.

Mitigation Strategy

There should be a master plan for flood control and management for each flood prone basin.

1. Adequate **flood-cushion** should be provided in water storage projects, wherever feasible, to facilitate better flood management.
2. While physical flood protection works like embankments is necessary, increased emphasis should be laid on non-structural measures such as flood forecasting and warning, flood plain zoning and flood proofing for the minimisation of losses and to reduce the recurring expenditure on flood relief.
3. There should be strict regulation of settlements and economic activity in the flood plain zones along with flood proofing, to minimise the loss of life and property on account of floods.
4. Flood forecasting activities should be modernised, value added and extended to other uncovered areas. Inflow forecasting to reservoirs should be instituted for their effective regulation.

Landslides And Avalanches

Landslides are mass movements of rocks, debris or earth, down mountain slopes or riverbanks. Such movements may occur gradually, but sudden sliding can also occur without warning.

Vulnerable Zones

1. They often take place in conjunction with **earthquakes, floods and volcanic eruptions**. At times, prolonged rainfall causing heavy landslides block the flow of rivers for quite some time, which on bursting can cause havoc to human settlements downstream.
2. The **hilly terrains of India,** particularly in the Himalayas and the Western Ghats, are most vulnerable to landslides. The Himalayan mountain belt comprises of tectonically unstable younger geological formations

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and often the slides are huge, and in most cases, the overburden along with the underlying lithology is displaced during sliding, such as in the Malpa landslide of 1998 when an entire village was buried by a huge landslide.

3. In contrast, the **Western Ghats and Nilgiri Hills** are geologically stable but have uplifted plateau margins influenced by neotectonic activity and the slides are usually confined to the over burden without affecting the bedrock beneath. The slides are generally in the nature of debris flows occurring population in the region.

Mitigation measures for Landslides

Measures to control landslides include

1. **Micro zonation** so as to regulate settlements in hazard prone areas
2. **Non-interference with the natural water channels**, construction of retaining walls against steep slopes and strengthening of weak areas with grouting.
3. In India, landslide studies are conducted by a number of **institutions, research and academic.** However, there is a need for better coordination among these institutions and also the user agencies.

Avalanches

The sliding down of snow cover on mountain slope causes avalanches. Avalanches may occur due to a combination of factors such as the slope of the mountain, depth of snow cover, wind velocity and atmospheric temperature, vibrations caused by gunfire and strength of resisting forces like vegetation cover of trees and shrubs. When the balance between the gravitational force of snow cover and the resisting force of the slope and the anchoring effect of shrubs are lost, avalanches are caused.

Damage and Loss

Avalanches create various crisis situations for the local administration; road traffic may be blocked and communication links to vital areas may be disrupted and winter sports may be disturbed stranding tourists in places with scant facilities. Avalanches may sometimes hit or bury human settlements down the slopes, as in the Kashmir avalanche of 2005, which killed 278 persons.

Mitigation Measures for Avalanches

These can be classified into structural and non-structural measures:

1. Structural measures: - Planting (Avalanche Prevention Forest) Stepped Terraces, Avalanche Control Piles, Avalanche Control Fence, Suspended Fences, Snow Cornice Control Structures, Protection structures such as stopping, deflecting and retarding structures.
2. Non-structural measures - removing snow deposits on slopes by blasting, predicting avalanches and evacuating people from vulnerable areas.

Industrial Disaster

Industrial disaster is probably the most devastating (after wars) among the man-made disasters.

These disasters may be caused by chemical, mechanical, civil, electrical or other process failures in an industrial plant due to accident or negligence, which may cause widespread damage within and/or outside the plant.

Vulnerability

About 1633 major industrial hazard units are located in 245 districts in 19 States/ UTs17. Stringent environmental protection laws have prevented major industrial disasters after Bhopal, but minor disasters do take place on and

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off site and also during transportation of hazardous materials, which claim a number of lives each year besides creating environmental problems. Industrial disasters are a major concern today because of increase in the pace of industrialization.

Damage and Loss

The worst example globally was the Methyl Iso-cynate gas leak in 1984 from the Union Carbide Factory in Bhopal (hereinafter referred to as the Bhopal Gas Tragedy) which has so far claimed more than 20,000 lives and injured several lakh persons16 besides stunting the growth of a generation born from the affected population.

Mitigation Measures

Before 1984, industrial safety was governed by legislations like the

- Factories Act, 1948
- The Explosives Act, 1884.
- The Environment Protection Act, 1986

More importantly, several rules were promulgated under the Acts.

Epidemics

In India, the major sources of epidemics can be broadly categorized as follows:

1. **Water-borne diseases** like cholera (and forms of gastroenteritis), typhoid, Hepatitis A, Hepatitis B etc - major epidemics of such diseases have been recorded in the past and continue to occur.
2. **Vector-borne** (often mosquito-borne) epidemics like dengue fever, chikungunya fever, Japanese encephalitis, malaria, kala-azar etc, which usually occur in certain regions of the country.
3. **Air-borne diseases** like influenza and measles that can also be transmitted through fomites (used clothes etc.)
4. **STDs** - Person to person transmission of diseases e.g. AIDS and other venereal diseases.

Recent Outbreaks

There are certain types of **emerging infectious diseases** such as the recent outbreak of avian flu in poultry in certain parts of the country and which has the potential of being transmitted to human beings. Epidemics due to the Dengue virus have occurred in many metropolitan cities of India and outbreak of various other types of viral diseases is also a recurring phenomena.

Vulnerability Zones

Epidemics often take place due to

1. Poor sanitary conditions leading to contamination of food and water
2. Inadequate disposal of human or animal carcasses in postdisaster situations. They become real dangers during floods and earthquakes.
3. Poor solid waste management may create epidemics like plague. Incidence of plague is quite uncommon now but it can still occur claiming many human lives and disrupting normal life as it did in Surat in 1994.

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Damage and Losses

Avian Influenza: The continuing outbreaks of highly pathogenic avian influenza (HPAI) in some parts of the country have spelt disaster for the poultry industry and have raised serious public health concerns. Over a million domestic poultry have either died or been destroyed. Economic losses to the poultry sector are likely to have serious implications, but despite control measures the disease continues to recur, causing further economic losses and threatening the livelihood of millions of poor livestock farmers, jeopardizing small-holder entrepreneurship and commercial poultry production and seriously impeding regional and international trade and market opportunities.

Nuclear Hazards

Vulnerability

With increased emphasis on power generation through nuclear technology, the threat of nuclear hazards has also increased. The Department of Atomic Energy (DAE) has been identified as the nodal agency in the country in respect of man-made radiological emergencies in the public domain.

Mitigation Measures

Nuclear facilities in India have adopted internationally accepted guidelines for ensuring safety to the public and environment. A crisis management system is also in place to take care of any nuclear hazard. In addition to the other types of emergency response plans in place within the facility to handle local emergencies, response plans have also been drawn up for handling such emergencies in the public domain, which are called as "off site Emergencies".

Desert Locusts

Desert Locusts, are undoubtedly the most dangerous of locust species. Under favourable environmental conditions, a few solitary individuals can dramatically multiply, form large swarms able to migrate great distances and threaten agriculture over a large part of Africa, the Middle East and Southwest Asia. In the last century, there have been six plagues of Desert Locusts, one of which lasted almost 13 years.

Mitigation Measures

- Initial Desert Locust control efforts were largely curative but the trend in the twentieth century had been toward preventing such plagues from occurring.
- International cooperation lies at the core of an effective strategy for locust control.
- This strategy has proved to be quite effective because countries have come to accept that international cooperation is critical in the fight against the Desert Locust.
- Nevertheless, plagues are not always prevented and often substantial control operations are required to reduce locust numbers and try to bring a halt to an upsurge or plague. It has become apparent that such operations could be strategically applied at certain times or in specific areas.
- The challenge in coming years will be to evolve Desert Locust management strategies in a manner that ensures food security while minimizing any detrimental effects on the environment.

Slow Onset Disasters

Disasters can also be classified as 'slow onset' disasters and 'rapid onset' disasters. Climate change (global warming), desertification, soil degradation, and droughts, would fall under the category of slow onset disasters while Earthquakes, cyclones, floods, tsunamis would fall under the category of rapid onset disasters. Slow onset disasters are also termed as 'Creeping Emergencies'. It may be added that with 'prevention' forming an integral

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part of the 'management cycle', slow onset disasters like global warming, and desertification must find adequate reflection in disaster preparedness - these phenomena gradually erode the 'health' of ecosystems and expose societies to the vagaries of nature.

Climatic Change

Climate change is defined as 'a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or even longer). Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.'

Global warming caused due to the "Greenhouse effect" is one of the major reasons for climate change. Global warming leads to melting of glaciers, rise in sea level and threatens low lying coastal areas (Like the Sunderbans and entire nations such as Bangladesh and Maldives).

Global Warming

The World's climate has barely changed since the industrial revolution. The temperature was stable in the 19th century, rose very slightly during the first half of the 20th century, fell back in the 1950s-70s, then started rising again. Over the last 100 years, it has gone up by about 0.6 Degrees Celsius.

So what's the issue now?

Not so much the rise in temperature as the reason for it. Previous changes in the world's climate have been set off by variations either in the angle of Earth's rotation or in its distance from the Sun. This time there is another factor involved: man-made "green house" gases.

Droughts

Droughts refer to a serious shortfall in availability of water, mainly, but not exclusively, due to deficiency of rains, affecting agriculture, drinking water supply and industry. Droughts occur in several parts of the world and can bring untold misery to populations particularly those depending on agriculture and living on generally degraded land. The causative factors are both natural and manmade. The impact of droughts on societies varies depending on coping capabilities and the general health of the national economies concerned.

Droughts in India have their own peculiarities requiring appreciation of some basic facts i.e.

1. India has an average annual rainfall of around 1150 mm; however, there is considerable annual variation.
2. More than 80% of rainfall is received in less than 100 days during the South-west monsoon and the geographic spread is uneven.
3. 21% area receives less than 700 mm rains annually making such areas the hot spots of drought.
4. Inadequacy of rains coupled with adverse land-man ratio compels the farmers to practice rain-fed agriculture in large parts of the country.
5. Irrigation, using groundwater aggravates the situation in the long run as ground-water withdrawal exceeds replenishment; in the peninsular region availability of surface water itself becomes scarce in years of rainfall insufficiency.
6. Per capita water availability in the country is steadily declining.
7. As against total annual availability 1953 km3, approximately 690 km3 of surface water and 396 km3 of from ground water resources can be put to use. So far, a quantum of about 600 km3 has been put to use21.
8. The traditional water harvesting systems have been largely abandoned.

Notes

The above factors demonstrate the complexity of Indian droughts and the constraints which rule out 'perfect solutions'. It also needs to be appreciated that, like anywhere else in the world, agriculture in India is affected by weather in all its phases - from tillage and sowing to post-harvest disposal. Thus, while adequate availability of water is crucial to agriculture, it continues to be affected by other variables such as temperature, humidity, and solar radiation and wind patterns.

Desertification and Soil Degradation

Any kind of land degradation can be termed as desertification. This can take place due to soil erosion, increasing alkalinity in soil and water-logging.

While desertification poses serious livelihood challenges for the affected populations, for areas under stress of soil erosion and land degradation the process of desertification is accelerated due to continuing cultivation.

Land degradation is estimated to affect one third of the total area of the country. About 8.6 million hectares of India's land area is afflicted with the twin problems of alkalinity and salinity coupled with water-logging, which seriously reduces agricultural productivity and has grave implications for our food security system.

Sea Erosion

The landward displacement of the shoreline caused by the forces of waves and currents is termed as erosion. Coastal erosion occurs when wind, waves and long shore currents move sand from the shore and deposit it somewhere else. The sand can be moved to another beach, to the deeper ocean bottom, into an ocean trench or onto the landside of a dune. The removal of sand from the sand-sharing system results in permanent changes in beach shape and structure.

The impact of the event is not always seen immediately, but it is equally important when we consider loss of property that it causes. It takes months or years to note the impact. So, this is generally classified as a "long term coastal hazard".

About 23 per cent of India's mainland coastline of 5423 km is getting affected by erosion, according to a survey. As much as 1248 km of the shoreline was getting eroded all along the coast with 480 km of the 569 km shoreline of Kerala affected by the phenomenon.

Prevention measures against sea erosion include sea walls, gabions, boulders, revetments, steel piles, rock groynes and offshore rock bars. The Ministry of Ocean Development has undertaken several 'Shoreline Management Plan Projects' too.

Disaster Response Mechanism in India

Over the centuries, local communities have developed their own indigenous survival mechanisms. This rich storehouse of knowledge is a part of our country's legacy.

- The Arthashastra, (a treatise on public administration by Chanakya in the 4th century B.C), devoted a section to mitigation measures to combat famines.
- Modern methods of crisis management began to be applied from the late 1870s when the first Famine Commission suggested formulation of Famine Codes and establishment of Agriculture Departments in the provinces

The community is usually the **first responder** in case of a crisis/disaster.

1. Field level response on behalf of the government in **rural areas** is by the nearest police station and the revenue functionary (patwari/patel/talati/karnam etc)

Notes

2. In **urban areas** the response is articulated by agencies like the civic authorities, the fire brigade and the local police station.

3. At present, panchayats do not have the capacity to react institutionally in any effective manner and it is the district administration, which retains the basic responsibility of handling crises situations with the **Collector playing a pivotal role**.

Legal and Institutional Framework

Realizing the importance of crisis management, many countries have passed laws to deal with various aspects of crisis management.

- Till independence, the entire crisis management exercise was confined to fighting natural calamities, particularly severe droughts causing famines.
- After Independence, drought relief works were undertaken in areas affected by severe droughts. With the onset of the green revolution in the late 1960s the necessity for famine relief work declined and a holistic drought management programme was taken up in the form of the **Drought Prone Areas Programme (DPAP)**.
- Disaster Management Act, 2005 legislation at the national level was enacted in the year 2005. Several states had also passed their own legislation on disaster management prior to the National Act.

Disaster Management in Constitution

The Indian Constitution has delineated specific roles for the Union and State Governments. However, the subject of disaster management **does not find mention in any of the three lists** in the Seventh Schedule of the Indian Constitution.

Constitutional Provision - is there need for a separate entry?

Under the **Seventh Schedule** of the Constitution, subjects that come under the legislative competence of the Union and State Governments are enumerated in the Union and the State Lists respectively. Subjects have also been identified for which both the Union and the States have concurrent legislative jurisdiction and these are included in the Concurrent List.

Disaster Management as a subject is **not mentioned in any of the three lists**. A subject not specifically mentioned in any of these lists comes under the **Residuary Powers of the Union under entry 97** of the Union List.

According to one view, Parliament therefore has the competence to legislate on this subject. However, by practice and convention the primary responsibility for managing disasters rests with the State Governments.

The NCRCW made the following recommendation -

"*Management of Disasters and Emergencies, natural or man-made be included in list threei.e. the concurrent list of the Seventh Schedule of the Indian Constitution".*

Parliament has enacted the **Disaster Management Act, 2005** by invoking entry 23 namely 'Social security and social insurance, employment and unemployment' in the Concurrent List even though all aspects of crisis management cannot be said to be covered by this entry.

Before one examines the issue of where the subject should appropriately be included, it is necessary to **analyze the activities that constitute 'disaster management'** so as to ensure that these do not come into conflict with other entries in the three lists.

Notes

There are already various entries in the three lists, which deal with some aspect or other of disaster management. 'Public order' finds a place in the State List, as does Public Health. Entries 14 and 17 in the State List deal with Agriculture and Water respectively. Environment and Social Security are included in the Concurrent List. Atomic energy and Railways are part of the Union List. In addition, after the 73rd and 74th amendments all civic powers have been delegated to local bodies.

Due to the **cross cutting nature of activities** that constitute disaster management and the vertical and horizontal linkages required which involve coordination between the Union, State and local governments on the one hand and a host of government departments and agencies on the other; setting up of a broadly uniform institutional framework at all levels is of paramount importance.

The legislative underpinning for such a framework would need to **ensure congruence and coherence with regard to the division of labour and responsibilities** among the agencies at the Union, State and other levels. This could best be achieved if the subject of Disaster Management is placed in the Concurrent List of the Constitution.

Role of State Government

In India the basic responsibility to undertake rescue, relief and rehabilitation measures in the event of natural disasters rests with the State Governments. The entire structure of crisis administration had been oriented from the very beginning towards post disaster relief and rehabilitation.

Relief Commissioner

- In states Relief Commissioners are in charge of the relief and rehabilitation measures. The Relief Commissionerate is usually an adjunct of the Revenue Department whose main job is to administer land ownership, land revenue and tenurial conditions in rural areas. Relief Commissioners work under the Secretary of the Revenue Department. In some states, the Revenue Secretary is also the ex-officio Relief Commissioner. This has the advantage of providing a direct chain of command to the district Collectors and the Tehsildars who are the main field functionaries in the districts and sub-districts, the basic units of administration, but the focus on crisis prevention and mitigation or even of preparedness is missing in such a supervisory framework.

Crisis Management Committee

- Every state has a Crisis Management Committee under the chairpersonship of the Chief Secretary, which reviews crisis situations on a day-to-day basis at the time of crisis, coordinates the activities of all departments and provides decision support system to the district administration.

District Collector

The District Magistrate/Collector has the responsibility for the overall management of disasters in the district.

- He has the authority to mobilize the response machinery and has been given financial powers to draw money under the provisions of the General Financial Rules/Treasury Codes
- All departments of the State Government including the police, fire services, public works, irrigation etc. work in a coordinated manner under the leadership of the Collector during a disaster, except in metropolitan areas where the municipal body plays a major role.
- The District Collector also enjoys the authority to request for assistance from the Armed Forces if circumstances so demand. NGOs have also been effective in providing relief, rescue and rehabilitation in recent times.

Notes

Role of Union Government

The Union Government plays a key supportive role in terms of physical and financial resources and providing complementary measures such as early warning and co-ordination of efforts of all Union ministries, departments and organizations.

- At the apex level, a Cabinet Committee on Natural Calamities reviews the crisis situations.
- A High Level Committee of Ministers under the chairmanship of Minister of Agriculture deals with the issue of financial support to be provided to the State Governments from the National Calamity Contingency Fund, if the funds available with the State Governments under Central Relief Fund are not adequate.

National Crisis Management Committee

The Cabinet Secretary, as the highest executive officer, heads the National Crisis Management Committee (NCMC). Reviews and monitors crisis situations on a regular basis and gives directions to the Crisis Management Group as deemed necessary. The NCMC can give directions to any ministry, department or organization for specific action needed for meeting the crisis situation.

The Central Relief Commissioner in the Ministry of Home Affairs is the Chairman of the Crisis Management Group (CMG) consisting of nodal officers from various concerned ministries. The

Ministry of Home Affairs

Till 2001, the Department of Agriculture and Cooperation had the nodal responsibility for managing disasters. After the Gujarat earthquake in 2001, this responsibility has been shifted to the Ministry of Home Affairs.

However, in view of the highly technical and specific nature of certain disaster events such as aviation disasters, rail accidents, chemical disasters and biological disasters etc; the ministries concerned have the nodal responsibility for handling that particular type of disaster.

Nodal Ministries for Managing Different Types of Disasters

Types of Disasters /Crises	Nodal Ministry
Natural and Man made Disasters	Ministry of Home Affairs
Droughts	Ministry of Agriculture
Air Accidents	Ministry of Civil Aviation
Railway Accidents	Ministry of Railways
Chemical Disasters	Ministry of Environment
Biological Disasters	Ministry of Health
Nuclear Accidents	Department of Atomic Energy

Schemes

- Schemes for financing expenditure on relief in the wake of natural calamities are governed by the recommendations of the Finance Commission appointed by the Government of India every five years.

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- Under the existing scheme, each state has Calamity Relief Fund (CRF) administered by a State Level Committee headed by the Chief Secretary of the State Government.
- In case the funds under CRF are not sufficient to meet the requirements, State Governments can seek assistance from the National Calamity Contingency Fund (NCCF) – a fund created at national government level.

Armed Forces

The Armed Forces play a major role in assisting the civil administration particularly in emergency support functions such as communications, search and rescue operations, health and medical facilities, transportation, power, food and civil supplies, publicworks and engineering, in the immediate aftermath of major disasters.

Evolution of the Legal Framework

Earlier there were no comprehensive law on the subject, laws and regulations pertaining to certain specific types of disaster situations did exist.

Unification Of Crisis Management: The Disaster Management Act, 2005

While the post-Gujarat earthquake reform initiatives were still in their initial phase of implementation, a devastating tsunami hit many countries on the rim of the Indian Ocean including several states of our country. This experience brought home the necessity of further reforms in the system. Taking the institutional reform process further, the Union Government decided to formulate comprehensive disaster management legislation, providing for a legal and institutional framework of crisis management at all levels in the country. The Disaster Management Bill was introduced in Parliament in May 2005 and finally enacted in December 2005. The Disaster Management Act in deals with all aspects of disaster management throughout the country.

Analysis of the Disaster Management Act, 2005

The Disaster Management Act, 2005 concentrates very comprehensive powers and functions at the national level for dealing with disasters. Thus, the National Disaster Management Authority (NDMA) has the responsibility for not only laying down policies, plans and guidelines, but also has executive functions for ensuring timely and effective response to disasters.

The Role and Functions of a National Disaster Management Organisation

The main scope of a disaster management law is to establish a national agency/ organization for coordination of disaster management.

The role of such an organization is to:

- Provide a coherent approach to disaster management across all phases from preparedness and mitigation to response and recovery.
- Provide a common framework
- Allocate responsibilities clearly.
- Provide a framework for coordinated response.

Recommendations on Disaster Management Act 2005

The Disaster Management Act, 2005 (Central Act) needs to be amended to bring in the following features:

1. Disaster/Crisis Management should continue to be the primary responsibility of the State Governments and the Union Government should play a supportive role.

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2. The Act should provide categorization of disasters (say, local, district, state or national level). This categorization along with intensity of each type of disaster will help in determining the level of authority primarily responsible for dealing with the disaster as well as the scale of response and relief - detailed guidelines may be stipulated by the NDMA on this subject.

3. The functions of the National Disaster Management Authority should be:

   a. to recommend policies, to lay down guidelines for preparation of different disaster management plans and standard operating procedures; to promote and organize vulnerability studies, research and evaluation;

   b. to advise on parameters of categorization and on declaration of national and state level disasters

   c. to develop expertise and knowledge in the field of crisis/disaster management and disseminate to the field, to develop and organize training and capacity building programmes, to coordinate the early warning systems;

   d. to deploy specialized manpower and machinery in support of local/State Governments, where required; to advise on constitution and use of the Disaster Management Funds and; to give recommendations on all matters relating to crisis/disaster management to the government.

4. The task of implementation of mitigation/prevention and response measures may be left to the State Governments and the district and local authorities with the line ministries/departments of Government of India, playing a supportive role.

5. The law should cast a duty on every public functionary, to promptly inform the concerned authority about any crisis, if he/she feels that such authority does not have such information.

6. The law should create a uniform structure at the apex level to handle all crises. Such a structure may be headed by the Prime Minister at the national level and the Chief Minister at the state level. At the administrative level the structure is appropriately headed by the Cabinet Secretary and the Chief Secretary respectively.

7. The law should make provisions for stringent punishment for misutilization of funds meant for crisis/ disaster management.

8. The role of the local governments should be brought to the forefront for crisis/disaster management.

9. The NEC as stipulated under the Disaster Management Act need not be constituted, and the NCMC should continue to be the apex coordination body. At the state level, the existing coordination mechanism under the Chief Secretary should continue.

10. Since all sections of the Act have not been notified, it is suggested that the above amendments be carried out without further delay. Meanwhile, except for those sections for which amendments are suggested, the others can be notified straightway so that the law can be brought into effect.

Institutional Framework

New Institutional Arrangements

Following the Gujarat earthquake, the Government of India took important policy decisions/measures for revamping the disaster management system in the country. These are:

- Disaster management with reference to rapid onset disasters was moved from the purview of the MoAgriculture to the Ministry of Home Affairs.

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- The MoAgriculture retains the responsibility for droughts, pest attacks and hailstorms;
- State Governments were advised to reorganize their Relief & Rehabilitation Department into a separate Disaster Management Department
- State Governments were further advised to constitute State Disaster Management Authority under the Chairmanship of State Chief Ministers and the District Disaster Management Committee under the Chairmanship of District Collectors
- National Disaster Response Force (NDRF), Emergency Operation Centres (EOC) , National Institute of Disaster Management(NIDM) was set up for disaster management.
- Basics of disaster management to be introduced in school education, disaster resistant technologies to be introduced in engineering and architecture courses and emergency health management to be introduced in medical and nursing education;
- A community based disaster risk management programme to be launched in multi-hazard districts throughout the country.

Recommendations on Institutional Framework -

1. There is no need for a separate ministry/department of disaster management at the national or the state level.
2. The National Crisis Management Committee can continue to be the apex coordination body.
3. At the state level, the existing coordination mechanism under the Chief Secretary may continue.
4. Notwithstanding the establishment of NDRF, the role of the Armed Forces, particularly the Army, in coming to the aid of victims of disasters should be retained

Role of Local Self-Governments (First Responders)

Local self-governments, both rural and urban, have emerged as important tiers of governance, after the 73rd and 74th Amendments to the Constitution. For the people, they are also the nearest units of administration and are among the first responders to any crisis besides being closely knit with the communities. These units can thus play an important role in crisis management under the overall leadership of the District Administration

Recommendation:

- State Governments may examine the need to incorporate provisions in the state disaster management law and also the state laws governing local bodies to provide for a well defined role to the municipal bodies and panchayat raj institutions.

Crisis Management Set Up for Metropolitan Cities

Recommendation

1. In larger cities (say, with population exceeding 2.5 million) the Mayor, assisted by the Commissioner of the Municipal Corporation and the Police Commissioner should be directly responsible for Crisis Management

Bringing "Water" at the Centre Stage of Policy Domain

Two of the major types of disasters i.e. floods and droughts are primarily water related**.** Adoption of both short and long term measures would remain sub-optimal unless larger issues like the National Water Budget and a policy regime that takes cognizance of the mismatch between supply and demand are properly addressed. A major impediment to making any progress in this direction is the 'segmented policy attention' from a number of ministries/ departments.

Notes

Recommendation

1. Water supply – urban and rural, soil conservation and watershed development, environment, water quality etc. are dealt with by other ministries/departments, The policies and programmes of the one impinge on the other. Since water has diverse uses, the entire subject cannot be brought under one ministry

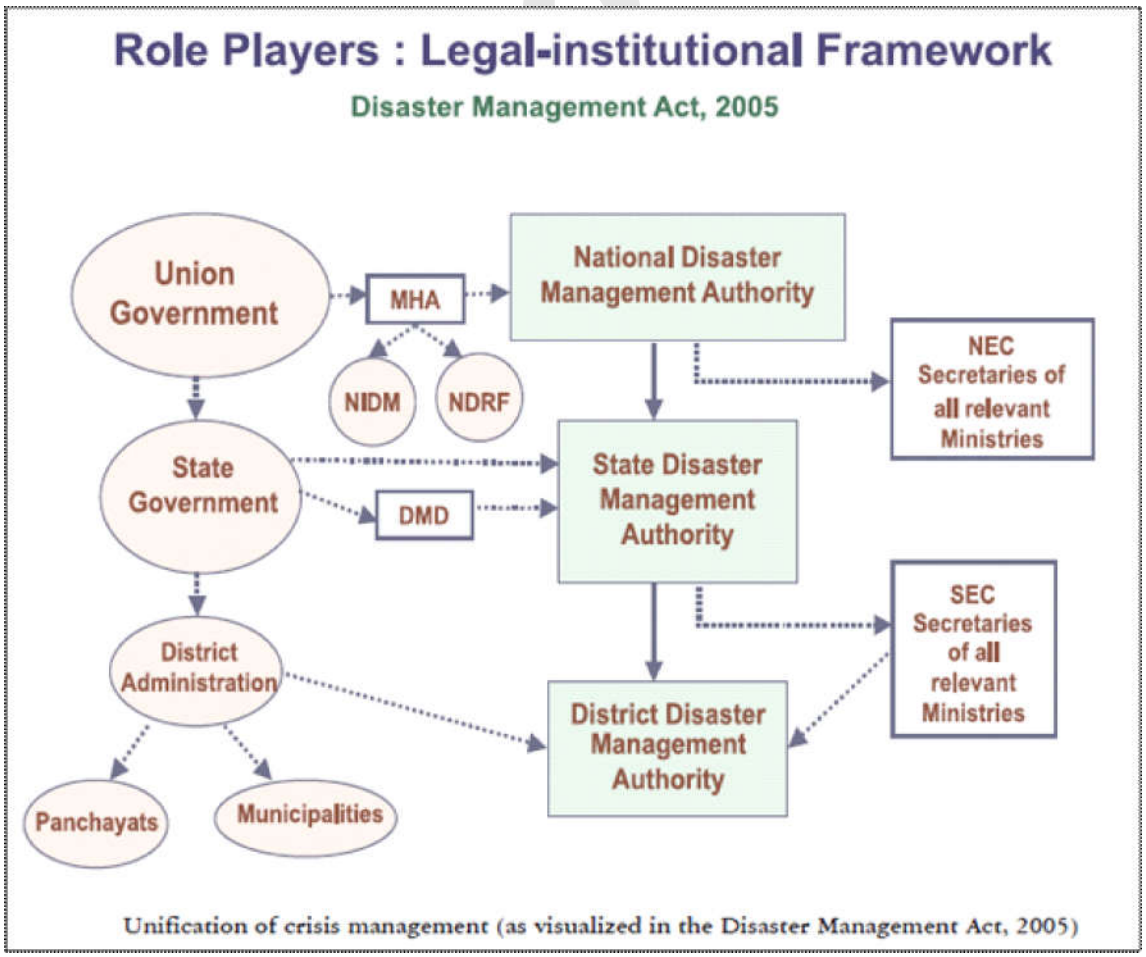
Professionalization of Disaster Management

Institutional development for disaster management in the country has clearly suffered on account of paucity of professionally qualified personnel. While civil servants and other senior personnel in organizations like the police, armed forces and municipal bodies have provided a leadership role and their leadership will continue to be required, it is time that special attention is paid to the long felt need to professionalize disaster management in the country.

Recommendations:

1. 'Disaster Management' as a body of knowledge should be introduced as a subject in Management and Public Administration. The University Grants Commission may initiate the process to see how best this can be implemented in selected universities.

2. The possibility of bilateral agreements with foreign governments and international institutions dealing with different aspects of disaster management, for exchange of experiences and learning from their documentation and research efforts may be explored.



Unification of crisis management (as visualized in the Disaster Management Act, 2005)

Notes

Risk Reduction

Disaster risk is a consequence of hazard and vulnerability. Disaster risk can be reduced by forecasting occurrence of hazards as accurately as possible and well in time, and preparing in advance for their onset and even manipulating those natural hazards, which lend themselves to manipulation.

Enunciating a Policy Which Emphasizes Risk Reduction

There is need to have a **National Policy on Disaster Management.** The policy must address all issues not included in legislations and may, in particular include the following:

1. Disaster management needs to be professionalized.
2. Risk management to be brought to the centre stage in all disaster mitigation plans.
3. All efforts to be based on hazard and vulnerability analysis.
4. Communities and local governments to be made aware of the hazards and the vulnerabilities.
5. Communities and local governments to be involved in formulating disaster management plans.
6. The primary responsibility is to be that of the State Government, with the Union Government playing a supportive role.
7. Effective implementation of land use laws, building byelaws, safety laws and environmental laws.

Assessment of Risk - Hazard and Vulnerability Analysis

The first step in planning for mitigation measures for any crisis in an area is an understanding of the potential hazards in that area. Closely linked with this is assessing the vulnerability of society to such hazards.

Recommendations

1. Hazard and vulnerability analyses should be made an essential component of all mitigation plans.
2. Priority should be given to seismic micro-zonation of vulnerable major cities, hazard prone areas, and urban agglomerations in a scale of 1:1000 in Zones V and IV, with topmost priority being given to cities with population of more than one million.
3. Geographical Information System tools should be used to integrate spatial data as well as non-spatial data on a common platform.
4. Scientific, technological and research organizations such as NRSA, ISRO, NIC, GSI and NIDM should be brought on a common platform by NDMA for developing a sound information base.
5. A detailed vulnerability analysis that would prioritize the areas in order of vulnerability; it should also highlight the vulnerability of different sections of society and infrastructure.

Generating Awareness about Risk

The basic purpose of carrying out risk analysis of an area is to use it as a tool to prepare for disaster mitigation. The goal is to bring about attitudinal and behavioural change in the communities by wide dissemination of the vulnerability of a particular area or community. Such an awareness campaign should be treated as a social marketing effort which should specifically target different sections of the community. The role of local self-governments would be particularly important in such efforts.

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Recommendations:

1. Awareness generation programmes should be undertaken using tools of social marketing.
2. A responsible media, which is also well informed about all aspects of disaster, is a very powerful tool for sensitizing people.
3. Details of past accidents and disasters and the lessons learnt, should be documented and kept in the public domain.

Preparation of Disaster Management Plans

Disaster Risk Reduction Plans (or mitigation/prevention plans) are important components of the plans to be prepared for disaster management at different levels. In this context for ease of analysis, the whole question of disaster management plans is examined. The Disaster Management Act, 2005 mandates preparation of District, State and National level Plans. The Tenth Five Year Plan also accorded a high priority to such *planning.*

Recommendations:

1. Plans should be prepared, based on hazard and vulnerability analysis. The off site emergency plans, in case of industrial hazards, should be integrated into the District Crisis/Disaster Management Plan.
2. The District Disaster Management Plan needs to have two components:
   a. Long Term Mitigation Plan.
   b. Emergency Response Plan.
3. The Long Term Mitigation Plan, in turn, should have the following components:
   a. Long Term Development Plan.
   b. Long Term Enforcement Plan.
4. Annual plans should be culled out of the Long Term Development/ Enforcement Plans. State Governments must evolve a mechanism for speedily scrutinizing district level long term plans to harmonize these with similar plans for other districts, particularly those located contiguously
5. The quality of on-site and off-site emergency plans in hazardous industrial units need to be enhanced in terms of completeness and practicability of implementation considering the ground level situation.
6. The plan should be prepared in consultation with all role players. Each role player should understand and accept his/her roles. This would require awareness campaigns, especially for the community.
7. For ensuring quality of on-site and off-site emergency plans (for hazardous units), the professional expertise available, both in industry, and in enforcement agencies such as the Factory Inspectorates should be improved.
8. All crisis/disaster management plans should be tested periodically through mock drills.

Early Warning Systems

The objective of an early warning system is to alert the community of any impending hazard so that they can take preventive measures. An early warning system basically has four components –

1. Capturing the precursor events

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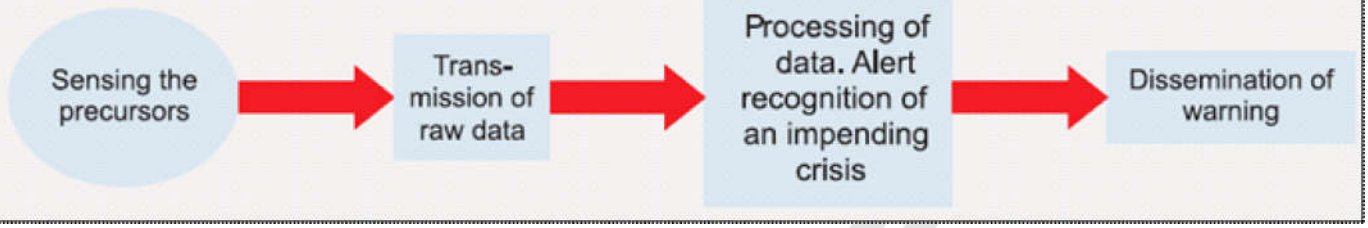
2. Transmission of this data to a central processing facility
3. Alert recognition of an impending crisis
4. Warning dissemination.

Fig. 4.1 : Four Components of an Early Warning System



Early Warning Systems - Key to Disaster Management

"Early warning systems are the key to effective risk reduction. They do save lives and livelihoods (and) in the world we live in, with so much division between rich and poor, they also save an enormous amount of investment for the donor countries that will be called upon to help when people die from such disasters.

We know that the most effective early warning takes more than scientifically advanced monitoring systems. All the sophisticated technology won't matter if we don't reach communities and people. Satellites, data networks will make us safer, but we must invest in the training, the institution building, the awareness raising on the ground. If we want effective global early warning systems, we must work together, government to government, federal and local officials, scientists with policy makers, legislators with teachers and community leaders."

Building Community Resilience

Recommendations:

1. Location specific training programmes for the community should be executed through the panchayats.
2. Crisis management awareness needs to be mainstreamed in schools, colleges, universities and in professional and vocational education.
3. Disaster awareness should be included in training programmes for elected leaders, civil servants, police personnel, and personnel in critical sectors such as revenue, agriculture, irrigation, health and public works.
4. Orientation and sensitization programmes highlighting issues and concerns in disaster management should be taken up for legislators, policy makers, and elected leaders of urban local bodies and Panchayati raj institutions.

Research and Use of Knowledge

Recommendations:

1. NIDM should develop methodologies for effective dissemination of knowledge.
2. Disaster management plans should attempt to integrate traditional knowledge available with the communities.
3. NIDM should coordinate with research institutions and universities on the one hand and field functionaries on the other and identify areas where research is required.

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Emergency Response System

Emergency Plan

During a major crisis, the normal emergency response system usually gets overwhelmed and mobilization of all resources of community, government, local bodies (municipalities and panchayats), NGOs and private sector becomes necessary.

Lessons Learnt from Tsunami

1. Although the State Government's response was quick, Standard Operating Prodecures(SOPs) need to be developed to minimize response time.
2. The relief teams need to be equipped with proper equipments.
3. Need for a stronger coordination mechanism for rescue and relief especially for NGOs.
4. Mismatch between demand and supply of relief material has to be through effective communication.
5. Post-disaster public health problems were avoided due to timely immunization, sanitation and disinfection.
6. Coastal Zone Regulations should be strictly enforced.
7. Urgent need for early warning system.

Recommendations:

1. Emergency Response Plans should be up-to-date and should lay down the 'trigger points' in unambiguous terms.
2. The district emergency response plan should be prepared in consultation with all the role players. (This should be a part of the District Disaster Management Plan).
3. SOPs should be developed for each disaster at the district and community level, keeping in mind the disaster vulnerability of the area.
4. Unity of command should be the underlying principle for effective rescue operations. For example in a district all agencies of Union and State Government have to work under the leadership of the Collector. Such unity of command principle should pervade at all field levels.
5. The plan should be validated annually through mock drills and it should be backed by capability building efforts.
6. Handling of crisis should be made a parameter for evaluating the performance of officers.

These principles apply to plans at other levels and also in case of metropolitan cities.

Coordinating Relief

The emergency response phase can be divided into two distinct categories of activities. **The first is rescue and the second is relief.** The immediate response to any disaster should be launching of rescue operations which have the primary aim of saving human lives and thereafter animal lives and property. The rescue operations have to be carried over a short period of time as the window of opportunity is usually small ranging from a few hours to a few days.

Mobilization of local efforts, use of volunteers, civil defence and other personnel, police and fire forces and armed forces, is important depending upon the intensity of the disaster. As the rescue operations are on, the

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phase for providing relief starts. Providing relief entails making immediate arrangements to ensure that the basic minimum necessities of life like food, clothing, shelter, security, and basic health and sanitation facilities are made available**.** The relief phase may last for a few weeks, till the affected families are properly rehabilitated. NGOs can play a particularly important role during the relief phase.

Recommendations:

1. Effective coordination is essential at the district and sub-district levels for rescue/relief operations and to ensure proper receipt and provision of relief. Unity of command should be ensured with the Collector in total command.
2. The demand should be assessed immediately and communicated to all concerned including through the media, so that the relief provisions are provided as per requirements.
3. Ensuring safe drinking water and sanitized living conditions should receive a priority
4. All procurement and distribution of relief materials should be done in a transparent manner.
5. Monitoring and vigilance committees should be set up involving the stakeholders.
6. Trauma care and counselling should be made an integral part of the relief operations.

Role of Specialized Agencies

There are several agencies which have an important role in disaster management. Some of these are

Civil Defence

Civil defence means the performance of some or all of the humanitarian tasks intended to protect the civilian population against the dangers, and to help it to recover from the immediate effects, of hostilities or **disasters** and also to provide the conditions necessary for its survival:

These tasks are"

a. Warning; b. evacuation; c. management of shelters; d. management of blackout measures; e. rescue; f. medical services, including first-aid, and religious assistance; g. fire-fighting;h. detection and marking of danger areas; i. decontamination and similar protective measures;j. provision of emergency accommodation and supplies; k. emergency assistance in the restoration and maintenance of order in distressed areas; l. emergency repair of indispensable public utilities;m. emergency disposal of the dead; n. assistance in the preservation of objects essential for survival; o. complementary activities necessary to carry out any of the tasks mentioned above, including, planning and organization."

Recommendations

1. The Civil Defence Act should be amended as proposed so as to cover all types of disasters.
2. Civil Defence should be constituted in all districts which are vulnerable not only to hostile attacks but also to natural calamities.
3. The goal of community participation should be pursued primarily through the instrumentality of Civil Defence especially in urban areas.
4. The objective should be to include 1% of the population within the fold of Civil Defence within five years.
5. Efforts should be made to enlist paramedics as Civil Defence volunteers.

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6. Budgetary allocations to Central Financial Assistance for Civil Defence should be increased.
7. Civil Defence set-ups should be permitted to accept donations.
8. The Civil Defence set-up at the state level may be brought under the control of the crisis/Disaster Management set-up.

Police, Home Guards and Fire Services:

The **police** are among the first responders in any crisis. This response normally comes from the nearest police station or police outpost. Their immediate responsibility is to communicate the information and mount rescue and relief efforts with whatever resources those are available with them.

The role of **Home Guards** is to serve as an auxiliary to the police in the maintenance of internal security, help the community in any kind of emergency such as an air-raid, fire, cyclone, earthquake, epidemic, etc., help in maintenance of essential services, promote communal harmony and assist the administration in protecting weaker sections, participate in socio-economic and welfare activities and perform civil defence duties The total strength of Home Guards in the country is 5,73,793 against which the raised strength is 4,87,239.

Recommendations

1. Policemen, Firemen and the Home Guards should be adequately trained in handling crises/ disasters. Such training should be specific to the types of crises envisaged in an area. More importantly, they should be fully involved in the preparation of the local Crisis/Disaster Management Plan
2. The minimum qualification for entry to Home Guards may be revised to at least a pass in the 10th class, given the increased responsibility and complexity of tasks to be entrusted to them.
3. A section of Home Guards should also be given Para-medical training.
4. Fire Services should more appropriately be renamed as Fire and Rescue Services with an enhanced role to respond to various types of crises.
5. Only persons with expertise in crisis/disaster management should be inducted into the top management of the Fire (and Rescue) Services.
6. Fire and Rescue Services should be brought under the control of the State Crisis/Disaster Management set up under the Disaster Management Law.
7. The NDMA may be requested to suggest model provisions regarding these services for inclusion in the Disaster Management Act/s.

Armed Forces/Territorial Army/Ex-Servicemen

Armed forces have invariably played an important role in rescue and relief operations in all major disasters in the country. The constitution of specialized NDRF battalions would reduce the pressure on the armed forces, but with widespread presence, availability of highly trained, dedicated and well equipped human resources, and their capability to react within a short time-frame, the armed forces would continue to play a vital role in rescue and relief during all major crises.

Territorial Army units should also be incorporated in planning and operations. The potential of ex-servicemen available throughout the country should also be tapped for disaster management. They should be mobilized for creating a voluntary disaster task force at the local level.

Notes

Setting-up Integrated Emergency Operations Centre (EOC):

While it is necessary that each nodal ministry handling crisis has an EOC, it is clearly desirable to have an integrated National Emergency Operation Centre for all types of crises. 'Subject-matter specific' Ministries/ Departments should deploy representatives in this Centre which must be networked with all other EOCs and control rooms.

Organising Emergency Medical Relief

a. An institutional arrangement to attend to medical emergencies is required to be put in place.

b. Access to this system should be facilitated by having an identical telephone number throughout the country.

Recovery - Relief And Rehabilitation

Relief and Rehabilitation:

The International Strategy for Disaster Reduction (ISDR) defines recovery as the decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk.

Recovery an Opportunity Disaster can become a development opportunity if relief efforts do not merely restore the poor status quo ante, but rather put people on a path to sustainable development. The goal in the transition phase must be to avoid a 'circularity of risk'. This is what can happen when houses built with valuable international assistance get washed away during floods, dams left unrepaired after an earthquake aggravate drought conditions, and procedural delays in receiving rehabilitation packages from government and donor agencies leave the poor more vulnerable to the next disaster.

Community Participation

In Latur, thousands of people waited five years for the Government to construct their houses. Contractor-built houses are not only disempowering, but can incrementally regress to non-seismic

structures. On the other hand, once people are given technical inputs on seismic safety features, owner-built houses help to internalize the know-how and to foster experimentation through different approaches and mix of technology. Involving the community in design helps to cater the specific agricultural needs such as grain storage, cattle-rearing and milk-processing.

Recommendations

1. Damage assessment should be carried out by multi-disciplinary teams
2. The efforts of NGOs and other groups have to be coordinated with government activities
3. A recovery strategy should be evolved in consultation with the affected people and concerned agencies and organisations.
4. Minimum standards of relief should be developed to address the requirements of food, health, water and sanitation shelter requirements.
5. Focus should be placed on the special needs of the vulnerable population that is, children, women, the elderly and the physically challenged.
6. Implementation of the rehabilitation efforts should be carried out by the village panchayats/local bodies.
7. Land use plans which ensure safety of the inhabitants should be brought into effect during reconstruction.

Notes

8. All new civil constructions should mandatorily be made disaster resistant as per prescribed standards.
9. A mechanism for redressal of grievances should be established at the local and district levels.
10. For all major disasters, NIDM should conduct a detailed evaluation exercise through independent professional agency.

Gender Issues and Vulnerability of Weaker Sections

It has been observed that women and children are the most adversely affected in disasters, particularly natural disasters, and consequently suffer the most.

The basic reason for this situation is

- The gender disparities which exist in our society because of which women have little say in decision making, particularly outside the household.
- They are comparatively less literate
- Have lesser mobility and are dependent on men folk in most matters
- Consequently, they are not adequately consulted in the decision making process in the community and have a lesser role in all activities

Therefore, in disaster preparedness plans or during relief and rescue operations, the special needs and concerns of women including their psychological and physical health and well being must be adequately addressed.

The same principles apply to other vulnerable sections like the children, the elderly and the physically challenged

Some of the causes of these patterns are similar across the region:

- Many women died because they stayed behind to look for their children and other relatives
- Men more often than women can swim
- Men more often than women can climb trees.

But differences too are important: Women in Aceh, for example, traditionally have a high level of participation in the labour force, but the wave struck on a Sunday morning when they were at home and the men were out on errands away from the seafront. Women in India play a major role in fishing and were waiting on the shore for the fishermen to bring in the catch, which they would then process and sell in the local market. In Sri Lanka, in Batticoloa District, the tsunami hit at the hour women on the east coast usually took their baths in the sea.

Recommendation

1. The vulnerability analysis should bring out the specific vulnerabilities of women and these should be addressed in any mitigation effort.
2. Disaster mitigation plans should be prepared, in consultation with women's groups. Similar steps should be taken for other vulnerable groups.
3. Rescue and relief operations should focus on the most vulnerable groups.
4. Particular attention needs to be given to their physical and mental well being through health care and counselling.

Notes

5. In the recovery phase, efforts should focus on making women economically independent by offering them opportunities of earning incomes; providing training in new skills, forming self-help groups and providing microfinance, marketing facilities etc.
6. The title of new assets created should be in the names of both husband and wife.
7. Camp managing committees should have adequate number of women representatives.
8. Trauma counselling and psychological care should be provided to widows and women and other persons in distress. These activities should form part of the disaster management plan.
9. Arrangements have to be made for orphaned children on a long term basis. NGOs should be encouraged to play a major role in their rehabilitation.

Drought Management

Risk Reduction

The principles of disaster risk reduction outlined in the previous chapters are applicable to droughts as well, but unlike floods, earthquakes, and cyclones, droughts have certain distinct features –

1. The onset is slow giving adequate warning,
2. It affects livelihoods of people over a large area
3. The duration of the disaster is much longer and so the relief efforts have to be sustained over this stretched time period
4. It remains basically a rural phenomenon except that very severe drought may also impact on urban water supply by drying up sources and drastically reducing water table in regions with aquifers
5. There is a possibility that drought management efforts could reduce vulnerability by improving moisture conservation and vegetal cover etc. This does not hold true of other natural disasters. In other words, droughts lend themselves to being managed in a manner not possible in most other disasters. All these factors necessitate 'independent consideration' drought management.

Drought-prone Area Development (DPAP)

Drought-prone areas should be made less vulnerable to droughtassociated problems through soil - moisture conservation measures, water harvesting practices, minimisation of evaporation losses,development of the ground water potential including recharging and the transfer of surface water from surplus areas where feasible and appropriate. Pastures, forestry or other modes of development which are relatively less water demanding should be encouraged. In planning water resource development projects, the needs of droughtprone areas should be given priority. Relief works undertaken for providing employment to droughtstricken population should preferably be for drought proofing.

Revisiting Long Term Interventions (Droughts)

A National Institute of Drought Management may be set up for networking on multi-disciplinary, cross-sectoral research on various aspects of drought, acting as a resource centre on droughts and carrying out impact evaluation studies of the drought management efforts. It needs to be ensured that the mandate and agenda of this proposed institute does not duplicate the efforts of the National Institute of Disaster Management.

Livelihood Management in Extremely Drought Prone Areas:

A strategy for making people pursue livelihoods compatible with their ecosystems needs to be evolved. Some concrete steps in this direction could be:

Notes

1. A multi-disciplinary team needs to be immediately constituted by the Ministry of Environment and Forests to specifically identify villages where soil and climatic conditions make 'conventional agriculture' unsustainable.

2. Alternate means of livelihood have to be evolved in consultation with the communities, in such areas.

Rationalization of Drought Declarations

The method and mechanism of declaration of droughts needs to be modified under the guidance of NDMA. While it is for the State Governments to work out the modalities keeping in view the peculiarities of their agro-climatic conditions, the Commission recommends that the modified mechanism may incorporate the following broad guiding principles:

1. Where a certain percentage (say, twenty per cent) of area normally cultivated remains unsown till the end of July or December for Kharif and Rabi respectively, the affected Tehsil/Taluka/Mandal could be declared drought affected by the government.

2. To begin with, 'eye estimates' could be used. Such estimates may be verified with reference to remote sensing data as access to such facilities improves progressively. The ultimate objective should be to use remote sensing as the primary tool of early detection of droughts with 'eye estimates' remaining only as 'secondary verifying methods'.

Deployment of Remote Sensing for Diagnosis and Prognosis of Drought Situations

Deployment of remote sensing as the primary tool for diagnosing droughts, monitoring their course and forecasting prognosis is a goal that needs to be pursued speedily and systematically. This would require dovetailing remote sensing into the routine framework of drought management. This could be best achieved through establishment of an NRSA cell in identified drought prone districts. The activities of the NRSA cells in the districts must include monitoring of other disasters as well.

Making Rivers Perennial:

Technical agencies under the Ministries of Water Resources, Environment and Forests and Science and Technology must immediately carry out river specific feasibility studies to determine the ecological and hydrological implications of making seasonal rivers perennial.

Rainfed Areas Authority

A National Rainfed Areas Authority may be constituted immediately. The Authority can deal inter alia, with all the issues of drought management mentioned in this chapter.

Epidemics and Disruption of Essential Services

Epidemics

Epidemics may assume crisis proportions when an outbreak is geographically widespread and the causative strain is of a particularly virulent variety. It is, however, also clear that the entire system of public health is based on the validated premise that, given an adequate regimen of surveillance and safeguards, epidemics can be prevented from assuming crisis proportions. Figures of mortality relatable to causes of death provide ample testimony to the fact that in the last several decades the toll taken by epidemics has shown a significant declining trend. The decline is also the result of advances made in medical sciences and through improvement of more efficacious therapeutic agents. It is, therefore, encouraging to note that, over the years, fewer epidemics have assumed the nature of catastrophe.

The complex nature of control of epidemics is evident from the fact that in the Constitution of India all the three legislative lists of the Seventh Schedule enumerate some aspects of the matter as follows:

Notes

1. List-I; entry 28 "quarantine" and entry 81 "inter-State quarantine";
2. List-II; entry 6 "Public health and sanitation";
3. List-III; entry 29 "prevention of the extension from one State to another of infectiousor contagious diseases".

Recommendations

1. To more effectively prevent outbreak/spread of epidemics, it is imperative that a comprehensive revised 'model' legislation on public health is finalized at an early date and that the Ministry of Health and Family Welfare systematically pursues its enactment by the states with adaptations necessitated by local requirements.
2. The Union legislation governing Public Health Emergencies be introduced for final consideration in the light of feedback received from the states at an early date.
3. Ministry of Health and Family Welfare has to ensure that requisite plans envisaged under the Disaster Management Act, 2005, are drawn up in respect of epidemics also and that the role of the district administration finds explicit mention in the Public Health Emergency Bill. The structure created by the Disaster Management Act, 2005, should be utilized for managing epidemics also.
4. While surveillance and management of epidemics are the responsibilities of public health professionals, it is clear that a particularly severe outbreak could overwhelm the capacities of the 'line organisations'. The Ministry of Health and Family Welfare and the State Governments must ensure that 'standard operating procedures' are devised to assign roles and responsibilities of agencies and personnel outside the line organizations wherever a situation so warrants.
5. State level handbooks and manuals concerning disaster management should have a chapter on "epidemics-related emergencies". A model chapter may be circulated by the Ministry of Health and Family Welfare for guidance of states. It may be useful to document the past handling of epidemics like the Plague (Surat) and Japanese encephalitis (Eastern UP) to facilitate standardization of response mechanisms.

Disruption of Essential Services

With rapid development, industrialization and urbanization, the life of citizens depends on a wide range of essential services like power, transport, telecommunications and drinking water supply. Any disruption in these services would lead to large scale hardship to people. Such disruptions may be caused by accidents, sabotage or strikes. It has been observed that often during natural disasters such essential services are severely hit. It is, therefore, necessary that the community and the administration should be prepared to meet such eventualities.

Recommendations

1. All crisis/disaster management plans should include plans for handling possible disruptions in essential services.
2. All agencies/organizations engaged in the supply of essential services should have their own internal crisis management plans to deal with emergencies.
3. The regulatory authorities of the respective sectors may lay down the required framework for drawing up standard operating procedures and crisis management plans.

Conclusion

With two goals of protecting people and structures from disasters and to increase the effectiveness of crisis response and recovery ARC has recommended ways to quicken the emergency responses of the administration and increase its effectiveness to meet crisis situations and enhance crisis preparedness.

Notes

The cumulative experience of crisis management over the years helped in shifting strategy to move from fatalism to prevention, from response to preparation, and from mobilizing resources after the fact to reducing risk before the fact.

Managing a crisis is primarily the responsibility of the government. But the community, local bodies and voluntary organizations also play a vital role. It is for the administration to coordinate the efforts of all stakeholders such that the synergy generated reinforces and multiplies the resources available and results in a comprehensive and timely response.

It's important to incorporate the view that crisis management is not a separate discipline but an approach to solving problems involving all the sectors in a manner to ensure collective response. In that context, crisis reduction becomes the responsibility of all stakeholders who may be potentially affected by the crisis.

Notes

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