

3

3

THIRD REPORT



SECOND ADMINISTRATIVE REFORMS COMMISSION

CRISIS MANAGEMENT From Despair to Hope

CRISIS MANAGEMENT
From Despair to Hope



Second Administrative Reforms Commission
Government of India

2nd Floor, Vigyan Bhawan Annexe, Maulana Azad Road, New Delhi 110 011
e-mail : arcommission@nic.in website : <http://arc.gov.in>

SEPTEMBER 2006

GOVERNMENT OF INDIA

SECOND ADMINISTRATIVE REFORMS COMMISSION

THIRD REPORT

CRISIS MANAGEMENT
FROM DESPAIR TO HOPE

SEPTEMBER 2006

PREFACE

The neglect of our natural assets and environment has always led to crisis. Whether it is the Mithi River of Mumbai or Tapi of Surat or the civilisational crises in the past in which the “cradle of civilisation” in the Middle East eventually became a desert, Greece and Turkey were deforested, and the destruction of the American prairie contributed to the Dust Bowl, these are eloquent testimony to such neglect. The once mighty Khmer Empire in Southeast Asia or the small tribes that lived on Easter Island in the Pacific Ocean were consigned to the throes of oblivion only because they so willfully decimated their natural assets and environment.

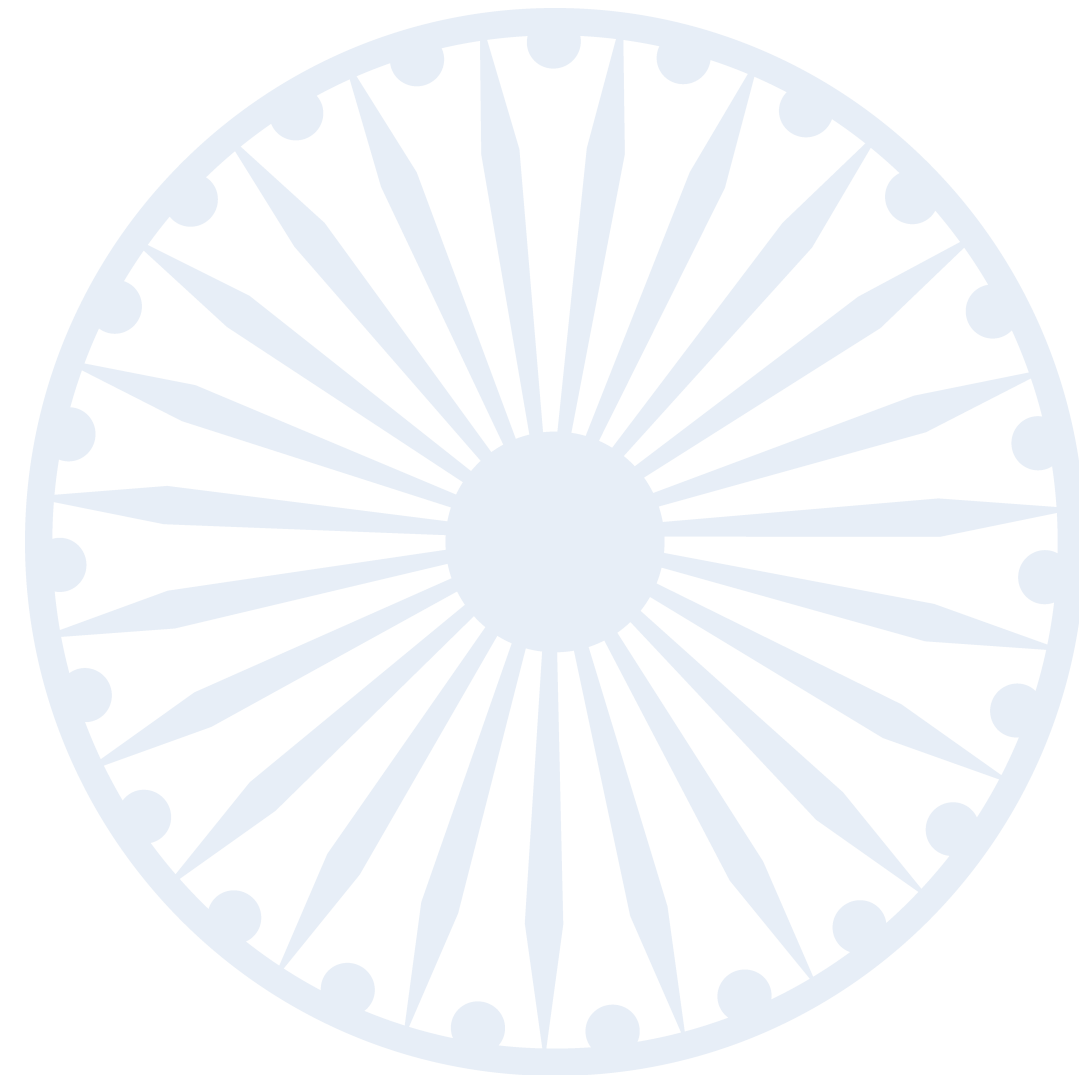
India is endowed with extraordinary natural and civilisational resources. Around the time of our Independence, the American scholar Kingsley Davis gave a glowing account of the fabulous geography of India, especially the great Indo-Gangetic plain:

“India is probably the third most gifted of the world’s regions with respect to industrial capacity, and the second or third with reference to agricultural resources. But in sheer area it is big enough. The geographical traits of the subcontinent are fabulous and their description requires unblushing superlatives...”

The key to the region’s peculiar geography lies more outside than inside the boundaries, although it has its main effects inside. This is the Himalayan range, the loftiest mountain barrier in the world, which shuts off the subcontinent from the rest of Asia. From 150 to 250 miles, the Roof of the World stretches over 1,500 miles across the north of India. It boasts of the three highest points on the earth’s surface, fifty summits of 25,000 feet or more, and an average elevation of 19,000 feet. The Himalayas contribute greatly to the soil, climate and the isolation of India. They are eroding rapidly and sending out rich loam to the plains below. Because high plateau lands lie to the north, the drainage runs southwards towards India. The three main rivers of the subcontinent - Indus, Ganges and Brahmaputra - with most of their tributaries, have their sources in the Himalayas and bring down silt that has made the Indo-Gangetic plain, covering the whole of northern India, the most fertile areas of its size in the world.

True, we cannot prevent natural hazards, which are endemic to our geology, geography, climate, social and cultural settings, but we can certainly strive to manage crisis more efficiently so that hazards do not degenerate into disasters. With a coherent and meaningful crisis management strategy in place, it is quite possible to visualize our country despite its manifold hazards as a place that will eventually be free of all disasters.

In the realm of crisis management, announcing a policy or promulgating a law or creating an institution is a relatively easy task; the challenge lies in implementing policies to achieve the desired outcomes. Crisis management, a governance issue that is both vital and complex, is at the core of India’s administrative system. The system requires innovative thinking and fundamental



“Crisis shouldn’t turn them beggars...”

Mahatma Gandhi during the Bihar Earthquake in 1934

changes in order to quicken the emergency responses of administration and increase the effectiveness of the machinery to meet the crisis situation and enhance crisis preparedness. To that end, it is necessary that the apparatus of crisis management should perform and deliver. The India Meteorological Department (IMD), in its 24 hours forecast and the National Centre for Medium Range Weather Forecast (NCMRWF) in its 46 hours forecast predicted only 8 cm to 16 cm of rainfall over Mumbai on 26th and 27th July 2005, while the actual rainfall recorded was 94.4 cm. Thus the margin of error was nearly 600%. There were significant intra-regional differences in rainfall due to cloudbursts in some areas. For example Colaba had a rainfall of 7.3 cm while Santacruz experienced a rainfall of 96 cm. Neither IMD nor NCMRWF could forecast these huge intra-city differences in rainfall.

What is needed is ushering in a new paradigm in the quality and efficacy of our institutional capacity and delivery mechanisms while ensuring, at the same time, that they are embedded in both the structures of authority and the mechanisms of accountability.

While dealing with disasters, we need to be particularly responsive to the emotional and social problems that people experience due to a disaster. Almost 10 per cent of the people affected by the tsunami – potentially half a million people – had mental health problems so severe that they required professional treatment. Psychosocial care deals with a broad range of emotional and social problems and helps in restoring social cohesion as well as the independence and dignity of individuals and groups. It prevents pathologic developments and further social dislocations. Normalisation of emotional reaction is an important task in psychosocial care for the survivors of the disaster. Emotional reactions such as guilt, fear, shock, grief, vigilance, numbness, intrusive memories, and despair are responses of people experiencing unforeseen disasters beyond their coping capacity. Emotional reactions are normal responses to an abnormal situation. Nearly 90% of survivors of disaster do undergo these emotional reactions immediately after the disaster. Psychosocial care is essential for all these people.

The Commission has carefully studied the present structure of crisis management, systems and processes including the Disaster Management Act, 2005 and the perceived gaps. In order to arrive at its recommendations, it has critically examined aspects related to constitutional and legal framework, institutional mechanisms, funding and infrastructure support systems, preparedness measures, human resources development and knowledge management institutions. The Commission's recommendations aim at not only having more efficient systems of governance but also at innovative ways of capacity building and empowerment of all stakeholders at all levels including panchayats and the community, strategic applications of science and technology, realisation of a sound emergency

communication network, building safe homes and infrastructure, and learning from research and development and also from the experiences of handling crisis situations in the past. Each of these tasks is a challenge, and calls for a careful strategy of planning and implementation coupled with coordinated efforts of a variety of players both within and outside the governmental structure.

The Commission thanks Dr. Manmohan Singh, Prime Minister of India for his valuable guidance and also for having given an opportunity to the Commission to critically examine this issue. The Commission is also grateful to Shri Shivraj V. Patil, Union Minister of Home Affairs for his cooperation and help.

Let me quote Mahatma Gandhi once again to highlight the essence of our recommendations ...

"A technological society has two choices. First, it can wait until catastrophic failures expose systemic deficiencies, distortion and self-deceptions.... Secondly, a culture can provide social checks and balances to correct for systemic distortions prior to catastrophic failures".

The recommendations aim at establishing the synergy and convergence of advances in the technological and knowledge era with our rich socio-cultural practices and indigenous coping mechanisms.



New Delhi
September 19, 2006

(M. VEERAPPA MOILY)
Chairman

Government of India
Ministry of Personnel, Public Grievances & Pensions
Department of Administrative Reforms and Public Grievances

Resolution

New Delhi, the 31st August, 2005

No. K-11022/9/2004-RC. — The President is pleased to set up a Commission of Inquiry to be called the second Administrative Reforms Commission (ARC) to prepare a detailed blueprint for revamping the public administration system.

2. The Commission will consist of the following :

- (i) Shri Veerappa Moily - Chairperson
- (ii) Shri V. Ramachandran - Member
- (iii) Dr. A.P. Mukherjee - Member
- (iv) Dr. A.H. Kalro - Member
- (v) Dr. Jayaprakash Narayan - Member
- (vi) Smt. Vineeta Rai - Member-Secretary

3. The Commission will suggest measures to achieve a proactive, responsive, accountable, sustainable and efficient administration for the country at all levels of the government.

The Commission will, inter alia, consider the following :

- (i) Organisational structure of the Government of India
- (ii) Ethics in governance
- (iii) Refurbishing of Personnel Administration
- (iv) Strengthening of Financial Management Systems
- (v) Steps to ensure effective administration at the State level
- (vi) Steps to ensure effective District Administration
- (vii) Local Self-Government/Panchayati Raj Institutions
- (viii) Social Capital, Trust and Participative public service delivery
- (ix) Citizen-centric administration
- (x) Promoting e-governance

(xi) Issues of Federal Polity

(xii) Crisis Management

(xiii) Public Order

Some of the issues to be examined under each head are given in the Terms of Reference attached as a Schedule to this Resolution.

4. The Commission may exclude from its purview the detailed examination of administration of Defence, Railways, External Affairs, Security and Intelligence, as also subjects such as Centre-State relations, judicial reforms etc. which are already being examined by other bodies. The Commission will, however, be free to take the problems of these sectors into account in recommending re-organisation of the machinery of the Government or of any of its service agencies.
5. The Commission will give due consideration to the need for consultation with the State Governments.
6. The Commission will devise its own procedures (including for consultations with the State Government as may be considered appropriate by the Commission), and may appoint committees, consultants/advisers to assist it. The Commission may take into account the existing material and reports available on the subject and consider building upon the same rather than attempting to address all the issues ab initio.
7. The Ministries and Departments of the Government of India will furnish such information and documents and provide other assistance as may be required by the Commission. The Government of India trusts that the State Governments and all others concerned will extend their fullest cooperation and assistance to the Commission.
8. The Commission will furnish its report(s) to the Ministry of Personnel, Public Grievances & Pensions, Government of India, within one year of its constitution.

Sd/-

(P.I. Suvrathan)

Additional Secretary to Government of India

Government of India
Ministry of Personnel, Public Grievances & Pensions
Department of Administrative Reforms
and Public Grievances

.....

RESOLUTION

New Delhi, the 24th July, 2006

No. K-11022/9/2004-RC (Vol.II) – The President is pleased to extend the term of the second Administrative Reforms Commission by one year upto 31.8.2007 for submission of its Reports to the Government.

Sd/-

(Rahul Sarin)

Additional Secretary to the Government of India

CONTENTS

Chapter 1	Introduction	1	Chapter 6	Emergency Response System	77
Chapter 2	Crisis Management - An Overview	4	6.1	Emergency Plan	77
2.1	History of Crisis Management	4	6.2	Coordinating Relief	79
2.2	Types of Crises	4	6.3	Role of Specialized Agencies	81
2.3	Scale of Crises	5	6.4	Setting up Integrated Emergency Operations Centre (EOC)	89
2.4	Crisis Management	5	6.5	Organising Emergency Medical Relief	90
2.5	Phases of Crisis/Disaster Management	7	Chapter 7	Recovery	92
2.6	Elements of Crisis Management	8	7.1	Relief and Rehabilitation	92
2.7	A Shift to Disaster Risk Reduction	9	7.2	Revisiting the Financial Procedures	96
2.8	Disaster Risk Reduction Framework	10	Chapter 8	Gender Issues and Vulnerability of Weaker Sections	99
Chapter 3	India's Key Hazards, Vulnerabilities and the Crisis Response Mechanism	12	Chapter 9	Drought Management	101
3.1	The High Cost of Disaster	12	9.1	Risk Reduction	101
3.2	Earthquakes	14	9.2	Revisiting Long Term Interventions	101
3.3	Cyclones	15	9.3	Livelihood Management in Extremely Drought Prone Areas	102
3.4	Tsunamis	16	9.4	Codifications of Management Methodologies	103
3.5	Floods	17	9.5	Rationalization of Drought Declarations	104
3.6	Landslides and Avalanches	18	9.6	Deployment of Remote Sensing for Diagnosis and Prognosis of Drought Situations	105
3.7	Industrial Disasters	19	9.7	Making Rivers Perennial	106
3.8	Epidemics	20	9.8	Rainfed Areas Authority	107
3.9	Nuclear Hazards	21	Chapter 10	Management of Specific Crisis Situations (Epidemics and Disruption of Essential Services)	108
3.10	Desert Locusts	22	10.1	Epidemics	108
3.11	Slow Onset Disasters	22	10.2	Disruption of Essential Services	111
3.12	Crisis/Disaster Response Mechanism in India	25	Chapter 11	Conclusion	113
Chapter 4	Legal and Institutional Framework	34		Summary of Recommendations	114
4.1	Constitutional Provision - is their need for a separate entry?	34			
4.2	Legal Framework	35			
4.3	Institutional Framework	42			
Chapter 5	Risk Reduction	52			
5.1	Reducing Disaster Risk	52			
5.2	Enunciating a Policy Towards Crisis Management Which Emphasizes Risk Reduction	52			
5.3	Assessment of Risk - Hazard and Vulnerability Analysis	54			
5.4	Generating Awareness about Risk	57			
5.5	Preparation of Disaster Management Plans	58			
5.6	Making Crisis/Disaster Management Plans a Part of Development Plans	62			
5.7	Instruments for Mitigation of Hazards	63			
5.8	Early Warning Systems	70			
5.9	Building Community Resilience	72			
5.10	Financial Tools for Risk Reduction	73			
5.11	Research and Use of Knowledge	75			

LIST OF BOXES

Box No.	Title	
2.1	Disaster Management and Sustainable Development	7
2.2	Distinction between Hazard and Disaster	8
2.3	World Conference on Natural Disaster, Reduction, Yokohama 1994	10
2.4	Information - the Key to Risk Reduction	11
3.1	Cyclone Shelters	16
3.2	Traditional Knowledge for Disaster Management	16
3.3	Flood Control and Management	17
3.4	Mitigation Measures for Avalanches	18
3.5	Global Warming	23
3.6	Land Erosion by Sea or River	25
3.7	Laws Dealing with Disaster in USA	26
3.8	Timely Action Saves Lives	29
4.1	The Role and Functions of a National Disaster Management Organisation	39
4.2	Evolution of the Crisis/Disaster Management System in the United States	40

4.3	Mayor of New York Gets Time Person of the Year Award	45
5.1	Management of Urban Floods: Case Study of Mumbai Floods 2005	53
5.2	Flood Risk Reduction in China	57
5.3	The Bhopal Gas Tragedy	59
5.4	BIS Codes for Earthquake Protection	65
5.5	Model Building Byelaws	65
5.6	Warning Systems - Key to Disaster Management	70
5.7	Public Address System Saves Lives in Pondicherry Villages	71
5.8	Some Capacity Building Initiatives Taken by Government of India	72
5.9	Insurance and Disaster Management	74
5.10	Constraints of Insurance in Developing Countries	74
5.11	Risk Reduction Through Catastrophic Insurance: Examples from Japan	75
5.12	India Disaster Resource Network	76
6.1	Lessons Learnt from Tsunami	77
6.2	Discretion and Judgement are Important	78
6.3	Civil Defence	83
7.1	From Relief to Recovery: The Gujarat Experience: UNDP	92
7.2	Recovery an Opportunity	93
7.3	Community Participation	93
7.4	Guiding Principles for Post - Disaster Recovery	94
7.5	Inadequate Planning and Preparation in Rescue and Relief may Lead to Further Disasters	95
8.1	Women in Disasters	99
9.1	Drought-prone Area Development	101

LIST OF TABLES

Table No.	Title	
2.1	Crises Management Matrix	6
3.1	Region-wise Earthquakes	14
3.2	Frequency of Cyclones	15
3.3	Nodal Ministries for Managing Different Types of Disasters	28
5.1	Classification of States according to Seismic Zones	54

LIST OF FIGURES

Figure No.	Title	
2.1	Elements of Crisis Management	9
3.1	Increasing Trends of Natural Disasters	13
3.2	Crisis Management Structure in the Country	30
3.3	Unification of Crisis Management (as visualized in the Disaster Management Act, 2005)	32
4.1	Four Components of an Early Warning System	70

LIST OF ANNEXURES

Annexure I	Speech of Shri M. Veerappa Moily, Chairman, ARC, at the Round-table held at NIDM, New Delhi	134
Annexure-II	Comparison of State Disaster Management Laws	144

Annexure-III	Salient Features of the Disaster Management Act, 2005	152
Annexure-IV	Recommendations of the Working Groups at the Regional Workshops	164
Annexure-V	Early Warning Systems	182
Annexure-VI	Questionnaire for Disaster Management	186

LIST OF ABBREVIATIONS

Abbreviation	Full Form
ARC	Administrative Reforms Commission
BIS	Bureau of Indian Standards
CAPE	Crop Acreage and Production Estimation
CBSE	Central Board of Secondary Education
CD	Civil Defence
CMG	Crisis Management Group
CRED	Centre for Research on the Epidemiology of Disasters, Belgium
CRF	Calamity Relief Fund
CWC	Central Water Commission
DDP	Desert Development Programme
DPAP	Drought Prone Areas Programme
EOC	Emergency Operation Centre
EMRI	Emergency Management Research Institute
FASAL	Forecasting Agricultural Output Using Space, Agrometeorology and Land Observations
GIS	Geographical Information System
GSDMA	Gujarat State Disaster Management Authority
GSI	Geological Survey of India
HPAI	Highly Pathogenic Avian Influenza
HPC	High Powered Committee
IIT	Indian Institute of Technology
IMD	India Meteorological Department
IDRN	India Disaster Resource Network
IRSA	Indian Remote Sensing Agency
ISRO	Indian Space Research Organisation
NCCM	National Crisis Management Committee
NCCF	National Calamity Contingency Fund
NCRCW	National Commission to Review the Working of the Constitution
NDMA	National Disaster Management Authority
NEC	National Executive Committee
NGOs	Non Governmental Organisations
NIC	National Informatics Centre
NIDM	National Institute of Disaster Management
NRSA	National Remote Sensing Agency
OFDA	Office of US Foreign Disaster Assistance
UNDP	United Nations Development Programme
UNHSP	United Nations Human Settlements Programme
USA	United States of America

INTRODUCTION

1.1 The dictionary meaning of the term 'crisis' is 'an unstable or crucial time or state of affairs in which a decisive change is impending; especially, one with the distinct possibility of a highly undesirable outcome'¹. 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. Thus, 'crisis' may be defined as "an emergency situation arising out of natural or human activity which poses a threat to human life and property or leads to large scale disruption of normal life". This emergency situation may arise suddenly or it may be an outcome of a simmering problem or issue, 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 on a large scale.

1.2 Preparedness and quick response can save lives, protect property and lessen disruptions caused by crises. This calls for a total and effective response, which must subsume the coordinated response of the entire governmental system as also civil society. The response should not only incorporate traditional coping mechanisms, which have evolved over the centuries 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.

1.3 One of the terms of reference of the Second Administrative Reforms Commission pertains to crisis management and in particular, to the following aspects of this subject: -

- (i) To suggest ways to quicken the emergency responses of administration.
- (ii) To suggest ways to increase the effectiveness of the machinery to meet the crisis situation and enhance crisis preparedness.

1.4 Crises include various events, which require immediate attention because of the threat they pose to human life and property. In this Report, the Commission has dealt primarily with 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

¹Merriam Webster Online Dictionary - <http://www.m-w.com/dictionary/crisis>

situations caused by hostile elements like terrorists and extremists involving taking of hostages, hijacking an aircraft or severely disrupting public order and administration are not included in this Report and will be dealt with in its Report on 'Public Order'.

1.5 While finalizing the present Report, the Commission has examined policies, operational issues and institutional contexts relevant to crisis management. In order to generate suitable discussions the Commission asked the National Institute of Disaster Management (NIDM) to prepare a concept paper on the subject, which was then circulated to all ministries and departments of Government of India for their comments/suggestions. Based on this paper and the suggestions received, a questionnaire was developed by the Commission for eliciting views and opinions from institutions, organizations and stakeholders in civil society. A consultation workshop was also held with various governmental agencies and based on all these inputs, a paper was prepared for discussion in the four regional workshops held at Chennai, Jammu, Mumbai and Jaipur. The participants at these workshops included officers from Union and State Governments, technical experts who spoke on specific disasters, District Collectors who presented case studies on management of recent disasters and a large number of stakeholders including NGOs and the media. The Commission also had discussions with the Vice Chairperson and Members of the National Disaster Management Authority, the Cabinet Secretary and the Union Home Secretary. The deliberations at the workshops, the feedback received from various organizations, the recommendations made in the past by different Committees and lessons from past crisis/disasters have all contributed to the formulation of our views in this Report.

1.6 The Commission has also drawn upon international declarations and best practices. The 'Yokahama Declaration' of 1994, enunciated during the International Decade for Natural Disaster Reduction signaled a radical shift in disaster management: the earlier practice of disaster management being regarded as the most efficient manner of responding to acute emergencies was replaced by a 'holistic' approach embracing all aspects of crisis management that is response, prevention, mitigation and preparedness. The 'Declaration' elucidates how prevention and mitigation are the keys to minimize, if not prevent, distress caused by natural disasters and thus form the bedrock of integrated disaster management. The Commission has been influenced by the principles underlying the 'Yokahama Declaration' and the subsequent Hyogo Framework of Action, in recommending 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.

1.7 The Commission wishes to record its gratitude to Gen. N C Vij, PVSM, UYSM, AVSM (Retd), Vice Chairperson, NDMA; Members of NDMA; Shri B K Chaturvedi, Cabinet Secretary; Shri V K Duggal, Union Home Secretary; Shri P G Dhar Chakrabarti,

Executive Director, NIDM; Shri S K Das, Consultant ARC; Shri Sanjay Srivastava, ISRO; Shri Naved Masood, Joint Secretary, Ministry of Agriculture; representatives of citizens' groups, officers of Government of India and State Governments and experts and academicians who participated in the workshops. The Commission also wishes to record its special thanks to Shri Ghulam Nabi Azad, Chief Minister of Jammu and Kashmir, who inaugurated the workshop in Jammu. The Commission also acknowledges the contributions made by the National Safety Council and the Department of Earthquake Engineering, Indian Institute of Technology, Roorkee.

2 CRISIS MANAGEMENT - AN OVERVIEW

"In the old days, we had famine codes and drought codes but I think now there are many more sources of uncertainty, many more sources of disorder and turbulence and therefore I think one should pay adequate attention to understanding the processes of this turbulence and how our administrative system has the primary responsibility to come to the help of our people in these times of difficulties, stress and strain".²

2.1 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. However, 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 facing nations has increased both in magnitude and complexity. For example, while the frequency of calamities may have remained unchanged, increasing population densities and urbanization have resulted in greater impact on human lives and property. 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. Similarly, while frequency of wars has declined, modern weapons and mass urbanization have increased manifold the human crisis caused by such conflicts. 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. Further, 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.

2.2 Types of Crises

Crises can be classified into the following categories:

- (i) Crises caused by acts of nature. These can further be divided into the following sub-categories:

² Excerpts from Prime Minister's remarks to IAS probationers; April 28, 2006, New Delhi.

- a. Climatic events: cyclones and storms (associated sea erosion), floods and drought and
- b. Geological events: earthquakes, tsunamis, landslides and avalanches;
- (ii) Crises caused by environmental degradation and disturbance of the ecological balance;
- (iii) Crises caused by accidents. These, again, can be further classified into: industrial and nuclear mishaps and fire related accidents;
- (iv) Crises caused by biological activities: public health crises, epidemics etc;
- (v) Crises caused by hostile elements: war, terrorism, extremism, insurgency etc;
- (vi) Crises caused by disruption/failure of major infrastructure facilities including communication systems, large-scale strikes etc; and
- (vii) Crises caused by large crowds getting out of control.

These crisis situations and their specific features are captured in a 'crisis management matrix' shown in Table-2.1.

2.3 Scale of Crises

Depending on its intensity and area of impact, a crisis situation may be labeled as local, sub-district, district, state or national level. State Governments and their agencies, district officials and local governments have important roles to play along with communities in crisis management. The scale of crisis 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. Also, in case of certain specific crisis situations, which affect the national interest, a national level response is necessary. Such contingent situations may be 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.

2.4 Crisis Management

2.4.1 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'. Besides, as stated in the Yokohama Declaration, the element of 'drama' and flurry of activities associated with these interventions tended to show to the

Table-2.1: Crises Management Matrix

Crisis caused by →	Natural events					Accidents			Biological events	Hostile elements		Disruption of essential services	Large gatherings getting unruly
	Climatic					Geological				Extremism	Terrorism		
	Drought	Cyclone	Tsunami	Flood	Earthquake	Landslide	Industrial	Nuclear					
Specific Features ↓	Yes	Limited	Very Limited	Limited	No	No	No	No	No	Yes	Limited	No	Limited
Early Warning Possible?	Yes	Limited	Very Limited	Limited	No	No	No	No	No	Yes	Limited	No	Limited
Level of Community Preparedness	Some Extent	Some Extent	Nil	Some Extent	Nil	Nil	Nil	Nil	Limited	Nil	Nil	Nil	Nil
Duration of Disaster	A Few Months	A Few Days	A Few Hours	A Few Days	A Few Minutes	A Few Days	Prolonged	A Few Hours	A Few Hours	Prolonged Days To Months	Instantaneous	A Few Days	A Few Hours
Whether Building Structures Important	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Area Affected	Large	Large	Large	Medium To Large	Large	Limited	Medium	Limited	Limited	Large	Limited	Large	Limited
Whether Mitigation Measures Possible?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Whether Rescue Required	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Limited

society at large that the State ‘cared’. A ‘Welfare State’ entails wider responsibilities meaning thereby that in addition to the traditional responsibilities of relief and immediate rehabilitation, governments in conjunction with the local bodies, the civil society, voluntary organizations and corporate bodies, address the factors leading to the crisis, in a manner that ideally prevents their occurrence, or at any rate, significantly reduces their ill effects.

Box 2.1: Disaster Management and Sustainable Development

“While we cannot do way with natural hazards, we can eliminate those we cause, minimize those we exacerbate, and reduce our vulnerability to most. Doing this requires healthy and resilient communities and ecosystems. Viewed in this light, disaster mitigation is clearly part of a broader strategy of sustainable development – making communities and nations socially, economically and ecologically sustainable.”

Source: J. Abramovitz, 2001.

(Extracted from - Living with Risk, A global review of disaster reduction initiatives, ISDR 2004)

2.4.2 It is also necessary to recognize that often a crisis does not emerge suddenly; it has a life cycle, which may take days, months or even decades to develop depending on its causative factors. A crisis, therefore, needs to be examined in terms of its management cycle that would enable us to anticipate the crisis, prevent and mitigate it to the extent possible and deal with the crisis situation as it emerges. This ‘life cycle’ of crisis management may be divided broadly in three phases - pre-crisis, during crisis and post crisis.

2.5 Phases of Crisis/Disaster Management

2.5.1 Pre-Crisis: Preparedness

2.5.1.1 This is the period when the potential hazard risk and vulnerabilities can be assessed and steps taken for preventing and mitigating the crisis and preparing for actual occurrence. These include 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.

2.5.1.2 Crisis can also be mitigated through various short term measures, which either reduce or modify the scale and intensity of the threat or improve the durability and capacity of the elements at risk, 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.

2.5.1.3 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.

2.5.2 During Crisis - Emergency Response

2.5.2.1 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. These are, 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 a degree of normalcy.

2.5.3 Post-Crisis

2.5.3.1 *Recovery*: This is the stage when efforts are made to achieve early recovery and reduce vulnerability and future risks. It comprises activities that encompass two overlapping phases of rehabilitation and reconstruction.

2.5.3.2 *Rehabilitation*: Includes provision of temporary public utilities and housing as interim measures to assist long term recovery.

2.5.3.3 *Reconstruction*: Includes construction of damaged infrastructure and habitats and enabling sustainable livelihoods.

2.6 Elements of Crisis Management

These three stages - preparedness and risk management, emergency response and recovery and rehabilitation may be subdivided into various detailed activities as presented in Fig 2.1.

Thus a crisis management strategy should aim at:

- i. Creating appropriate legal and organizational framework;
- ii. Making government organizations, local bodies, communities/groups and individuals at all levels aware of the risk of potential natural and man-made hazards as well as their vulnerabilities;
- iii. Meticulous long and short term planning for crisis management, and effective implementation of plans and enforcement measures;
- iv. Building resilience of the communities to face crises and ensuring their full participation;

Box 2.2: 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 (usually defined as an event and even psychological factors that shape people's that overwhelms that community's capacity to cope). 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 create the environment that they live in."

Source: Twigg, J. 2001.

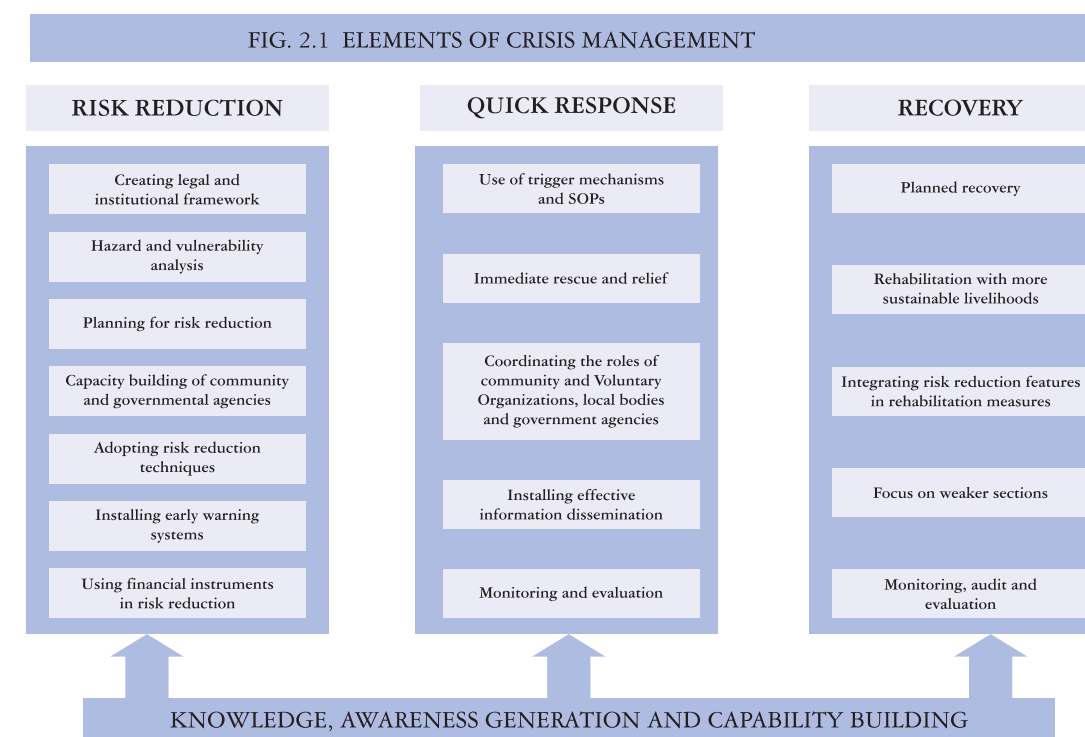
(Extracted from *Living with Risk, A global review of disaster reduction initiatives 2004 version*)

- v. Building and maintaining capabilities (human and institutional), infrastructure and logistics; and
- vi. Developing and disseminating knowledge for effective crisis management. Integration of traditional knowledge in crisis management efforts.

2.7 A Shift to Disaster Risk Reduction

2.7.1 Little attention was paid in the past to disaster risk reduction strategies that have the potential to save thousands of lives by adoption of simple preventive measures. Reviews of the global scenario carried out in the 1990s in the wake of the "Yokohama Declaration" also brought home the fact that economic losses caused by natural disasters were increasing. Lack of coherent disaster reduction strategies and the absence of a 'culture of prevention' were identified as the major causes for this disturbing phenomenon³.

2.7.2 Disaster risk reduction (disaster 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'.⁴ Disaster reduction strategies include appraisal of likelihood and intensity of hazards and analysis of vulnerabilities thereto of the community. Building of institutional capabilities and community preparedness is the next step. Crucial to all these



³Living with Risk - a global review of disaster reduction initiatives (UN/ISDR)

⁴Source: UNDP (extracted from http://www.dfid.gov.uk/pubs/files/disaster_risk_reduction_policy)

efforts, however, is the existence of a 'safety culture' in societies. Inputs like education, training and capacity building play a very significant role. It needs to be understood that such preparedness can not be a 'one time' effort, but is a continuous process.

2.7.3 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.

2.7.4 Risk (in the context of disaster) is defined as the probability of harmful consequences or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.⁵ Thus 'risk' depends on the nature and intensity of the hazard on the one hand and the vulnerability of the community on the other.

2.8 Disaster Risk Reduction Framework

The disaster risk reduction framework is composed of the following fields of action:⁶

2.8.1 Policy towards Risk Management

A policy framework has to be drawn up backed by the requisite legal and institutional mechanism that focuses on risk reduction as the major priority in disaster management.

2.8.2 Assessment of Risk including Hazard Analysis and Vulnerability

Risk assessment is done based on the assessment of hazards and the resilience of the community. The likely intensity, location, frequency and past experience

Box 2.3: World Conference on Natural Disaster Reduction, Yokohama, 1994 *Yokohama Strategy and Plan of Action for a Safer World*

- Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies and measures.
- Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief.
- Disaster prevention and preparedness should be considered integral aspects of development policy and planning at national, regional, bilateral, multilateral and international levels.
- The development and strengthening of capacities to prevent, reduce and mitigate disasters is a top priority area to be addressed so as to provide a strong basis for follow-up activities to IDNDR.
- Early warnings of impending disasters and their effective dissemination are key factors to successful disaster prevention and preparedness.
- Preventive measures are most effective when they involve participation at all levels from the local community through the national government to the regional and international level.
- Vulnerability can be reduced by the application of proper design and patterns of development focused on target groups by appropriate education and training of the whole community.
- The international community accepts the need to share the necessary technology to prevent, reduce and mitigate disaster.
- Environmental protection as a component of sustainable development consistent with poverty alleviation is imperative in the prevention and mitigation of natural disasters.
- Each country bears the primary responsibility for protecting its people, infrastructure, and other national assets from the impact of natural disasters. The international community should demonstrate strong political determination required to make efficient use of existing resources, including financial, scientific and technological means, in the field of natural disaster reduction, bearing in mind the needs of the developing countries, particularly the least developed countries.

would determine the magnitude and impact of a likely hazard. A social, cultural, political and economic and technological assessment of the community would indicate its vulnerability. The two combined together would give an indication of the risk.

2.8.3 Risk Awareness and Preparation of Plans for Risk Mitigation

Having assessed the risk the next step is to make the stakeholders and the decision makers aware of the risk. This enables government and civil society to take measures to mitigate the harmful effects of disasters. A plan of action, which should include both long term and short term components need to be prepared. The plan would be complete only if it also includes measures to improve community resilience.

2.8.4 Implementation of the Plan

The disaster management plan need not be confined only to rescue and relief measures but should be all encompassing and include measures like environment management, urban planning, and enforcement of safety laws.

2.8.5 Early Warning Systems

The provision of timely and reliable information, through identified institutions, that allows the community and the government machinery to reduce their risk and be prepared to face the hazard is essential. Technological advances have helped in accurately forecasting some of the disasters. The challenge here is to use mechanisms to ensure that the warning reaches the vulnerable population with utmost urgency.

2.8.6 Use of Knowledge

Research in the field of disaster management has contributed substantially towards acquiring knowledge about disasters and their impacts. Most of the natural disasters can now be predicted with a fair degree of accuracy (earthquakes are an exception), and this has led to establishment of efficient Early Warning Systems. Similarly, a reservoir of knowledge and experience now exists about managing all aspects of disasters. The challenge is to ensure that the community at large and the decision makers are empowered with this knowledge. Moreover, information on the subject is growing at a rapid rate, which, again, calls for development of systems for processing and sharing of such information. While limitations of technology do exist, they are being addressed through research globally.

Box 2.4: Information-the Key to Risk Reduction

Effective disaster risk management depends on the informed participation of all stakeholders. The exchange of information and easily accessible communication practices play key roles. Data is crucial for ongoing research, national planning, monitoring hazards and assessing risks. The widespread and consistent availability of current and accurate data is fundamental to all aspects of disaster risk reduction.

(Source: *Living with Risk: A global review of disaster reduction initiatives*; ISDR 2004)

⁵ Living with Risk - a global review of disaster reduction initiatives (UN/ISDR)

⁶ These are based on the framework provided by Living with Risk - a global review of disaster reduction initiatives, with some modifications.

3 INDIA'S KEY HAZARDS, VULNERABILITIES AND THE CRISIS RESPONSE MECHANISM

3.1 The High Cost of Disasters

3.1.1 The Intergovernmental Panel on Climate Change (IPCC) came to the conclusion that, worldwide the frequency and magnitude of all types of natural disasters are on the rise (Fig 3.1). Discernible changes in weather with a general increase in temperature (or a decrease in the number of cold days) have been observed in nearly all the land masses. There is also an increase in the frequency of heavy precipitation events. In some regions of the country, the frequency and intensity of droughts have increased over the past few decades. Projections for this century show that the number of 'hot' and 'very hot' days will continue to rise. It is also likely that the intensity and frequency of extreme precipitation events will increase over many areas, resulting in greater number of floods and landslides. Mid-continental areas would generally become drier, thus increasing the risk of summer droughts and forest fires. Increase in tropical cyclone peak wind intensities and mean and peak precipitation intensities are expected to be on the rise. Such increasing trends in natural disasters will inevitably create crisis situations. Should these dire prognostications come to pass, crisis management will become a very critical issue in the coming years.

3.1.2 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 (Source: Disaster Management in India — A status report, 2004, Ministry of Home Affairs, Government of India). Of the 35 states and union territories, 27 are prone to one or more of these 'events'. To this, it must be added that some areas are also vulnerable to industrial, chemical and biological disasters.

3.1.3 The magnitude of loss of human lives and livelihood in our country due to such disasters is excessive by any modern standard. There is no reason why 13,805 deaths, 11,67,000 injuries, 2,22,035 houses destroyed, and 917,158 houses damaged⁷ should have been the result of an earthquake measuring 6.9 on the Richter scale in Gujarat whereas

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.

3.1.4 In terms of erosion of resources, disasters have proved frightfully expensive. According to a recent study by the World Bank⁸, 2.25% of the GDP and 12.15% of the revenue of the country were lost due to natural disasters during 1996-2000, when the country was hard

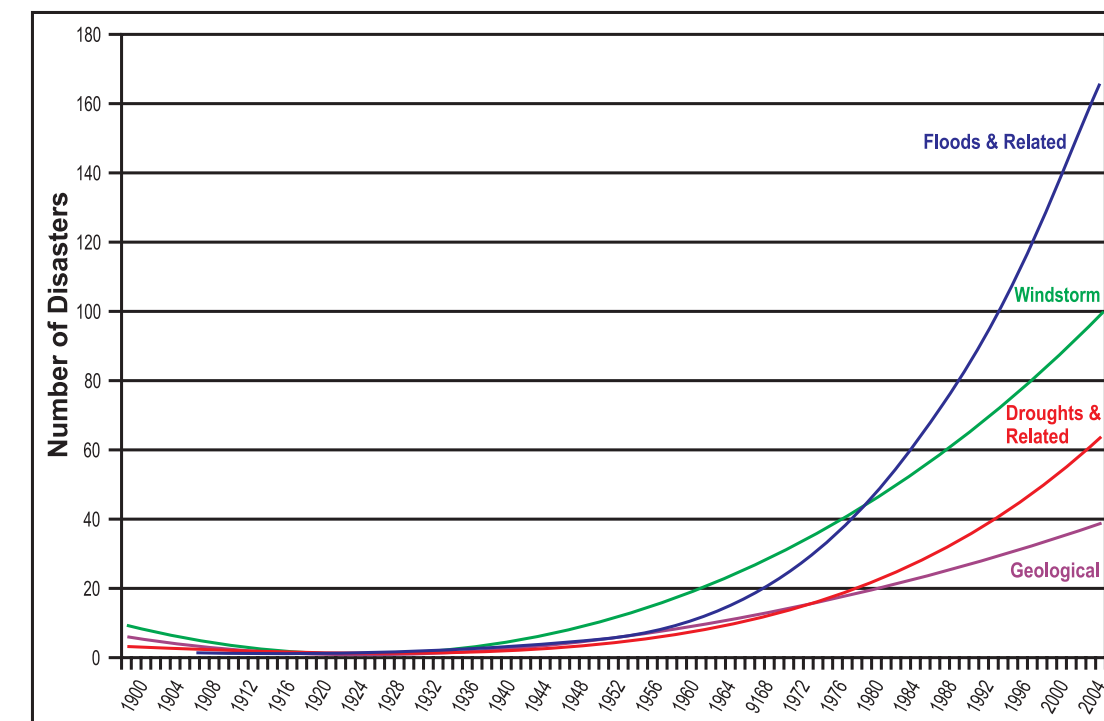


Fig 3.1. Increasing trends of natural disasters (Source: EM-DAT: The OFDA/CRED International Disaster Database. <http://www.em-dat.net>, UCL - Brussels, Belgium).

put to mobilize equivalent resources for health care. 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. Apart from assistance from the CRF and the NCCF, additional resources had to be mobilized from multilateral financial institutions following severe disasters like the Gujarat earthquake (Rs. 7936 crores) and the Tsunami (Rs. 9870 crores) for long term rehabilitation and reconstruction⁹. This has serious implications for macro-economic management and development planning. Arguably,

⁷Presentation of GSDMA at Mumbai Workshop.

⁸ Financing Rapid Onset Natural Disaster Losses in India: A Risk Management Approach, August 2003.

⁹ DM Division, Ministry of Home Affairs, Government of India.

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 rehabilitation¹⁰. Unfortunately, long-term benefits of crisis prevention and mitigation have not been duly factored into our planning and administrative systems.

3.1.5 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. A brief description of some major crises/disasters, which India faces is given in the following paragraphs:

3.2 Earthquakes

3.2.1 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, have 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. The hilly regions 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. Based on seismic data of the past 109 years the distribution of earthquakes of 5.0 or more on the Richter scale and their recurrence (return period) has been worked out in Table 3.1¹¹:

Table 3.1 – Region-wise Earthquakes (M>5.0¹²) 1897-2006

SNo	Seismic region	No. of earthquakes of magnitude				Return period
		5-5.9	6-6.9	7-7.9	8.0+	
1	Kashmir & Western Himalayas	25	7	2	1	2.5-3 yrs
2	Central Himalayas	68	28	4	1	1 yr
3	North East India	200	130	15	4	<4 months
4	Indo-Gangetic Basin	14	6	-	-	5 yrs
5	Cambay and Rann of Kutch	6	5	2	1	7 yrs
6	Peninsular India	32	10	-	-	2.5-3 yrs
7	Andaman & Nicobar Islands	80	68	1	1	<8 months

¹⁰ Source: The Federal Emergency Management Agency has estimated that every dollar spent on disaster mitigation saves between three and five dollars in future economic losses - <http://www.tsunamispecialenvoy.org/presscenter/032706wjc.asp>

¹¹ Source: Compiled by Dr. A S Arya, Professor Emeritus, IIT Roorkee (Courtesy: NIDM)

¹² M>5: Magnitude greater than 5 on Richter scale.

3.2.2 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.

3.3 Cyclones

3.3.1 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.

Table 3.2: Frequencies of Cyclones crossing various districts during 1891-2005¹³

West Coast			East Coast		
State	Coastal district	No. of storms	State	Coastal district	No. of storms
Kerala	Thiruvananthapuram	1	West Bengal	24 Parganas (North & South)	23
	Ernakulam	1		Midnapore	12
	Malappuram	1	Orissa	Balasore	19
	Kozhikode	2		Cuttack	17
Kannur	1	Puri		10	
Karnataka	South Kannada	2	Andhra Pradesh	Ganjam	7
				Srikakulam	14
	Visakhapatnam	8			
	East Godavari	8			
	Krishna	14			
	Guntur	3			
Gujarat	Bharuch	1	Tamil Nadu	Chingleput	15
	Bhavnagar	2		South Arcot	5
	Junagadh	10		Thanjavur	13
	Jamnagar	3		Ramanathapuram	3
	Kutch	3		Tirunelveli	2

¹³ Source: NIDM

3.3.2 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.

Box 3.1: 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)

3.3.3 An effective cyclone disaster prevention and mitigation plan requires: (i) efficient cyclone forecast - and warning services; (ii) rapid dissemination of warnings to the government agencies, particularly marine interests like ports, fisheries and shipping and to the general public and (iii) 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.

3.4 Tsunamis

3.4.1 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 bolide (e.g, asteroid, meteor, 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. 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

Box 3.2: Traditional Knowledge for Disaster Management

Why should people be brought in for a community approach to disaster management? The answer should be easy to appreciate. If tribals in the Andamans could survive the tsunami, it was because their existing warning systems worked well in comparison to our non-existent modern systems. The fact that traditional houses of wood and stone survived the Uttarkashi earthquake not so long ago while modern buildings collapsed offered a similar lesson. In the flood-prone rural North-East, one can find houses on bamboo stilts that allow flood waters to flow under them rather than through or over! One need not multiply examples to just make a small point: Native intelligence is significant and technical expertise needs to treat this as complementary. This intelligence needs to be tapped for devising approaches to management of disasters. Further, policies and laws for disaster management need to provide space for such intelligence to be counted.

(Source: <http://indiatogether.org/2005/apr/vup-disaster.htm#continue>, also reported in *Economic and Political Weekly*, September 2-8, 2006).

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.

3.4.2 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 3000 metres 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 while 5,640 people are still unaccounted for. Seventy five per cent of the fatalities were women and children; 787 women were widowed and 480 children were orphaned. As many as 1,089 villages were affected, 1,57,393 houses were destroyed and approximately 7,30,000 individuals had to be evacuated. The figures for other damages are: 83,788 boats damaged or destroyed; 31,755 livestock lost; and 39,035 hectares of ripe agricultural land damaged¹⁴. The total estimated value of damages is Rs.11,300 crores (Approx US \$2.56 billion). The lessons learnt from the tsunami disaster are summarized in Box 6.1.

3.5 Floods

3.5.1 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. According to the estimates of the National Flood Commission (1980), commonly known as the Rashtriya Barh Ayog, Assam and Bihar are the States worst affected by floods followed by U.P and West Bengal. However, 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

Box 3.3: Flood Control and Management

- There should be a master plan for flood control and management for each flood prone basin.
- Adequate flood-cushion should be provided in water storage projects, wherever feasible, to facilitate better flood management. In highly flood prone areas, flood control should be given overriding consideration in reservoir regulation policy even at the cost of sacrificing some irrigation or power benefits.
- While physical flood protection works like embankments and dykes will continue to be 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.
- 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.
- The 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.

(National Water Policy)

¹⁴Source: Retrieved from http://www.tn.gov.in/tsunami/TO_tsunami_impact.pdf on 10-9-06. These figures are based on Government of India, Ministry of Home Affairs Report, 25 May, 2005.

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. 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 recent times in urban areas such as Mumbai, Surat, Vadodara and other places 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. Freak weather conditions, possibly the result of global warming, have been reflected recently in incessant rains in August 2006, resulting in floods in the deserts of Rajasthan, leading to loss of about 300 lives, immense damage to housing and infrastructure and widespread devastation in an area where people are not used to floods and have few mechanisms to cope with the crisis. The country has to shift towards efficient management of flood plains, disaster preparedness, response planning, flood forecasting and warning.

3.6 Landslides and Avalanches

3.6.1 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. 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.

3.6.2 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 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. 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

Box 3.4: Mitigation Measures for Avalanches

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

1. Structural measures:
 - a) Planting (Avalanche Prevention Forest)
 - b) Stepped Terraces
 - c) Avalanche Control Piles
 - d) Avalanche Control Fence
 - e) Suspended Fences
 - f) Snow Cornice Control Structures
 - g) 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.

mainly during monsoons, but the effects are felt more acutely due to higher density of population in the region. Measures to control landslides include micro zonation so as to regulate settlements in hazard prone areas, non interference with the natural water channels, construction of retaining walls against steep slopes and strengthening of weak areas with grouting. 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.

3.6.3 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. 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. Small rivers may be blocked creating danger of down stream flooding. Avalanches may sometimes hit or bury human settlements down the slopes, as in the Kashmir avalanche of 2005, which killed 278 persons, mostly living in temporary winter hutments.¹⁵

3.7 Industrial Disasters

3.7.1 Among the man made disasters, probably the most devastating (after wars) are industrial 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. The worst example globally was the Methyl Iso-cyanate 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. This disaster triggered a completely new legal regime and practices for preventing such disasters.

3.7.2 In the pre-Bhopal Gas Tragedy era, industrial safety was governed by legislations like the Factories Act, 1948 and the Explosives Act, 1884. These laws proved to be inadequate to provide safety to workers as well as to the people living in the surrounding areas. After the Bhopal Gas Tragedy, a new chapter was inserted in the Factories Act, 1948 dealing with hazardous processes. The Environment Protection Act, 1986 was enacted. More importantly, several Rules were promulgated under the Act. Important among them are:

1. The Environment (Protection) Rules, 1986.

¹⁵Source: SITREP; National Disaster Management Division, Ministry of Home Affairs; Dated 28-2-2005

¹⁶Number of claims filed in death cases - 22149, for personal injuries 10.01 lakhs; source-website of Bhopal Gas Tragedy Relief and Rehabilitation Department; Government of MP; Bhopal, website – www.mp.nic.in/bgtrrdmp

2. Hazardous Waste (Management and Handling) Rules, 1989.
3. The Manufacture, Storage and Import of Hazardous Substances Rules, 1989/2000 (MSIHS).
4. The Public Liability Insurance Act and Rules and Amendment, 1992.
5. The Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996.
6. The Environment (Siting for Industrial Projects) Rules, 1999.
7. The Municipal Solid Wastes (Management and Handling) Rules, 2000.
8. The Ozone Depleting Substances (Regulation and Control) Rules, 2000.

3.7.3 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 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. It is reported that more than 1140 workers lost their lives and 48,000 workers suffered injuries in factories in 2005¹⁸. The figure would be more if one includes the civilians who have lost their lives due to accidents in manufacturing processes, storage and transportation of hazardous material. With rapid industrialization, the threat of industrial disasters has increased. However, in spite of the existence of a large number of laws, their enforcement has left much to be desired.

3.8 Epidemics

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

(a) 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; (b) 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; (c) Person to person transmission of diseases e.g. AIDS and other venereal diseases; and (d) Air-borne diseases like influenza and measles that can also be transmitted through fomites (used clothes etc.).

3.8.2 In addition to the above, there are certain types of emerging infectious diseases such as epidemic of Severe Acute Respiratory Syndrome (SARS), which had occurred in China or 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.

3.8.3 Epidemics often take place due to poor sanitary conditions leading to contamination of food and water or due to inadequate disposal of human or animal carcasses in post-disaster situations. They become real dangers during floods and earthquakes. Sometimes, 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.

3.8.4 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.

3.8.5 The HPAI virus has the potential of being transmissible among human beings, thereby causing threat to millions of lives. It has been estimated by the WHO that millions of people could die of HPAI, should a human pandemic occur. Considering the potential for this scenario, it is imperative to have a synergy between global and national strategy to help stem the broad negative impact of the disease. The long-term vision of the strategy is to minimize the global threat and risk of HPAI in domestic poultry and humans, through progressive control and eradication of HPAI, particularly that caused by H5N1 virus, from terrestrial domestic poultry in the country. Achieving this goal will diminish the global threat of a human pandemic, stabilize poultry production, enhance a robust regional and international trade in poultry and poultry products, increase human and food safety, and improve the livelihoods of the rural poor.

3.9 Nuclear Hazards

3.9.1 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. 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

¹⁷Annual Report, Ministry of Environment and Forests, 2005-06

¹⁸Source: Website of Director General, Factory Advice Service & Labour Institutes; <http://dgfasli.nic.in>

also been drawn up for handling such emergencies in the public domain, which are called as “off site Emergencies”. These plans - *drawn up separately in detail for each site* - which are under the jurisdiction of the local district administration, cover an area of about 16 km radius around the plant or the off site Emergency Planning Zone.¹⁹

3.10 Desert Locusts

3.10.1 Desert Locusts, *Schistocerca gregaria*, 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. Initial Desert Locust control efforts were largely curative but the trend in the twentieth century had been toward preventing such plagues from occurring. Affected countries have assumed ever more responsibility for monitoring locust breeding areas and treating infestations before they increase in size and number. In fact, our knowledge of the Desert Locust has evolved along with the ability to manage locust plagues.

3.10.2 International cooperation lies at the core of an effective strategy for locust control. as a result, locust management decisions are based on information gathered by and exchanged with national agencies and international organizations that have developed programs to regularly monitor locusts and the weather in the desert before they reach agricultural areas. 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. One example is the delaying of control operations until locusts become concentrated into a relatively small area, which would allow more locusts to be treated using a lower quantity of pesticides applied over a smaller area. 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.

3.11 Slow Onset Disasters

3.11.1 Disasters can also be classified as ‘slow onset’ disasters and ‘rapid onset’ disasters. Earthquakes, cyclones, floods, tsunamis would fall under the category of rapid onset disasters; climate change (global warming), desertification, soil degradation, and droughts, would fall under the category of slow onset disasters. Slow onset disasters are also termed as ‘Creeping Emergencies’. It may be added that with ‘prevention’ forming an integral part of the ‘management cycle’, slow onset disasters like global warming, and desertification

¹⁹Source: Department of Atomic Energy Website. Retrieved on 10-9-06

must find adequate reflection in disaster preparedness - these phenomena gradually erode the ‘health’ of ecosystems and expose societies to the vagaries of nature. Unlike the rapid onset disasters, their impact is not felt immediately; however societies lose their ability to derive sustenance from their surroundings, over a period of time. Development policies and the manner in which they are implemented are some of the main reasons for the slow onset disasters.

3.11.2 Climatic Change

3.11.2.1 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 use²⁰.’ 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). Recent unexpected and unseasonal rainfall and drought is attributed to global warming. Combating global warming requires urgent and concerted efforts by the international community.

Box 3.5: 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 fuss about? 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.

(Source: *The Economist*; September 9-15, 2006)

3.11.3 Droughts

3.11.3.1 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 man made. The impact of droughts on societies varies depending on coping capabilities and the general health of the national economies concerned.

3.11.3.2 Droughts in India have their own peculiarities requiring appreciation of some basic facts. These are:

- *India has an average annual rainfall of around 1150 mm; no other country has such a high annual average, however, there is considerable annual variation.*
- *More than 80% of rainfall is received in less than 100 days during the South-west monsoon and the geographic spread is uneven.*

²⁰<http://www.envfor.nic.in/cc/what.htm>, Climate change website of the Ministry of Environment and Forests, Government of India. Retrieved on 10-9-06.

- 21% area receives less than 700 mm rains annually making such areas the hot spots of drought.
- Inadequacy of rains coupled with adverse land-man ratio compels the farmers to practice rain-fed agriculture in large parts of the country.
- 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.
- Per capita water availability in the country is steadily declining.
- 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.
- The traditional water harvesting systems have been largely abandoned.

3.11.3.3 The above factors demonstrate the complexity of Indian droughts and the constraints which rule out 'perfect solutions'. Further, the causes for droughts are increasingly attributable to the mismatch between supply and demand, particularly the demand for non-agricultural purposes. In other words, it is not as if a simple pre-existing problem is awaiting better remedies, the problem itself is becoming more complex.

3.11.3.4 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, solar radiation and wind patterns.

3.11.4 Desertification and Soil Degradation

3.11.4.1 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. Land degradation is estimated to affect one third of the total area of the country. 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. 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.²²

3.11.5 Sea Erosion

3.11.5.1 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". While the effects of waves, currents, tides and wind are primary natural factors that influence the coast, other factors leading to coastline erosion are: the sand sources and sinks, changes in relative sea level and geomorphological characteristics of the shore and sand, etc. Other anthropological effects that trigger beach erosion are: construction of artificial structures, mining of beach sand, offshore dredging, or building of dams²³.

Box 3.6: Land Erosion by Sea or River

The erosion of land, whether by the sea in coastal areas or by river waters inland, should be minimised by suitable cost-effective measures. The States and Union Territories should also undertake all requisite steps to ensure that indiscriminate occupation and exploitation of coastal strips of land are discouraged and that the location of economic activities in areas adjacent to the sea is regulated.

Each coastal State should prepare a comprehensive coastal land management plan, keeping in view of the environmental and ecological impacts, and regulate the developmental activities accordingly.

(National Water Policy)

3.11.5.2 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 phenomenon²⁴.

3.11.5.3 Prevention measures against sea erosion include (i) sea walls, (ii) gabions, (iii) boulders, (iii) revetments, (iv) steel piles, (iv) rock groynes and (v) offshore rock bars. The Ministry of Ocean Development has undertaken several 'Shoreline Management Plan Projects'. The State Governments have also taken up implementation of anti sea erosion works.

3.12 Crisis/Disaster Response Mechanism in India

3.12.1 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 to improve agricultural production as a safeguard against famines as well as preparatory measure to deal with acute scarcities occasioned by frequent failure of rains.

²¹Report of the National Commission for Integrated Water Resources Development, 1999

²²Website of the Central Soil Salinity Research Institute, http://www.cssri.org/introduction_regional.htm

²³ Taken from the website of the National Institute of Oceanography

²⁴A study conducted by the Ocean Engineering Division of the National Institute of Oceanography, Goa

3.12.2 Legal Framework

3.12.2.1 Realizing the importance of crisis management, many countries have passed laws to deal with various aspects of crisis management. For example, in the United States various laws dealing with crisis management enacted between 1950 and 2000 are indicated in Box 3.7.

Box 3.7: Laws dealing with disaster in USA

1950	Federal Disaster Relief Act (PL 81-875)
1966	Disaster Relief Act of 1966 (PL 89-769)
1968	National Flood Insurance Act (PL 90-448)
1969	Disaster Relief Act of 1969 (PL 91-79)
1970	Disaster Assistance Act of 1970 (PL 91-606)
1973	Flood Disaster Protection Act (PL 93-234)
1974	Disaster Relief Act of 1974 (PL 93-288)
1977	Earthquake Hazards Reduction Act (PL 95-124)
1979	Creation of Federal Emergency Management Agency
1988	Robert T. Stafford Relief and Emergency Assistance Act
1994	National Flood Insurance Reform Act (PL 103-325)
2000	Disaster Mitigation Act of 2000 (PL 106-390)

3.12.2.2 In India, recurrent crises in the form of widespread famines and locust invasions were a common feature of the colonial period and to deal with these, various famine commissions were set up in the 19th century and Famine Codes were developed as mentioned earlier. 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).

3.12.2.3 Legislation on disaster management at the national level was enacted in the year 2005 with the Disaster Management Act, 2005. Several states had also passed their own legislation on disaster management prior to the National Act. A comparison of these state legislations and the salient features of the Disaster Management Act, 2005 are placed at Annexures-II and III respectively.

3.12.3 The Response Mechanism

3.12.3.1 The community is usually the first responder in case of a disaster. 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); in urban areas the response is articulated by agencies like the civic authorities, the fire brigade and the local police station. At present, panchayats do not have the capacity to react institutionally in any effective manner to such situations and it is the district administration, which retains the basic responsibility of handling crises situations with the Collector playing a pivotal role.

3.12.3.2 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.

3.12.3.3 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 in the State Governments had been oriented from the very beginning towards post disaster relief and rehabilitation. Most of the states have Relief Commissioners who 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. A few states have switched over to a Disaster Management Department with the required linkages with the various development and regulatory departments concerned with prevention, mitigation and preparedness.

3.12.3.4 Every state has a Crisis Management Committee under the chairpersonship of the Chief Secretary, consisting of secretaries in charge of concerned departments, 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. At the ministers' level, a Cabinet Committee on Natural Calamities under the chairpersonship of the Chief Minister takes stock of situations and is responsible for all important policy decisions.

3.12.3.5 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.

3.12.3.6 Role of Union Government: Although the State Government concerned has the primary responsibility for crisis management, 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. Matters relating to nuclear, biological and chemical emergencies are looked after by the Cabinet Committee on Security.

3.12.3.7 The Cabinet Secretary, as the highest executive officer, heads the National Crisis Management Committee (NCMC). Secretaries of ministries and departments concerned and heads of other organizations are members of NCMC, which 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.

3.12.3.8 Till recently, 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 dealing with that particular subject have the nodal responsibility for handling that particular type of disaster, as shown in Table 3.3 .

Table 3.3: 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

3.12.3.9 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 CMG's functions are to review annual contingency plans formulated by various ministries, departments and organizations in their respective sectors, measures

required for dealing with a natural disaster, coordinate the activities of the Union Ministries and State Governments in relation to disaster preparedness and relief, and to obtain information from the nodal officers on all these issues. In the event of a disaster, the CMG meets frequently to review relief operations and extends all possible assistance required by the affected states to overcome the situation. The Resident Commissioner of the affected state is also associated with such meetings. The existing structure of crisis management is shown in Fig 3.2.

3.12.3.10 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. Under the existing scheme, each state has a corpus of funds called Calamity Relief Fund (CRF) administered by a State Level Committee headed by the Chief Secretary of the State

Box 3.8: Timely Action Saves Lives

On June 26, 2005, there was a sudden breach in the artificial lake on river Parechu, in Tibet (China) which led to an unprecedented rise in the water level of river Satluj and caused flash floods in five districts of Himachal Pradesh. Due to a timely alert sounded by the ITBP post at Lepcha and prompt action initiated by the State Government and Government of India for evacuation of people residing on the bank of rivers Spiti and Satluj, not a single human life was lost. The flash floods, however, caused extensive damage to roads, bridges, agricultural crops, government & private properties and other infrastructure.

(Source: Annual Report, Ministry of Home Affairs, Government of India, 2005-06)

Government. The size of the corpus is determined with reference to the expenditure normally incurred by the state on relief and rehabilitation over the past ten years. In case the funds under CRF are not sufficient to meet the specific requirements, State Governments can seek assistance from the National Calamity Contingency Fund (NCCF) – a fund created at national government level. Both these funds, as the names suggest, are meant for relief and rehabilitation and do not cover either mitigation or reconstruction works, which have to be funded separately by the State or Union Government.

3.12.3.11 *Armed Forces:* The Armed Forces, in view of their ability to organize action in adverse ground circumstances, their speed of operational response and also the resources and capabilities at their disposal 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, public works and engineering, in the immediate aftermath of major disasters.

3.12.3.12 Apart from natural disasters, certain other types of crises are dealt with through separate legislations or rules framed thereunder. For example, the Chemical Accidents (Emergency Planning, Preparedness, and Response) Rules, 1996 have been framed under

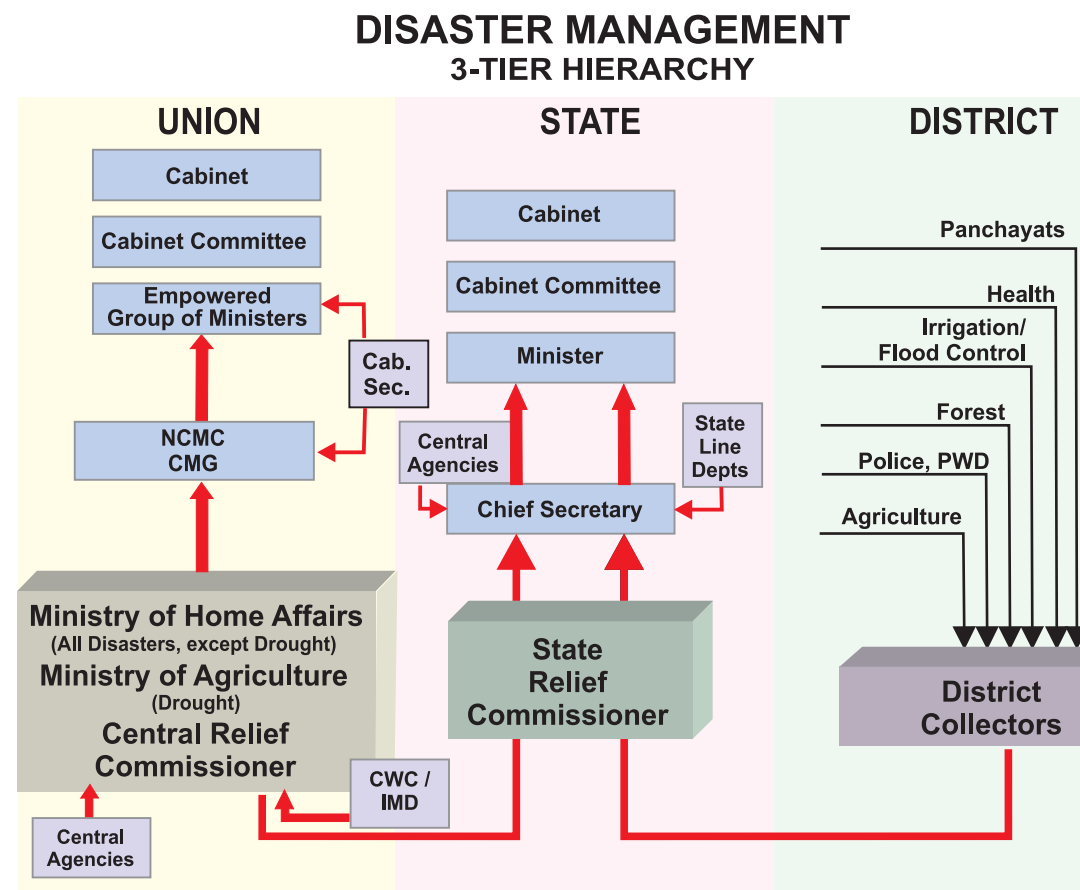


Fig. 3.2: Crisis management structure in the country (prior to enactment of the Disaster Management Act, 2005)

the Environment Protection Act. Similar Rules have been framed under Atomic Energy Act. Most States Governments have passed Essential Services Maintenance Acts (ESMA) to ensure provision of essential services during the time of crisis. The Code of Criminal Procedure (Cr.P.C) still remains the most important Act to tackle crisis situations due to public order problems.

3.12.4 High Powered Committee [HPC]

3.12.4.1 A paradigm shift in the approach to crisis management from relief and rehabilitation to prevention and mitigation and towards a holistic and comprehensive framework, took place with the United Nations deciding to observe the 1990s as the International Decade of Natural Disaster Reduction (IDNDR). National Governments were expected to pay special attention to measures to deal with natural disasters in a manner designed to minimize

their occurrence and to mitigate hardships if they do occur. The efforts took concrete shape in India in 1999 with the constitution of a High Powered Committee (HPC) on Disaster Management. The mandate of the HPC was to suggest institutional measures for effective management of both natural and man made disasters, in the country. The HPC submitted its final report in October 2001 outlining a vision to create a disaster-free India through adherence to the culture of preparedness, quick response, strategic thinking and prevention. The HPC came out with a large number of recommendations, dealing with the constitutional and legal framework, organizational structures and institutional mechanism in the overall disaster management system of the country.

3.12.5 New Institutional Arrangements

3.12.5.1 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 Ministry of Agriculture to the Ministry of Home Affairs. The Ministry of Agriculture 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;
- A specialized force comprising eight battalions to be named as National Disaster Response Force to be constituted with state-of-the-art equipment and training to respond to various natural and man made disasters;
- An advanced fail-proof disaster communication network would be set up through Emergency Operation Centres (EOC) at national, state and district levels;
- The National Institute of Disaster Management was set up at Delhi for training, capacity building, research and documentation on different aspects of disaster management in the country;
- 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.

3.12.6 Unification of Crisis Management: The Disaster Management Act, 2005

3.12.6.1 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 a 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. Sections 2 to 8, 10, 75, 77 and 79 of the

Role Players : Legal-institutional Framework

Disaster Management Act, 2005

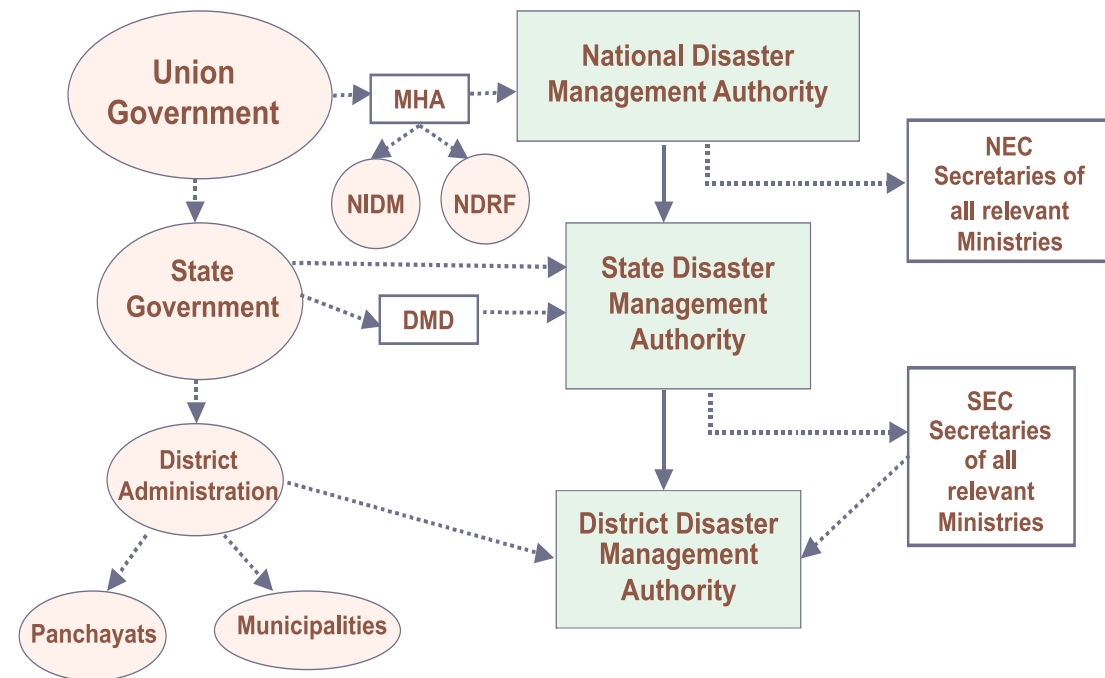


Fig 3.3: Unification of crisis management (as visualized in the Disaster Management Act, 2005)

Act have been notified on 28th July, 2006. However the National Disaster Management Authority was constituted by an Executive Order dated 28th September, 2005. The salient features of the Act are given in Annexure-III.

4 LEGAL AND INSTITUTIONAL FRAMEWORK

4.1 Constitutional Provision - is there need for a separate entry?

4.1.1 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. As already noted, '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 Ministry of Agriculture made a plea to the National Commission to Review the Working of the Constitution (NCRCW) to recommend insertion of an entry on the subject in the Concurrent List. The High Powered Committee (HPC) also recommended that a conscious view needs to be taken to make an appropriate mention of the subject of disaster management in one of the lists. The NCRCW ultimately made the following recommendation;

“Management of Disasters and Emergencies, natural or man-made be included in list three i.e. the concurrent list of the Seventh Schedule of the Indian Constitution”.

4.1.2 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. Similarly, some States have also passed laws governing disaster management. 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.

4.1.3 Disaster management encompasses all activities including preparedness, early warning systems, rescue, relief and rehabilitation. The term disaster includes natural calamities, health related disasters (epidemics), industrial disasters and disasters caused by hostile elements

such as terrorists. 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.

4.1.4 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. Unlike in other cases of proposals for inclusion in the Concurrent List, State Governments may also welcome this, as this will also enable them to have legislation without ambiguity regarding the entry.

4.1.5 Recommendation :

- a. A new entry, “Management of Disasters and Emergencies, natural or man-made”, may be included in List III (Concurrent List) of the Seventh Schedule of the Constitution.

4.2 Legal Framework

4.2.1 Evolution of the Legal Framework

4.2.1.1 Traditionally the district administration, under the instructions of and with the Union and State Governments, has been the focal point of disaster management activities and powers (formal and informal) have been vested in the Collectors. While there was no comprehensive law on the subject, laws and regulations pertaining to certain specific types of disaster situations did exist. These include:

- The Factories Act, 1948 amended after the Bhopal tragedy to include the right to information; along with the EPA ,1986 which lays down rules for the protection of land, water and air; and the Manufacture, Storage and Transport of Hazardous Chemicals Rules,1989 and the Chemical Accident (Prevention and Preparedness) Rules, 1996;

- The Atomic Energy Act combined with Rules notified under the Environment Protection act, 1986 (EPA) which provide for emergency response plans both on and off site for atomic accidents / disasters;
- State Essential Services Maintenance Acts (ESMA) which govern incidents involving disruption of essential public services;
- Various Regulations/Codes/Rules relating to different aspects of disaster management e.g. Coastal Zone Regulations, Building Codes, Fire Safety Rules etc;
- State Public Health Acts;
- The Code of Criminal Procedure, which deals with public nuisance;
- The Army Act, which empowers civil administration to seek help of army during crisis; and
- State laws dealing with public order and local governments.

4.2.1.2 A comprehensive legislation on the subject was envisaged in 2001 when the HPC drafted a “National Calamity Management Bill”. This draft Bill aimed at ensuring efficiency and effective management of natural and other calamities and achieving greater coordination and responsiveness with respect to prevention and mitigation of disasters so as to provide better relief and rehabilitation of victims of disasters. Besides, HPC also drafted a Model State Disaster Management Bill.

4.2.1.3 While the Central law was under consideration, the following state laws were passed: (i) The Bihar Disaster Management Act, 2004, (ii) Uttaranchal Disaster Mitigation, Management and Prevention Act, 2005, (iii) The Gujarat State Disaster Management Act, 2003 and the Uttar Pradesh Disaster Management Act, 2005. An analysis of the provisions of the state laws is given in Annexure-II. The Bihar Disaster Management Act is based on the model recommended by the HPC. The Uttaranchal Disaster Mitigation, Management and Prevention Act, 2005 contemplates constitution of a Disaster Mitigation and Management Center. This center would focus on disaster management, creating awareness, networking and information exchange, establishing and operationalising an Advance Warning System in the region etc. The Gujarat State Disaster Management Act is quite different. The definition of ‘disaster’ is wider than in the model proposed by HPC. The Gujarat Act also constitutes a State Disaster Management Authority, headed by the Chief Minister with state ministers and officers as its members. This Authority acts as the central planning, coordinating and monitoring body for disaster management. The Act does not constitute any body at the district level but envisages that the Collector would head the disaster

management efforts. As stated earlier, Parliament passed the Disaster Management Act in 2005 to deal with all aspects of disaster management throughout the country.

4.2.2 What should a law on crisis management provide?

4.2.2.1 The experience from past disasters and the prospect of more disasters/crisis, demand a holistic and an agile system for dealing with crisis/disasters. This would require strengthening of the existing legal framework, removal of loopholes, wherever they exist, ensuring an effective coordination mechanism and an administrative structure with unity of command and well defined responsibilities at all levels.

4.2.2.2 The traditionally used definition of the word ‘disaster’ and its association with natural calamities is limited in scope. With rapid economic development, man-made disasters pose equally grave threats to all life, property and environment. Moreover, man-made disasters are preventable and therefore what needs to be tackled is ‘crisis’ and not disaster. Every disaster is a crisis, but every crisis may not lead to a disaster. Focus should be on management of crises so that their degeneration into a disaster is prevented.

4.2.2.3 The multidisciplinary nature of crisis/disaster management, its large canvass spreading from preparedness to rehabilitation and evaluation, and its widespread impact, which require resources to be drawn from different levels of government, means that a totally centralized or totally decentralized mechanism would be ineffective. It is best if certain functions of disaster management are centralized while others are decentralized down to the lowest level.

4.2.2.4 Immediate rescue and relief should be the responsibility of the level of government closest to the affected population. This logically has to be the district administration and the local self-governments. The same argument also holds good for the rehabilitation efforts. The district administration is part of the State Government and the primary responsibility for managing any disaster is with the State Governments. The resources of states being limited they seek and get assistance from the Union Government. This arrangement of ‘bottom-up’ responsibilities regarding implementation is appropriate and has worked well in the past and should not be disturbed.

4.2.2.5 On the other hand, disaster management planning requires wider perspective and expertise. Developments in science and technology should be used for mitigating the adverse impacts of disasters and have to be studied, researched and updated. Specialized manpower and equipment for dealing with disasters also needs to be readily available. A repository of best practices needs to be created so that these could be replicated, adapted, if necessary and used on future occasions. National and regional early warning systems need to be developed and deployed. Moreover, there is the need for implementation of standard capacity building

and awareness generation programmes. These types of activities call for an agency to coordinate efforts at the state and the national levels.

4.2.2.6 Thus, the legislation for disaster/crisis management needs to create agencies/authorities at local/district/state and national levels. The responsibility and the authority assigned to each one of these have to be distinct. National level planning, research, analysis and adoption of best practices, development of standard operating procedures (national level), development of training and capacity building programmes, administration of early warning systems and formulating policy on crisis/disaster management are best entrusted to a national body. Local planning and the actual work of implementation are better left with State Governments, local governments and the district administration with support from the Union Government's implementing agencies.

4.2.2.7 Disaster/crisis management may require mobilization of resources and services. Such resources and services may have to be requisitioned including from individuals and private organizations. The law needs to empower authorities handling disasters to requisition such resources for specified periods and the issue of compensation should not be a hindrance in crisis management efforts.

4.2.2.8 A warning about a looming disaster, received well in time, can avert huge loss of human lives. To ensure this, state-of-the-art early warning systems have to be meticulously designed and installed. But even with a high degree of sophistication, the human element is involved in the transmission process and any slippage due to carelessness could prove disastrous. Prompt transmission of information, as prescribed under standard operating procedures and instructions for transmission, should be made a statutory duty of each concerned functionary. Responsibilities of citizens should also be appropriately provided for in the law.

4.2.2.9 Another lesson learnt from past disasters is that funds meant for disaster relief often tend to get misused as normal procedures are not followed because of urgency. While enforcing stringent procurement procedures may become a hurdle in the disaster management effort, the penalty for misutilization of funds meant for disaster relief should be stringent and could form part of the law itself.

4.2.3 Analysis of the Disaster Management Act, 2005

4.2.3.1 The Disaster Management Act, 2005 defines disaster as natural or man made event that cause substantial loss to life, property and environment. The scope of this definition does not cover a variety of other crisis situations that may or may not culminate in a disaster. The Act 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 {Sections 6, 10(2)(m), 36f}. The National Executive Committee (NEC) which is to be set up under the NDMA would be chaired by the Secretary to the Government of India in charge of the Ministry or Department of the Union Government having administrative control of disaster management {Section 8(2)(a)}. This body has extensive powers and functions including laying down guidelines and giving directions to the concerned ministries or departments of the Government of India, State

Box: 4.1: The Role and Functions of a National Disaster Management Organisation

The main scope of a disaster management law; or a National Disaster Counter Measure Act 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.

The National Disaster Management Organisation (NDMO) is not intended to:

- Duplicate normal government.
- Act independently of government.
- Seek to control other agencies.

(Source: Presentation by AJ Rego, Director PDIR, Asian Disaster Preparedness Centre to the GOI-CII-UNDP Disaster Preparedness and Mitigation Summit. New Delhi, November 2002)

Governments and State Disaster Management Authorities regarding measures to be taken by them in response to any threatening disaster and also powers to require any department or agency of the government to make available to the national authority or state authorities, such men or material resources as are available with it. In other words, the NDMA as well as the National Executive Committee (NEC) have been given the role not just of planning, coordinating, monitoring and providing assistance during a disaster but also executive functions related to implementation of the emergency relief and disaster response.

4.2.3.2 The Disaster Management Act envisages a unified structure of disaster management in the country; the integration of this institutional structure with the existing constitutional, legal and administrative framework of the country may, however, pose several problems. Under the Act, the NDMA and the NEC will not only approve the national plans and the plans of the respective union ministries/departments; they will also lay down guidelines for the state authorities, coordinate the enforcement and implementation of these policies and plans for disaster management and ensure timely response. All these functions traditionally have been performed by State Governments. What, in fact, is however needed is further empowerment and delegation to the front-end functionaries when it comes to implementation of disaster management efforts. Moreover, in any crisis situation, expeditious and appropriate response is the essence, and the field functionaries, the State Governments and the line departments and ministries of the Union Government being aware of the field situation

would be in the best position to provide timely and effective response, if they are fully authorized to do so.

4.2.3.3 International practices also do not normally involve setting up centralized authorities with command and control functions to deal with disasters. For example, in the US, the Federal Emergency Management Agency (FEMA) is an agency that operates under the control of the Department of Home Land Security for the purpose of overseeing federal government assistance in domestic disaster preparation, training of first responders and coordination of the government's disaster response efforts. Similarly, in Japan, although legislation provides an overall structure for planning and response, local governments have the primary responsibility of disaster management. Bangladesh, on the other hand, with its history of recurrent floods and cyclones, has adopted a more unitary model, setting up a Ministry of Disaster Management and Relief (MDMR) at the national level under which a Directorate of Relief and Rehabilitation (DRR) operates relief activities for distribution to the remote field levels. (It may, however, be noted that Bangladesh has a unitary form of government).

4.2.3.4 The Commission has considered the issues carefully from an administrative angle and is of the view that the Disaster Management Act, 2005 requires substantial amendments to ensure that it provides a coherent and practical framework for dealing with disasters at the Union, State, District and local levels.

Box 4.2: Evolution of the Crisis/Disaster Management System in the United States

The 1960s and early 1970s brought massive disasters requiring major federal response and recovery operations by the Federal Disaster Assistance Administration, established within the Department of Housing and Urban Development. Hurricane Carla struck in 1962, hurricane Betsy in 1965, hurricane Camille in 1969, and hurricane Agnes in 1972. The San Fernando earthquake rocked Southern California in 1971, and the Alaskan earthquake hit in 1964. To respond to national concern regarding these events, the Congress passed the 1974 Disaster Relief Act that established the process of Presidential disaster declarations.

However, emergency and disaster activities were still fragmented. Many parallel programs and policies existed at the state and local level, compounding the complexity of federal disaster relief efforts. In 1979, President Carter issued an executive order that merged many of the separate disaster-related responsibilities into a new, independent Federal Emergency Management Agency (FEMA) Among other agencies, FEMA absorbed the Federal Insurance Administration, the National Fire Prevention and Control Administration, the National Weather Service Community Preparedness Program, the Federal Preparedness Agency of the General Services Administration, and the Federal Disaster Assistance Administration activities from HUD. Civil defense responsibilities were also transferred to the new agency from the Defense Department's Defense Civil Preparedness Agency. FEMA led the federal response to hurricane Andrew, which slammed into and leveled much of South Florida in August 1992. Based on recommendations following the response to hurricane Andrew FEMA was elevated to a cabinet level agency whose director reported to the President. The Homeland Security Act of 2002,5 which established DHS, created new requirements for emergency preparedness and response and placed FEMA within DHS.

(Extracted from; Statement of William O. Jenkins, Jr., Director Homeland Security and Justice Issues. Testimony before the Committee on Homeland Security, U.S. House of Representatives; May 9, 2006)

4.2.3.5 Recommendations :

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

- a. Disaster/Crisis Management should continue to be the primary responsibility of the State Governments and the Union Government should play a supportive role.
- b. 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.
- c. The functions of the National Disaster Management Authority should be: 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; to advise on parameters of categorization and on declaration of national and state level disasters; 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; 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.
- d. 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.
- e. 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.
- f. 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.

- g. The law should make provisions for stringent punishment for misutilization of funds meant for crisis/disaster management.
- h. The role of the local governments should be brought to the forefront for crisis/disaster management.
- i. 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 (refer para 4.3.3).
- j. 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.

4.3 Institutional Framework

4.3.1 Institutional Framework at Apex Level

4.3.1.1 HPC had observed that disaster/crisis management needs full political commitment at all levels of national, state and local government as cataclysmic events sometimes assume the nature of national crisis involving the mobilization of practically the entire government at the highest level²⁵. The HPC had recommended that an institutional mechanism needs to be created at the highest level by setting a Cabinet Committee on Disaster Management that would ensure continued and sustained focus on this area at the highest level of the government. The HPC also recommended that the All Party National Committee under the Chairmanship of the Prime Minister and the Working Group set up under it, need to be institutionalized as permanent standing bodies as the former would help generate the necessary political will, consensus and support, while the latter, that is the Working Group, being a body of experts, will evolve appropriate strategies for implementation of broad policy guidelines.

4.3.1.2 The Commission broadly agrees with the suggestions of the HPC that a Cabinet Committee on Crisis Management be set up and notes that such a Committee has already been set up. However, with the setting up of the National Disaster Management Authority, on the lines proposed, the Working Group as recommended by the HPC may not be required.

²⁵Report of the High Powered Committee on Disaster Management, 2001.

4.3.2 Is There a Case for a Separate Ministry/Department of Disaster/Crisis Management?

4.3.2.1 The HPC recommended the creation of a separate ministry of disaster management for sustained and focused efforts in the area of disaster preparedness, mitigation and management. It was envisaged that this ministry would deal with both man-made and natural disasters as a “nodal ministry”. The functions expected of the ministry were networking and coordination of national resources while the concerned ‘functional’ ministries would continue to discharge their responsibilities and functions in accordance with their respective disaster management plans and also work in close cooperation with the nodal ministry. A separate department of disaster management and mitigation was also mooted at the state level. Uttaranchal is the only state, which has a separate department of disaster management. Bangladesh is the only South Asian country to have set up a separate ministry for disaster management and relief²⁶.

4.3.2.2 The Commission feels that given the multi-disciplinary nature of activities in crisis management, creation of a separate ministry is likely to lead to conflict and delays rather than coordination. For planning, research, capacity building and coordination of national resources; such a coordination mechanism is now available with the formation of the NDMA. And for the purposes of implementation, a coordination mechanism headed by the Cabinet Secretary would be more effective. Therefore, the Commission is not in favour of creation of a separate ministry/department at the national or the state level.

4.3.3 Coordination at the Apex Operational Level

4.3.3.1 The National Crisis Management Committee (NCMC) headed by the Cabinet Secretary coordinates and guides the work of different departments of Government of India in times of crisis. The NEC envisaged under the Disaster Management Act, 2005 would be duplicating the role of NCMC to a great extent. The NCMC has inherent advantages of ensuring quick decisions and immediate implementation. If parallel bodies are created the possibility of the pre-existing and newly formed committees trespassing on each other and creating confusion and blurring of responsibilities during crisis situations cannot be ruled out. Moreover, there is need to shift the focus from managing disasters to managing crises and the NEC would not be in position to handle all types of crises. This problem would be further compounded in case of multiple crises or disasters. Unity of command and quick decision making are paramount in any crisis management situation. The Commission is therefore of the view that NEC, as envisaged under the Disaster Management Act need not be constituted and that the existing coordination mechanism under the Cabinet Secretary should continue. Similarly, at the state level the existing coordination mechanism under the Chief Secretary should be retained.

4.3.3.2 The Act also envisages establishment of a National Disaster Response Force (NDRF), a uniformed and highly trained quick response agency to respond to the needs of search and

²⁶Duryog Nivaran. South Asian Network for Disaster Risk Reduction; <http://www.duryognivaran.org/duryog/disasterprofile.php?profile=2>

rescue and to provide, on the spot, life-saving assistance to the victims. To a large extent, this role has been admirably filled by our Armed Forces, in particular, the Army. The lessons learnt from the devastating hurricane Katrina in the US is that extraordinarily severe disasters could overwhelm specialized agencies and that in such situations the Armed Forces remain the 'measure of last resort'. It is imperative that even after the NDRF becomes fully functional, the 'enabling role' of the Armed Forces in assisting the civil authorities be retained and the Armed Forces continue to maintain capabilities in specialized search and rescue operations.

4.3.3.3 Recommendations :

- a. **There is no need for a separate ministry/department of disaster management at the national or the state level.**
- b. **The NEC as stipulated under the Disaster Management Act, 2005 need not be constituted, and the NCMC can continue to be the apex coordination body. At the state level, the existing coordination mechanism under the Chief Secretary may continue.**
- c. **Notwithstanding the establishment of NDRE, the role of the Armed Forces, particularly the Army, in coming to the aid of victims of disasters should be retained and the special capabilities acquired by the Armed Forces in search and rescue and on-the spot medical attention need to be maintained.**

4.3.4 Role of Local Self-Governments

4.3.4.1 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. With the enactment of a central legislation on the subject and the possibility that more state level legislations will be forthcoming, State Governments would need to examine if enabling, provisions need to be introduced in disaster management legislations or even the municipal legislations to bring greater salience to the role of the municipal bodies in responding to disasters.

4.3.4.2 Recommendation :

- a. **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.

4.3.5 Crisis Management Set Up for Metropolitan Cities

4.3.5.1 In major cities (say, with population exceeding 2.5 million), Municipal Corporations have a large administrative system including departments like engineering, public health and revenue, and sometimes fire services. These should provide a good mechanism for coordinated response in case of any crisis/disaster. Moreover, in cities where there is a Police Commissioner system, the District Collector does not have as much a role as in other districts. In such situations, District Disaster Management Authority prescribed by the Disaster Management Act, 2005 may not be very suitable. In metropolitan cities it is advisable to make the urban metropolitan government directly responsible for disaster management.

Box 4.3: Mayor of New York gets Time Person of the Year Award

Sixteen hours had passed since the Twin Towers crumbled and fell, and people kept telling Rudy Giuliani to get some rest. The indomitable mayor of New York City had spent the day and night holding his town together. He arrived at the World Trade Center just after the second plane hit, watched human beings drop from the sky and - when the south tower imploded - nearly got trapped inside his makeshift command center near the site. Then he led a battered platoon of city officials, reporters and civilians north through the blizzard of ash and smoke, and a detective jimmied open the door to a firehouse so the mayor could revive his government there. Giuliani took to the airwaves to calm and reassure his people, made a few hundred rapid-fire decisions about the security and rescue operations, toured hospitals to comfort the families of the missing and made four more visits to the apocalyptic attack scene.

(Source- <http://www.time.com/time/poy2001/poyprofile.html>)

4.3.5.2 Recommendation :

- a. **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.**

4.3.6 Bringing "Water" at the Centre Stage of Policy Domain

4.3.6.1 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. Without being exhaustive, attention may be invited to the following different policy platforms:

- Ministry of Water Resources; Irrigation and Flood Control, Inter-State Basin Issues etc.

- Department of Drinking Water Supply; Rural Water Supply.
- Ministry of Urban Development and Poverty Alleviation; Urban Water Supply.
- Ministry of Environment and Forests; Lakes, control of desertification/aridity.
- Ministry of Agriculture; Watershed Development/Droughts.
- Ministry of Rural Development; Water conservation in rural areas.
- Ministry of Science and Technology; Hydrology, Hydrogeology etc.

4.3.6.2 The long term interests of the country, including drought related concerns, will be better addressed if all the policy aspects and schemes with water, water conservation and improving water availability as their primary focus are brought on a single policy platform. This aspect needs to be considered along with other issues concerning 'machinery of the central government'. It may be added here that while a National Water Policy encompassing diverse policy concerns was framed in 2002 with the Ministry of Water Resources as the 'nodal point', recognition of 'policy diversities' has not resulted in the emergence of a road map for integration of responsibilities.

4.3.6.3 The National Commission for Integrated Water Resources Development Plan-1999, examined the issue of institutional set up at the state and national levels. That Commission stated as follows about the structure at the state level.

The dominant institutional structure of governments in India is departmental and that is true of the water sector also. In that structure, there is division of responsibilities among departments, both in the Ministry (secretariat) and at the implementing levels (Head of the Department and his vertical organization down to the field level) - No department is in charge of or can command services of all components of work that are essential for achieving results. Since the number of departments has increased, there is need for time-consuming consultations. While there are constant inter-departmental references and meetings, there is a weak coordination and lack of a holistic approach. The negative effects of departmental structure are aggravated by the lack of internal delegation of decision-making. The head of the department and organization for research, education, training and survey and data collection - which should have enough autonomy in their working, function as subordinate offices and have to seek the Ministry's orders and approvals on most matters. Micro-management and not achievement of results is the main result. The basic constraints in a departmental structure are compounded in the case of 'Water', because many departments deal with different aspects of water.

Since the raison de'etre of departmental officialdom is to serve farmers, the irrigation bureaucracy must understand and appreciate the socio-economic dynamics of human interaction. The pressing

needs of integrated decision-making require an organizational restructuring to a more holistic management orientation involving a multidisciplinary interaction of diverse expertise covering the full range of water management skills to achieve the goals. The irrigation departments may be restructured from a hierarchical to a functional orientation.

4.3.6.4 Similarly, it emphasized the need for an integrated approach at the national level also. It stated:

The Ministry of Water Resources was concerned, from its earlier days as Ministry of Irrigation and Power, mainly with 'irrigation' aspects of water resources. Its current mandate in the Allocation of Business includes the following general clause, namely:

'Development, conservation and management of water as a national resource; overall national perspective of water planning and coordination in relation to diverse use of water'.

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 and as stated above, what is essential is to ensure coordination. For this purpose, the ministry (secretariat) and more so, its attached office (head of the department) should have multi-disciplinary capability.

The challenges of integrated water development and management can be fixed only if the apex institution at the national level is suitably equipped for it and has the necessary multi-disciplinary capacity. The status of an attached office, which is in practice subordinate to the Ministry and has little autonomy in functioning, is inappropriate for achieving this. We recommend that the CWC should be restructured into a statutory high-powered inter-disciplinary Commission, with maximum autonomy, in order to deal with policy and reforms, centre-state and inter-state issues, planning and project finalization, international aspects other than those that have to be retained with the ministry; legal economic and financial issues, water productivity, conservation and management, environmental aspects and rehabilitation, people's participation and communication, coordination and facilitation of inter-disciplinary research, HRD and training, and a National Information/Data System.

4.3.7 Essential 'Policy Integration' between Long and Short Term Measures to Achieve Disaster Avoidance

4.3.7.1 While a number of Centrally Sponsored Schemes have objectives connected directly or indirectly, with drought avoidance, the two major interventions in this sphere are the Drought Prone Areas Programme (DPAP) and the Desert Development Programme (DDP).

The thrust of these schemes is to 'treat' land and vegetation in selected areas in a manner that the 'treated areas' become less vulnerable to ill effects associated with high drought vulnerability and aridity. These schemes are handled by the Department of Land Resources (DoLR) in the Ministry of Rural Development. DoLR is also entrusted with another issue of crucial significance to agriculture, namely, Land Reforms. It is learnt that there is a proposal under active consideration for forming a National Rainfed Areas Authority. As already mentioned, for droughts, management of the chronic malady and the crisis are best dealt with in a holistic manner in the same Ministry.

4.3.7.2 The Commission would like to only underscore these two major issues (4.3.6 and 4.3.7) in this Report. Formulation of suitable recommendations on the subject would be dealt with in the Report on the organizational structure of the Government of India.

4.3.8 Creation of Legal and Institutional Framework for Managing Floods in Inter-State Rivers

4.3.8.1 This year's (2006) unprecedented floods in many states have highlighted the need for coordinated release of waters from reservoirs in the case of inter-state rivers. Timely information of storage levels and inflows is not published and there is also the tendency to retain water in the reservoirs until the levels reached are considered dangerous. Sudden release of water leads to large scale flooding of downstream regions. The National Commission for Integrated Development Plan for Water Resources (1999) had recommended the constitution of inter-state river basin authorities. A beginning should be made at least for the purpose collection of data, timely release of such data and working out of agreed releases from reservoirs on reaching certain levels of storage. Legislation needs to be enacted urgently by Parliament using the power under Entry 56 of the Union List dealing with inter-state rivers.

4.3.8.2 Recommendation:

- a. Using powers under Entry 56 in the Union List, a Law may be enacted to set up mechanisms for collection of data, managing flow in rivers and release of water from reservoirs, so as to prevent disasters, with inter-state ramifications.

4.3.9 Empowering the Relief Commissioners/Disaster Management Departments to Effectively Discharge Disaster Related Responsibilities

4.3.9.1 The state level nodal points, by whatever names known, have to discharge onerous responsibilities of coordination and supervision of disaster relief operations. Such duties are more demanding in case of droughts due to the much longer duration of the phenomenon

and involvement of more governmental agencies. Keen observers of the scene have generally held the view that there needs to be a standing, though not necessarily permanent arrangement, to enable the nodal points to discharge the heavy responsibilities effectively during crisis. This responsibility encompasses many spheres - damage assessments, planning of relief operations, sectoral arrangements, inter-sectoral cooperation, distribution of relief and monitoring activities with communication of reports and returns. Added to this is the daunting task of rendering accounts. Clearly, therefore, a strengthening of the nodal point and establishment of an executing-coordinating agency is imperative. This could be achieved by secondment of officers from related departments to the State Disaster Management Authorities during a crisis. All these officers should work under the leadership of the Disaster Management Department/Authority. An added advantage of this arrangement will be that over a period of time departmental representatives will develop expertise in disaster management. This should help address the long term need for a dedicated cadre of disaster managers.

4.3.9.2 Recommendation:

- a. **The State Disaster Management organisations need to be strengthened for dealing with crises. This could be achieved in the following manner:**
 - (i) A framework should be in readiness to be put in place immediately during crisis or on fulfillment of some pre-defined scenarios – the 'trigger mechanism' needs to be well defined to ensure that the 'framework' is put in active operation instantaneously.
 - (ii) The 'framework' may consist of officers (designated by name) drawn from Revenue, Police, Agriculture, Animal Husbandry, Public Health Engineering, Water Resources, Women & Child Development, Welfare, Public Works, Highways, Irrigation, Health, and Treasury & Accounts Departments. The designated officers must undergo a week's orientation every year, though they may continue to discharge their normal departmental responsibilities except when seconded to the nodal point in the manner suggested above.
 - (iii) The designated officers will work as a cohesive integrated team under one roof on whole-time basis during crisis situations, under the leadership of the nodal officer and be responsible entirely for the functioning of their department insofar as it relates to drought/disaster management.

- (iv) The role and responsibility of each department needs to be specifically identified and defined on the lines the Ministry of Agriculture has specified the responsibilities of various Union Government agencies during severe droughts.
- (v) The designated departmental officer should be delegated powers and responsibilities defined in advance and will deal with other departmental functionaries directly.

4.3.10 Institutional Support of Science and Technology Institutions for Disaster Management

4.3.10.1 Disaster management depends heavily upon the inputs from various science and technology institutions. Indeed, major improvements in disaster management efforts may be attributed to developments in science and technology. As crisis management is multi-disciplinary in nature, the relevant research is carried out in several sectoral Research and Development organizations.

4.3.10.2 Towards strengthening the national response mechanisms, the Department of Space (DOS) in the 10th Five Year Plan launched a Disaster Management Support (DMS) programme. Using synergistically space and airborne systems in conjunction with the conventional technologies, the programme has been providing space enabled products and services on a reliable and timely basis for effective disaster management. The DMS is proposed to be considerably expanded during the Eleventh Plan. Other Science and Technology Departments have also drawn up similar major proposals. The organizations are working through mutual consultations, but it is advisable to provide a formal common platform to achieve synergy.

4.3.10.3 Recommendation:

- a. The National Disaster Management Authority, assisted by NIDM, may facilitate a common platform between the Science and Technology organizations and the users of the relevant technologies. Such mechanisms may be operationalised both at the Union and State levels.

4.3.11 Strengthening of National Institute of Disaster Management (NIDM)

4.3.11.1 The National Institute of Disaster Management (NIDM) is a premier national organization working for human resource development at national level in the area of disaster mitigation and management. It is an autonomous body under the Ministry of Home Affairs and its objectives are: (i) to undertake quality research, (ii) to work as a national resource centre, (iii) to professionalise disaster management, (iv) to promote training, (v) to build partnerships with

stakeholders and other institutions and (vi) to link learning and action. Certain steps are necessary to enable the institution to meet the expectations with which it was established.

4.3.11.2 Recommendation:

- (a) NIDM may continue as an autonomous body and function as the apex professional institution in disaster management. In addition to research and studies, the institution needs to engage itself in documenting and disseminating global and national best practices and in developing planning, training and evaluation methodologies.

4.3.12 Professionalization of Disaster Management

4.3.12.1 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.

4.3.12.2 The 'best practices' in disaster management are the strategies and methods perfected by several developed countries and India can take advantage from exposure to these practices. It is, therefore, desirable that the possibility of bilateral agreements with foreign governments for exchange of experiences and learning from their documentation and research efforts be fully explored.

4.3.12.3 Recommendations:

- (a) '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.
- (b) 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.

5 RISK REDUCTION

5.1 Reducing Disaster Risk

5.1.1 As explained in the previous chapter, 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. It can also be brought down by taking measures to reduce vulnerability. In this chapter, the issues involved in risk reduction are analyzed and recommendations made. The underlying principles apply to all types of crises/disasters. However, some crises/disasters have very specific features which are also dealt with in this chapter. The chapter has been structured around the different components of risk reduction, described in the following paras.²⁷

5.2 Enunciating a Policy Towards Crisis Management Which Emphasizes Risk Reduction

5.2.1. The enactment of laws and the setting up of national, state and district level authorities is an acknowledgement of the fact that disaster management is an integral part of administration. The preparation of well considered disaster management plans with preventive and risk management measures and their implementation will be an important component of the work of these bodies.

5.2.2 The NDMA has been mandated to lay down policies, plans and guidelines for disaster management {Section 6(1) of the Disaster Management Act, 2005}. The Commission is of the view that a national policy should reflect the paradigm shift in disaster management from a short term to a long term perspective, from relief and rehabilitation to mitigation and risk reduction, and from a government led approach to innovative partnerships involving the community, civil society, corporate bodies and with a focus on women and children who often bear the brunt of most disasters.

5.2.3 Recommendations: 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:

- a. Disaster management to be professionalized.
- b. Risk management to be brought to the centre stage in all disaster mitigation plans.
- c. All efforts for disaster management to be based on hazard and vulnerability analysis.
- d. Communities and local governments to be made aware of the hazards and the vulnerabilities.
- e. Communities and local governments to be involved in formulating disaster management plans.
- f. The primary responsibility for disaster management to be that of the State Government, with the Union Government playing a supportive role.
- g. Effective implementation of land use laws, building byelaws, safety laws and environmental laws.

Box 5.1: Management of Urban Floods: Case Study of Mumbai Floods 2005

Lessons:

1. The limitations of the weather prediction and early warning system were exposed.
2. Response of Government agencies was quick. Army was deployed within 12 hours of heavy rainfall on the first day i.e. 27th July, 2005.
3. Declaration of holidays on 27th and 28th July, 2005 reduced distress.
4. Civil society responded in a big way.
5. Massive immunization and effective mobilization of health services prevented major epidemic.
6. While unprecedented rainfall was the main reason for the Mumbai flood in 2005, major contributing factors were unplanned urban development in complete disregard of the delicate environment and ecology of the area, such as:
 - 900 green plots were de-reserved to make way for real estate developments.
 - 730 acres of mangrove wetland filled in Mahim creek for the development of Bandra-Kurla complex.
 - Western Expressway was widened despite objections from BMC thereby seriously compromising the drainage system.
 - Course of Mithi river diverted for expansion of airport runway.
 - Transferable Development Right was allowed indiscriminately without consideration of carrying capacity of the area.
7. The drainage system was clogged by solid wastes.
8. The Disaster Management Plan was not updated.
9. Community was not involved in the planning process.

(Source: National Institute of Disaster Management)

²⁷This is a modified version of the framework proposed in Living with Risk, A global review of disaster reduction initiatives, 2004 version. (Inter-Agency Secretariat of the International Strategy for Disaster Reduction)

- h. Setting up a framework to coordinate the responses from different sections like donors, voluntary organisations, corporate bodies etc.
- i. Special needs of women, children, elderly and physically challenged persons to be addressed.

5.3 Assessment of Risk - Hazard and Vulnerability Analysis

5.3.1 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. The operational level at which disaster management plans are prepared, is the district level. But it has been noticed that these plans are usually not based on proper hazard and vulnerability analysis of the district. Hazard analysis is a multi-disciplinary task and requires inputs from different specialized organizations. Similarly, vulnerability analysis also requires study of social, cultural, economic and political aspects of the local communities.

5.3.2 The entire landmass of India has been mapped for the three natural hazards, viz. earthquake, cyclone (windstorm) and flood in a scale of 1:2.5 million using the Survey of India maps of the same scale as the base map. This map was published as Vulnerability Atlas of India in 1998. This was followed up by preparing Vulnerability Atlases for each state in the same scale covering these hazards. The census data of existing housing types were used to assess the vulnerability of structures and to carry out district-wise risk analysis of housing units. This atlas, which offers a useful guide to development planners, decision makers, professionals and householders for assessing the risk to the shelters in a particular area, is currently under revision, similarly, the Building Materials and Technology Promotion Council (BMPTC) has prepared the Landslide hazard zonation atlas of India.

5.3.3 Based on the available data on epicentres and years of occurrence of earthquakes (>5.0 intensity) as per the IMD catalogue of earthquakes, and expected maximum intensity of earthquake related seismo-tectonic features in different parts of the country (on the basis of studies conducted by the Geological Survey of India and the Department of Earthquake Engineering of IIT Roorkee), a seismic zone map of India has been standardized. This map divides the entire country into four seismic zones, II to V, as shown in Table 5.1 :

Table 5.1: Classification of States according to Seismic Zones

Seismic Zone	Risk Zone	Intensity		States
		MSK ²⁸	R. Scale ²⁹	
V	Very High Damage Risk Zone	IX	8+	Entire North East and parts of Jammu & Kashmir, HP, Uttaranchal, Gujarat, Bihar and Andaman & Nicobar Islands

²⁸MSK: Medvedev-Sponheuer-Karnik scale of seismic intensity {Degree I (Imperceptible) to Degree XII (Very catastrophic)}

²⁹R scale: Richter scale

Seismic Zone	Risk Zone	Intensity		States
		MSK	R. Scale	
IV	High Damage Risk Zone	VIII	7 - 7.9	Parts of Jammu & Kashmir, HP, Punjab, Haryana, Uttaranchal, UP, Bihar, Jharkhand, West Bengal, Gujarat and Maharashtra.
III	Moderate Damage Risk Zone	VII	5 - 6.9	Parts of Punjab, Haryana, UP, Bihar, Jharkhand, West Bengal, Orissa, MP, Chhattisgarh, Rajasthan, Gujarat and Maharashtra, AP, TN, Karnataka, Kerala and Lakshadweep.
II	Low Damage Risk Zone	VI	- 4.9	Parts of Rajasthan, MP, Chhattisgarh, Jharkhand, Orissa, Maharashtra, AP, TN, Karnataka and Kerala.

5.3.4 Thirty-five major towns with population of more than half a million each are located in seismic zones III, IV and V. The total population of these towns is 100 million. Each of these towns has the potential risk of seismic damages to life and property.

5.3.5 The seismic zone based categorization of the entire country on 1:1.25 million scale is a good indication of the seismic hazards of the states and districts, but is inadequate for undertaking seismic mitigation activities at the sub-district or city level. This requires advanced micro-zonation maps in 1:1000 scale, based on local geological, soil and ground water surveys. The preparation of such maps was taken up on a pilot basis for the selected cities of Delhi, Guwahati and Jabalpur, but none of the studies has been completed with common standards and protocols that can be accepted as the scientific basis for seismic designing of new buildings and retrofitting of old buildings. In the absence of such maps, broad macro-level maps are being used for regulating building design, which may not always be ideal particularly for high-rise structures which have come up in metro cities. Priority needs to be given to seismic micro-zonation of vulnerable major cities and urban centres, with topmost priority being given to cities with population of more than one million, along with detailed assessment of buildings and infrastructure.

5.3.6 It is also possible to use the Geographical Information System (GIS) tools to integrate various spatial data such as topography, hydrology, land use, land cover, settlement pattern, built up structures etc and non-spatial data such as demography, socio-economic conditions and infrastructure like road, rail network, communication system, hospital etc. on a common platform for developing a sound information base for crisis management. This can be further integrated with satellite and aerospace data and Geographical Positioning System (GPS) for real time monitoring of crisis situation and for scientific assessment of damages. This should be taken up as a Plan scheme during the Eleventh Five Year Plan bringing all the scientific, technological and research organizations such as NRSA, ISRO, NIC, GSI, NIDM and other institutions together on a common platform for this purpose. Care has to be taken to ensure

that these efforts are able to generate hazard maps, which can be used as a base for preparing operational plans.

5.3.7 However, till such time that the GIS based hazard maps become operational, conventional maps will have to be used for hazard analysis. A proper vulnerability analysis would require in-depth knowledge about the conditions of people in the hazard prone zone which is only possible with full community participation. These principles would apply to all types of natural disasters, including industrial disasters.

5.3.8 Recommendations:

- a. Hazard and vulnerability analyses should be made an essential component of all crisis/disaster mitigation plans.
- b. 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.
- c. Geographical Information System tools should be used to integrate spatial data such as topography, hydrology, land use, land cover, settlement pattern and built structure as well as non-spatial data such as demography, socio-economic conditions and infrastructure on a common platform. This should be integrated with satellite and aerospace data as well as data from Geographical Positioning Systems for real time monitoring of crisis situations and for scientific assessment of damages.
- d. 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 for crisis management. This exercise should generate base hazard maps for district and sub-district levels and should be completed by the end of Eleventh Plan. Till such time the GIS based hazard maps are prepared, the conventional maps have to be used. These maps should form the basis for hazard analysis.
- e. A detailed vulnerability analysis should be carried out in all hazard prone areas. Such an analysis would prioritize the areas in order of vulnerability; it should also highlight the vulnerability of different sections of society and infrastructure.

5.4 Generating Awareness about Risk

5.4.1 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 behavioral 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.

5.4.2 The mass media plays a very important role in spreading awareness about disasters. Immediately after a major disaster in any part of the world, the curiosity and apprehension among the communities about their own risk is at its maximum. This is an opportune time to carry out public awareness campaigns and use media to focus on generating awareness about the risk the community is exposed to. This could best be achieved through a healthy partnership between the media and the disaster management machinery.

5.4.3 An important input in such awareness generation programmes, could be the lessons that have been learnt from disasters in the past or from disasters in other areas. For this purpose, the details of all such disasters need to be properly documented and kept in the public domain. The District Disaster Management Authorities, the State Disaster Management Authorities and the NDMA should have these details along with the lessons learnt, on their respective web-sites.

Box 5.2: Flood Risk Reduction in China

The reclamation and use of lakes, flood plains and slope land in up-stream areas had reduced the storage/discharge capacity of floodwater in China. The flood control plans were difficult to put into practice and the conflicts between the local interest and overall river basin management led to inefficient flood operation during the flood periods.

Appropriate policies including economic ones were not emphasized in flood management before the 1998 large flood event. Local governments and people were often reluctant to follow the planned activities in flood management. China has now put in place steps for integrated water resources management and flood management; the relevant terms include:

- Water development plans should be formulated on the basis of integration of all the factors emphasizing on multipurpose use and the coordination of the water use in livelihood, development and environment;
- Water resources development programs should be integrated into the national and social development plan;
- The water management system is based on the integration of river basin management and that of the administrative regions (mainly provinces);

Box 5.2: Flood Risk Reduction in China (Contd.)

- Construction of any building, infrastructure, etc. or any activity within river channel management areas affecting flood discharge capacity in flood passage is prohibited.
- The central government has laid down specific policies for implementation of the above-mentioned laws, comprising:
 - * Restoration of reclaimed slope area, lake area and the flood prone areas to natural forest and lakes with government subsidy;
 - * Relocation of people of these reclaimed areas and economic compensation and tax exemption for the settlers; and
 - * Restraining the economic development and control of the population growth in flood prone areas, especially in frequently flooded areas.
 - * Specific policies to cope with soil and water loss in mountainous and hilly areas include:
 - ♦ Integrated regulation and management of small catchments;
 - ♦ Establishment of a contract system for regulation and management of small catchment in soil eroded areas;
 - ♦ Reinforcement of prevention of soil erosion; and
 - ♦ Establishment of a market oriented mechanism in soil and water conservation.

(Source: China: Flood Management by Zhang Hai-lun, Institute of Hydrology and Water Resources, Nanjing Hydraulic Research Institute, Nanjing China)

5.4.4 Recommendations:

- a. Awareness generation programmes should be undertaken using tools of social marketing.
- b. A responsible media, which is also well informed about all aspects of disaster, is a very powerful tool for sensitizing people. Proactive disclosures about all aspects of disaster management would build a healthy relationship between the media and disaster management agencies.
- c. Details of past accidents and disasters and the lessons learnt, should be documented and kept in the public domain. The Disaster Management Authorities have to take up this task.

5.5 Preparation of Disaster Management Plans

5.5.1 Disaster Risk Reduction Plans (or mitigation³⁰/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 being examined.

5.5.2 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*

³⁰Mitigation is defined as structural and non-structural measures undertaken to limit the adverse impact of natural and technological hazards (ISDR). The Disaster Management Act, 2005 defines mitigation as measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation.

“... we now have to look ahead and plan for disaster preparedness and mitigation, in order that the periodic shocks to our development efforts are minimized.”.

5.5.3 The Disaster Management Act, 2005 visualizes the district plan as the one that lists out the vulnerable areas in the district, the measures required for prevention and mitigation of disasters, the capacity building and preparedness measures involved, the allocations of responsibilities among the different district level departments, and the emergency response mechanisms including communication systems, procurement of essential resources, dissemination of information etc.

5.5.4 While the concept of the district plan as mentioned in the Act is quite comprehensive, it should be understood that measures for prevention and mitigation of disasters are capital intensive and usually cut across district boundaries. Therefore, the mitigation plan may have a longer perspective ranging from 5-20 years depending upon the local situation. Normally, it is understood that plans incorporate only developmental measures such as construction of shelters, construction of embankments etc. But disaster mitigation plans should also incorporate a schedule of ‘enforcement measures’ and the functionaries who will be held responsible for these. Such enforcement measures being ‘unpleasant’ and unpopular are very often not contemplated leave aside acted upon. These measures could include enforcement of building regulations in urban areas, removal of encroachments from natural water-courses or environmentally fragile areas, and strict enforcement of environmental, safety and public health regulations.

Box 5.3: The Bhopal Gas Tragedy

On a cold wintry night of December, 2nd /3rd December, 1984, when the residents of Bhopal went to their beds, they had no inkling that many of them were doing so for the last time. Not far from them in the factory of Union Carbide (India) Limited, a chemical reaction had already started to that end. At around midnight, this chemical reaction culminated in the leakage of deadly Methyl Isocyanate (MIC) gas from one of the tanks of the factory. A cloud of gas gradually and surely started descending and enveloping the city in its lethal folds. On the morning of December, 3, the whole world learnt about the holocaust in shocked disbelief. The tragedy took an immediate toll of about 3000 lives and left thousands and thousands of citizens physically impaired or affected in various degrees. Livestock were killed, injured and infected. Businesses were interrupted. Environment was polluted and the ecology affected with flora and fauna disturbed. Such was the enormity of the tragedy that all available instruments in the field of health care, administration and law were found to be inadequate.

(Source: <http://www.mp.nic.in/bgtrrdmp/profile.htm>)

Lessons:

1. Due consideration to human safety was not given while locating the plant.
2. The safety regulations were not followed at all.
3. Total lack of awareness about the risk of a hazardous unit like the Union Carbide Plant.
4. The emergency response system was woefully inadequate.
5. The need for having a legislative framework for corporate responsibility in case of disasters was highlighted.
6. The need for a pro-active disaster management policy was felt.
7. The battle for compensation was very prolonged.

5.5.5 Therefore, the District Disaster Management Plan should have two components:

- a. Long Term Disaster Management Plan.
- b. Emergency Response Plan including a listing of 'standard operating procedures'.

The Long Term Disaster Management Plan, in turn, should have the following parts:

- a. Long Term Development Plan.
- b. Long Term Enforcement Plan.

5.5.6 Annual plans should be culled out from the Long Term Development/Enforcement Plans. These principles should apply to the state and the national plans. It should also be borne in mind that there is a distinct possibility of duplication between plans of various districts, particularly those that are geographically contiguous, in the matter of long term plans. This calls for a mechanism at the state level to quickly scrutinize such plans and suggest improvements.

5.5.7 The HPC has recommended an outline for the preparation of the District Disaster Management Plan. The outline provides framework for preparation of the plan, but it has to be ensured that all the components mentioned above should form an integral part of the plan.

5.5.8 Apart from the district plan, on site and off site plans are to be prepared for nuclear installations and major hazardous industries. The plans prepared for nuclear emergencies are quite comprehensive as they are prepared under the supervision of experts. But the same cannot be said for the other off-site emergency plans {Preparation of such plans is stipulated under the Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996}. The quality of off-site emergency plans requires considerable improvement in terms of completeness and practicability of implementation considering the situation at the ground level. Lack of proper vulnerability analysis again constitutes a major weakness of these plans.

5.5.9 Recommendations:

- a. Crisis/disaster management plans as stipulated under the Disaster Management Act, 2005 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. The State Disaster Management Authorities should set up a mechanism to evaluate these plans periodically, and ensure the effectiveness of the plans.

- b. The District Disaster Management Plan needs to have two components:
 - i. Long Term Mitigation Plan.
 - ii. Emergency Response Plan.

The Long Term Mitigation Plan, in turn, should have the following components:

- i. Long Term Development Plan.
- ii. Long Term Enforcement Plan.

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.

- c. 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. The State Disaster Management Authorities should set up a mechanism in place to evaluate these plans periodically.
- d. 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.
- e. 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.
- f. All crisis/disaster management plans should be tested periodically through mock drills.
- g. It should be the responsibility of the state level 'nodal department' to ensure that adequate assistance is available at the district level for drawing up and periodically updating the plans. The nodal department must engage agencies and experts on a continuing basis to examine the plans and bring methodological and substantive deficiencies to the notice of agencies formulating the plans.
- h. The same principles would apply *mutatis mutandis* to plans at other levels.

5.6 Making Crisis/Disaster Management Plans a Part of Development Plans

5.6.1 The Yokohama message emanating from the International Decade for Natural Disaster Reduction in May 1994 underlined the need for an emphatic shift in the strategy for disaster mitigation. It was emphasized that disaster prevention, mitigation and preparedness are better than only disaster response in achieving the objectives of vulnerability reduction. It has been stated that mere disaster response is insufficient as it yields only temporary results at very high costs whereas prevention and mitigation contribute to lasting improvement in safety and are essential to integrated disaster management³¹. The Tenth Plan also emphasizes that development cannot be sustainable without mitigation being built into the development process.

5.6.2 Long term disaster mitigation/prevention plans include major capital intensive activities such as training of water courses, construction of protective bunds, afforestation, plantation of drought resistant vegetation, construction of shelters, raising embankments, retrofitting of buildings, permanent relocation of vulnerable settlements etc, which can sometimes have inter-district or even inter-state ramifications. Therefore, the long term plans may have to encompass block, district, state and national levels and once the national and state level works have been detailed; the works, which would be taken up at the district, block and panchayat level can be planned. It has also been noted that since the benefits from such works are not experienced in the short term, local bodies tend to give low priority to such works and consequently not many are taken up. Therefore, the immediate supervisory level should ensure that while preparing their annual developmental plans, the long term works included in the disaster plan are given priority and they do not remain "paper plans".

5.6.3 Recommendations:

- a. The activities in the disaster management plans should be included in the development plans of the line agencies and local bodies like panchayats and municipal bodies.
- b. The supervisory level of each agency should ensure that the annual plan of that agency incorporates the activities listed out in the disaster management plan on a priority basis.
- c. Incorporation of disaster mitigation plans into the development plans should be specially monitored at the five year and annual plan discussions at State and Union (Planning Commission) levels. The Planning Commission, State Planning Boards and Planning Departments must revise on priority basis the proforma for formulating plan proposals to ensure that the process adequately takes into account the disaster prevention/mitigation concerns.

³¹Disaster Management in India- a status report; Ministry of Home Affairs 2004

5.7 Instruments for Mitigation of Hazards

There are various instruments through which the adverse impact of a hazard can be reduced. Such instruments differ for different types of hazards but these could be categorized into the following:

- Proper environmental management.
- Hazard reduction measures.
- Effective implementation of legal measures

5.7.1. Proper Environment Management

5.7.1.1 Over-exploitation of natural resources and unplanned growth in human settlements leads to environmental degradation. This, in turn, may lead to a disaster as the delicate ecological balance gets disturbed, and may also increase the vulnerability of certain sections of society which depend on these environmental resources. A disaster may further degrade the environment. Thus, environmental degradation and disasters constitute a vicious cycle. Development practices that enhance the quality of environment would not only help in mitigating disasters but could also build community resilience. Normally, environmental management is lost sight of in disaster management plans, as well as in the normal development plans. Environment management must be factored into all planning and development activities.

5.7.1.2 Recommendation:

- a. Environment management should be made an integral part of all development and disaster management plans.

5.7.2 Hazard Reduction Measures

5.7.2.1 Different disasters require different mitigation measures. Flood mitigation requires measures like training the rivers, building embankments, raising level of habitations etc. Earthquake mitigation requires construction of disaster resistant structures, retrofitting of buildings and relocation of habitations. Cyclone mitigation requires construction of embankments, strengthening of buildings, construction of shelters etc. Mitigating industrial disasters requires proper enforcement of safety regulations, incorporation of safety devices etc. Adoption of soil conservation measures, water harvesting practices, optimum use of water resources, transfer of water from surplus to deficit areas, plantation of drought resistant vegetation are some measures to reduce the vulnerability of drought prone areas. Several technologies like sand dune stabilization, shelterbelt plantation, soil and water conservation, improved agro-forestry systems, management of cropland, pasture and range areas,

management of saline-sodic soils are available for arresting desertification. Measures to counter global warming would include putting industrial development on an environment-friendly path, switching over to cleaner fuels, taking measures to reduce air pollution and increasing forest cover. Soil and crop management, crop improvement, irrigation and drainage engineering are some measures to arrest soil salinity. Some measures like awareness generation, capability building of community are common for all types of disasters. Another cross cutting mitigating/preventive measure is effective implementation of laws governing planned development of habitations, building byelaws and environmental regulations. In order to have a comprehensive and integrated approach it would be better if all these measures are also made part of the long term mitigation plans. Long term prevention and mitigation measures can be broadly be divided under three heads - (i) construction of major civil engineering structures, (ii) construction of disaster resistant dwellings and public use buildings, and (iii) non-structural measures.

5.7.2.2 Construction of Major Civil Engineering Structures

5.7.2.2.1 Structural measures are mainly engineering solutions to prevent disasters such as construction of dams, diversion channels, flood protection walls, sea walls, cyclone shelters, shelterbelt plantations and regeneration of mangrove belts in coastal areas etc. Structural prevention measures, if properly planned, after taking into account environmental considerations are effective and lasting solutions to prevent disasters but these are usually highly capital intensive and cannot provide complete solution to prevent every crisis situation. Since these measures are in the nature of civil works, they should be included in all long term disaster management plans, and executed as explained in para 5.6.

5.7.2.3 Construction of Disaster Resistant Dwellings and Public Use Buildings

5.7.2.3.1 Unlike the major structures mentioned in the previous para, (which seek to divert the impact of the hazard itself), disaster resistant structures (dealt with here) seek to protect the people staying inside them by withstanding the onslaught of the disaster or at least by remaining intact. In this context it may truly be said that whereas 'earthquake hazard is natural, earthquake-disaster is 'man-made', as the earthquake by itself may not kill but the damage caused by it to buildings results in large scale loss of life and property. Similarly, disaster resistant structures also minimize damages during floods and cyclones.

5.7.2.3.2 Construction of houses and other buildings is regulated through the mechanism of building byelaws. These byelaws exist in major cities but are virtually non-existent in the smaller cities and rural areas. Even in areas where these byelaws exist, they generally regulate the total built up area in a housing or commercial unit and also specify the extent of land, which can be used for construction. But they do not stipulate the construction standards which have to be maintained. Thus safety of the constructed units is not sought to be enforced by these byelaws. As a result, unsafe buildings are added on day by day to the

already large number of existing unsafe buildings. Most of these buildings are non-engineered constructions where engineers and architects are not consulted. Generally, the owner and the mason take important decisions including those affecting strength of the building. The collapse of such buildings have resulted in wide spread casualties and loss of property. About 10000 people lost their lives and 15000 houses were destroyed in the Killari earthquake; 13805 people lost their lives and 300000 houses were destroyed in the Bhuj earthquake, primarily due to collapse of non-engineered stone masonry houses.

5.7.2.3.3 The technology for construction of disaster resistant units exists and has been codified by the Bureau of Indian Standards. The National Building Code of India (NBC) 2005, a comprehensive building Code, is a national instrument providing guidelines for regulating the building construction activities across the country. It serves as a Model Code for adoption by all agencies involved in building construction. The Code mainly contains administrative regulations, development control rules and general building requirements; fire safety requirements; stipulations regarding materials, structural design and construction (including safety); and building and plumbing services³². But these Standards, Codes and guidelines for earthquake resistant design and construction of buildings are seldom used. The main reason for unsatisfactory implementation of these codes is ignorance about them and even if there is awareness in some sections of society, the fear that adoption of these measures would increase the costs substantially discourages people from adopting them. A balance has to be struck between safety and cost.

Box 5.4: BIS Codes for Earthquake Protection

1. IS: 1893-2002 "Criteria for Earthquake Resistant Design of Structures (Fifth Revision)".
2. IS: 13920-1993 "Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces - Code of Practice".
3. IS: 4326-1993 "Earthquake Resistant Design and Construction of Buildings - Code of Practice (Second Revision)".
4. IS: 13828-1993 "Improving Earthquake Resistance of Low Strength Masonry Buildings - Guidelines".
5. IS: 13827-1993 "Improving Earthquake Resistance of Earthen Buildings - Guidelines".
6. IS: 13935-1993 "Repair and Seismic Strengthening of Buildings - Guidelines".
7. IS: 1893 (Part 4): 2005 "Criteria for Earthquake Resistant Design of Structures".

Box 5.5: Model Building Byelaws

The Ministry of Home Affairs constituted a Committee to develop Model Building Bye-Laws and the Review of Town and Country Planning Act, develop the Zoning Regulations, vide Govt. Order No. 31/35/2003-NDM-II dated January 20, 2004, on the recommendation of the National Core Group on Earthquake Mitigation set up by the Ministry. The Core Group suggested that the Model Bye-Laws "should be a speaking and self-contained document" as far as possible by including the main features of the BIS Codes and the non-structural aspects, which have bearing on seismic safety. It was also of the view that the State Town & Country Planning Act as well as Zoning regulations be reviewed so as to ensure that these are in conformity with the mitigation requirement. The Committee studied the Model Town & Country Planning legislation framed during 1960, based on which most of the State Town & Country legislation are enacted. Also the Committee studied the revised Model Regional & Town Planning & Development Law 1985 framed by Town & Country Planning Organisation, Ministry of Urban Development & Poverty Alleviation. This combined planning and development law was formulated to provide for planning authorities and plan implementations were combined together so that single agency could undertake both these functions.

³² Source: <http://www.bis.org.in/sf/nbc.htm>; retrieved on 10-9-06.

5.7.2.3.4 As a pre-requisite, the Codes, should be in public domain and freely available at the BIS³³ website. Simplified booklets/ practical manuals/ guidelines explaining the various clauses of the codes with some practical examples need to be generated so that it is easily understood even by common people interested in building their own houses.

5.7.2.3.5 A programme seeking adoption of disaster resistant technologies for construction of dwelling units by the people at large would not succeed without creating proper awareness regarding: (i) earthquakes/disasters, the phenomena including causes and their natural characteristics, (ii) how the natural occurrence of ground motion (or onslaught by floods or waves or storms) becomes disastrous and (iii) how the disastrous effects can be avoided. There is definite need to start broad based educational and training programs in seismic zones³⁴ III, IV and V and intensive training programme in zone V areas. For awareness generation, apart from the normal means, setting up Building Technology Demonstration Centres and undertaking demonstrative constructions should be taken up.

5.7.2.3.6 Awareness generation about disaster resistant construction may lead to voluntary acceptance of the technology to some extent, but recourse to legal measures would be necessary in the larger public interest. Incorporation of the safety codes in the building byelaws would provide the necessary legal framework.

5.7.2.3.7 An approach of applying these safety norms to selected areas first would prove more successful, rather than an across-the-board application to all areas. The areas in zone V should be taken up on priority. Also for all public buildings, and buildings constructed under government schemes in hazard prone areas, adoption of such safety norms should be inbuilt in the model design. The Municipalities/Corporations/Development Authorities at present do not have the structure and the capability to implement the new building byelaws incorporating the disaster resistant construction. Institutional changes are needed either to establish self-sustaining new Wings/Cells or to reorganize the set up so that it is able to meet the demand.

5.7.2.3.8 There are large areas where town planning legislation and development control/ building byelaws are not applicable and the sanctioning authority is the panchayat. The safety norms stipulated by the BIS are complicated and can be understood only by qualified engineers and architects. It would be incorrect to presume that such complicated provisions (BIS codes) would be enforced by the panchayats. The BIS should convert these norms (at least for small dwelling units) into commonly understood principles, which could be followed and enforced even by village panchayats.

³³Bureau of Indian Standards website : <http://www.bis.org.in>

³⁴There are five seismic zones in India, zone I being the secure place and zone V, most vulnerable to earthquakes.

5.7.2.3.9 The approach of drafting model byelaws and circulating them to the states for incorporation by the local bodies has not produced the desired results. Adoption of these model regulations would require periodic monitoring. Targets should be fixed each year and even financial incentives need to be used to motivate the local bodies to adopt the safety features in their building byelaws.

5.7.2.3.10 Owners of private buildings and the general public need to be made aware and advised to carry out upgrading of their residential buildings by providing incentives in terms of subsidies, reduced insurance premia and allowing increased Floor Area Ratio (FAR).

5.7.2.3.11 The limitation of building byelaws, even if they are effectively enforced, is that their effect is only prospective. The huge stock of existing dwelling and other units would continue to be vulnerable. Technically, retrofitting of buildings provides a solution, but it is too expensive to be adopted by a common citizen. In the case of government buildings, the concerned departments could take it up, with the more commonly used public buildings being given priority. Private buildings like hospitals and schools in hazardous areas would also have to be given the same priority but the issue of financing the retrofitting effort would remain. A financial package to fund such an effort may be worked out by the state governments along with banks and insurance agencies. Even non-financial incentives like relaxation on extent of built up areas could act as an incentive to motivate private owners to take up retrofitting.

5.7.2.3.12 Zoning regulations: Zoning regulations are normally issued under the Town and Country Planning Acts of the respective states. They stipulate the nature of construction and the density of construction permissible in a defined zone. Zoning regulations provide an important mechanism for planned development of any area. These could be used to prevent settlements in hazard prone areas like the riverbanks, which are flood prone, or areas near coasts, which are prone to cyclones, or areas of extremely high seismic activity, or ecologically sensitive areas. Apart from preventing human settlements in critical areas, these could also be used to spread out the population so that impact of any hazard is limited. However, at present zoning regulations exist only in big cities. In small towns and rural areas the concept of zoning regulations is almost non-existent. Even in bigger cities where they do exist, they are often not prepared with an intention to mitigate hazards or reduce vulnerabilities of populations. Another weakness of these zoning regulations is their poor enforcement. Therefore, there is an urgent need to update the zoning regulations in the cities from the point of view of disaster management. The town and country planning set up in the smaller cities and rural areas also need to be strengthened. It would be advisable if the hazard analysis as described in para 5.3 is used as one of the important tools in preparing zoning regulations for an area.

5.7.2.3.13 Recommendations:

- a. Structural prevention measures should be a part of long term disaster management plans for an area.
- b. Appropriate zoning regulations need to be extended to all areas. Phasing of the areas to be covered should be done based on the intensity of the hazard anticipated. This would require strengthening of the Town and Country Planning Departments of State Governments. Local bodies can be given financial incentives for preparation of zoning regulations. The hazard zonation maps prepared should be one of the inputs for preparation of zoning regulations.
- c. Building byelaws should incorporate the disaster resistant features of buildings. Since safety codes are complex and technical, it is necessary to issue simplified guidelines which could be understood by citizens. Further, these codes should be implemented in the most hazard prone areas, on priority.
- d. The importance of disaster resistant constructions and simplified safety guidelines should be widely disseminated so as to promote compliance. In so far as the rural areas are concerned, other methods of dissemination including setting up of Building Technology Demonstration Centres and undertaking demonstrative disaster constructions in severe hazard prone areas should be taken up. Demonstration camps should also be used to make the people aware of the concerns and the solutions.
- e. The existing system of enforcement of building regulations needs to be revised. It should be professionalised by licensing architects and structural engineers for assessment of structures and for certification of safe buildings. The units of local bodies dealing with enforcement of building byelaws and zoning regulations also need to be strengthened.
- f. The standards prescribed by BIS for disaster resistant buildings should be available in the public domain, free of cost. This should be posted on websites of the concerned government agencies to promote compliance.
- g. Among the existing buildings, government buildings used by the public should be evaluated and retrofitted first, giving preference to buildings housing essential services. It would be advisable to fix a schedule for all

such buildings in hazard prone areas. Private buildings used by the public should also be tackled on priority. A mix of regulatory and financial incentives could be used for this purpose by the local bodies.

- h. All these measures should become an integral part of long term disaster/ crisis management plans.

5.7.2.4 *Non structural measures:* These measures are in the form of capacity building and improved livelihood practices. These include afforestation, scientific watershed management, vegetative bunds, improved agricultural practices and relocation of habitations. All these measures should be included in the long term disaster management plans.

5.7.3 Effective Implementation of Laws and Regulations

5.7.3.1 Some of the major industrial disasters as well as seemingly natural disasters such as urban floods are due to ineffective planning, poor enforcement of laws and toleration of flagrant violations of laws over years. The Uphaar³⁵ and Bhopal Gas tragedies as well as urban floods in Tamil Nadu and Mumbai are noteworthy examples. While there are a large number of laws regulating fire hazards, safety of buildings, public health, environmental concerns and industrial safety, unfortunately, as the cases mentioned above indicate, the requirements prescribed under these laws are not complied with and violators often get away with impunity. This is due to collusion or a lenient view taken by the authorities or sheer negligence. The Commission is of the view that special mechanisms have to be evolved to ensure proper compliance and implementation of such laws. One option may be to institute concurrent third party audit of all major alleged violations. Records relating to such permissions must be brought in the public domain suo-motu and could be posted on the websites of the respective organizations. Another option could be to have periodic inspections by a team of stakeholders assisted by experts. Education of the public on the consequences of violations is also important.

5.7.3.2 Recommendations:

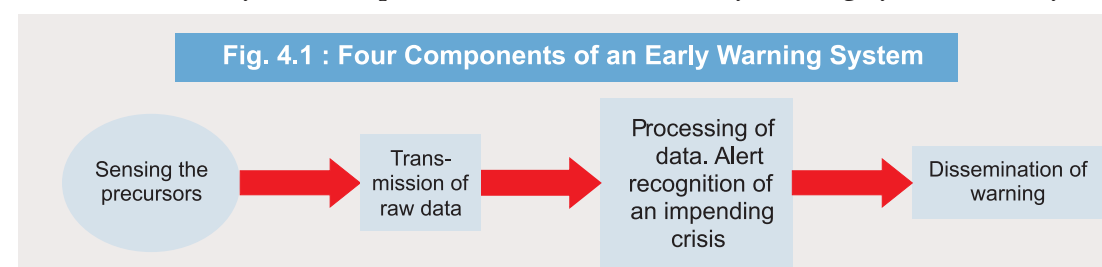
- a. Effective enforcement of laws on encroachments, public health and safety, industrial safety, fire hazards, safety at public places should be ensured. The same applies to zoning regulations and building byelaws.
- b. Third party audit of all major alleged violations needs to be introduced in the respective regulation governing the activity.
- c. All records pertaining to permissions/licenses should be brought in the public domain *suo motu*.

³⁵On 13th June, 1997, a faulty transformer led to a devastating fire in Uphaar Cinema Hall in Delhi and more than 50 lives were lost

- d. There should be periodic inspections of all such places/facilities by a team of stakeholders assisted by experts.
- e. A scheme for enforcement of laws should be part of the long term mitigation plan.
- f. Public education on consequences of violations is important.

5.8 Early Warning Systems

5.8.1 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 - capturing the precursor events, transmission of this data to a central processing facility, alert recognition of an impending crisis and warning dissemination. Capturing the precursor events is generally a technology driven process for most disasters. However for disasters like epidemics, strikes and terrorism, the human element plays a vital role in the data capture. Transmission of this data to the central processing facility is also totally technology based. Alerts are generated based on data analysis. Sometimes, alert generation may take some time, as a decision making process may be involved. The dissemination of warning to the vulnerable sections again has both technology and human elements.

5.8.2 The last decade has seen major advances in technology relating to data capture, transmission, analysis and even dissemination. Thus, the early warning phase of disaster management is largely

Box 5.6: 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 who 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, buoys, 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."¹⁰

(Excerpt from the United Nations Special Envoy for Tsunami Recovery, President William J. Clinton's statement at EWC III, on 27 March, 2006).

technology driven with satellite imagery, remote sensing, seismology, oceanography, climatology etc providing vital inputs. But like most technologies there are last mile problems which make human intervention essential. It is important that the warning reaches the most vulnerable sections in a manner that is understood by them. Therefore, in spite of far reaching technological advances, mechanisms still have to be put in place to suit the local conditions. And without the total involvement and awareness of the local community, the last mile issue cannot be addressed or resolved.

Box 5.7: Public Address System Saves Lives in Pondicherry Villages

In the coastal villages of Nallavadu and Veerampattinam in the Union Territory of Pondicherry, a Public Address System (PAS) installed in their 'Rural Knowledge Centres' saved thousands of lives when the tsunami struck on 26th December, 2004.

One of the residents of Nallavadu, who lived abroad, heard about the tsunami and informed his village on telephone. The villagers used the PAS to warn the residents who quickly vacated the village and were saved.

In Veerampattinam, a fisherman was repairing his boat when he noticed a dramatic increase in the sea level. He raised an alarm which alerted the Panchayat leaders who used the PAS to make the villagers vacate the area.

(Source: <http://www.hinduonnet.com/fline/fl2202/stories/20050128006701600.htm>)

5.8.3 Recommendations:

- a. Though it is the responsibility of the government machinery and the local bodies to disseminate the warning, peoples' participation has to be enlisted. For this purpose, the role of community leaders, NGOs and others should be clearly defined in the emergency response plan and they should be fully trained and prepared for their respective roles.
- b. Communications networks, with sufficient redundancies should be established between the data collection point to the points where hazard is likely to occur. The communication channels from the point of alert generation to the point of disaster should have enough redundancies so as to maintain line of communication in the event of a disaster striking. Care has to be taken to put in place systems to disseminate warnings to all sections of the people.
- c. The early warning system should be evaluated after each disaster to carry out further improvements.

As Early Warning Systems will be increasingly technology driven, the systems in use for different types of disasters and the improvements being undertaken are briefly described in Annexure-V.

5.9 Building Community Resilience

5.9.1 Disaster risk reduction can be effective if the communities feel that their needs are being met and participate in it. The community is also a repository of knowledge and skills which have evolved traditionally and these need to be integrated in the risk reduction process. It is necessary to educate the community about the entire disaster risk reduction and even to impart skills and assign specific roles to the members of the community, so that the first response from the community is a well coordinated one. This could be achieved by:

- i. *Undertaking location specific training programmes for the community:* Such programmes should be a part of the disaster management plan. As the number of persons to be imparted knowledge and skills is very large, a cascading approach should be followed. Village panchayats, should be entrusted this responsibility. These training programmes could be made more meaningful if roles are assigned to individual members and then they are given the necessary skills to discharge their respective responsibilities.
- ii. *Mainstreaming crisis management in education:* Disaster management education needs to be integrated and institutionalized within the formal and informal systems of education (already, substantial progress has been achieved in this direction by CBSE in

Box 5.8: Some Capacity Building Initiatives Taken by Government of India

- Two National programmes for capacity building in earthquake risk management have been undertaken for training of 20,000 engineers and architects.
- Disaster Management faculties are being financially supported by the Ministry of Home Affairs in 29 State level training institutes located in 28 States. The State Training Institutes take up focused training programme for different target groups within the State.
- Training capsules have been drawn up and integrated in the syllabi of training programmes for All India Services. Disaster Management has been made an essential component for the initial training of Central Police Forces.
- Disaster management, as a subject in social sciences, has been introduced in the school curricula for Classes VIII, IX & X through the Central Board of Secondary Education. Training of teachers for teaching the curricula has been undertaken by CBSE with financial assistance from the Ministry. The State Governments have also been advised to take similar steps through their respective School Boards of Education. Several State Governments have already introduced similar curricula in school education.
- The Ministry of Home Affairs has also initiated programmes for training of volunteers under the Nehru Yuvak Kendra Sanghathan (NYKS) and National Service Scheme (NSS).
- The Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie has been designated as the Nodal Training Institute for the purpose of training of trainers in different modules of incident command system.

(Source: Annual Report, Ministry of Home Affairs, Government of India, 2005-06)

incorporating disaster management in the school syllabi). An appropriate component of disaster awareness at the school/college/university level will help increase awareness among student and teacher community and their family members. All state governments may be persuaded to include disaster management education in junior, middle and high schools and in colleges and universities. Disaster management and disaster resistant development practices may be included as specific components in professional and technical education. Appropriate short duration courses could also be developed for various vocational courses.

- iii. *Mainstreaming crisis management in training programmes:* Priority should be given to training and capacity building of elected leaders and personnel in critical sectors like police, revenue, agriculture, irrigation, health, public works etc.

5.9.2 Recommendations:

- a. Location specific training programmes for the community should be executed through the panchayats.
- b. Crisis management awareness needs to be mainstreamed in education. For the purpose, an appropriate component of disaster awareness should be introduced in schools, colleges, universities and in professional and vocational education.
- c. 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.
- d. 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.
- e. NIDM and NDMA would have to play a vital role in working out the details of these suggestions for implementation by different authorities.

5.10 Financial Tools for Risk Reduction

5.10.1 As already stated, the two funding mechanisms are mainly for relief and rehabilitation efforts. While post disaster funding is an important element of crisis management, excessive dependence on it creates a regime where there are no incentives for adoption of risk reduction

methods by individuals, agencies and governments, The HPC was of the opinion that insurance brings quality in infrastructure and a culture of safety. However, the large sections of low income populations coupled with low penetration by the insurance companies poses a major challenge to provide insurance cover to the vulnerable sections.

5.10.2 Following the success of micro-credit for rural development, micro-insurance has started emerging as a tool for *ex ante* risk management. In fact, micro-credit and micro-insurance support each other. Several government agencies and NGOs have come forward in this field, but their efforts need to be scaled up.

5.10.3 While the Commission would not go into the details of working out an insurance framework for disaster management, it would strongly recommend that the tool of insurance be made attractive through a set of policy measures and fiscal incentives.

5.10.4 Recommendation:

- a. **Government and the insurance companies should play a more pro-active role in motivating citizens in vulnerable areas to take insurance cover. This could be done through suitably designed insurance policies, if required, with part funding from government. NDMA could play a major facilitating role in this area.**

Box 5.9: Insurance and Disaster Management

"Insurance is a potentially important mitigation measure in disaster-prone areas as it brings quality in the infrastructure & consciousness and a culture of safety by its insistence on following building codes, norms, guidelines, quality materials in construction etc. Disaster insurance mostly works under the premise of 'higher the risk higher the premium, lesser the risk lesser the premium', thus creating awareness towards vulnerable areas and motivating people to settle in relatively safer areas."

{Extract from a Chapter on 'Disaster Management - The Development Perspective' in the Tenth Five-year Plan Document by the Planning Commission of India (2002-2007)}

Box 5.10: Constraints of Insurance in Developing Countries

Yet, despite their growing exposures and vulnerabilities to hazards, developing countries retain most of the attendant risk due to the undeveloped state of their domestic insurance markets and a resultant inability to transfer risk to international reinsurance markets. In these countries, less than 1% of total direct losses from natural disasters is insured, compared with 40-100% in industrial countries such as the United States or France. Even the small amount of insurance coverage that is available in practice tends to be limited to major commercial properties in urban areas. With the level of insurance negligible. Catastrophe protection for better off homeowners is sometimes present in middle-income emerging markets. The key constraint on insurance market development is low per capita income, since low-income consumers have less discretionary income and fewer assets to insure. The major determinant of insurance density (premium per capita) is per capita income, and there appear to be few means to circumvent this "iron law" through private markets alone.

(Source: Rapid Onset Natural Disasters: The Role of Financing in Effective Risk Management, Eugene Gurenko & Rodney Lester, The World Bank Policy Research Paper).

Box 5.11: Risk Reduction through Catastrophic Insurance: Examples from Japan

Lying in one of the most seismically active zones on Earth, Japan is home to a dynamic catastrophe insurance market. Under the guidance of a governmental organization established after the 1995 Kobe Earthquake, the Earthquake Research Committee (ERC) has brought out the Japan National Seismic Hazard Maps based on extensive seismic sources and ground motion modeling which incorporate the latest understanding of subduction zones, active faults, crustal zones, and intraslab seismicity zones. These maps have been put to use and have been found appropriate for modeling financial risk, including time-dependent and time-independent rates of earthquake recurrence. In addition, a more robust set of cascade events was introduced in the model.

The risk assessment provides the most advanced modeling of the vulnerability of individual risks in Japan. The methodology uses an objective measure of ground motion intensity called spectral acceleration to directly correlate ground motion to building performance based upon building height, construction material, and ground motion propagation. Vulnerability functions in the model are based on actual building behavior observed in the Kobe Earthquake and other recent events, including the 2004 Niigata-ken Chuetsu earthquake. These functions also reflect changes to the seismic design criteria in the Japanese building code by considering year of construction, building height, and construction type. At the heart of the vulnerability module is the regional inventory database, which uses detailed exposure information from housing surveys, the census report, and other sources to estimate the density of exposure values by city/ward for insured lines of business. Japan's Earthquake Model meets the unique needs of insurance market by allowing insurers to assess the seismic vulnerability of individual locations and successfully manage their entire portfolio at risk using the latest scientific modeling techniques and market research on financial loss perspectives.

(Source: Japan Earthquake, RMS Japan Earthquake Model)

5.11 Research and Use of Knowledge

5.11.1 Disaster management is an area which has attracted the attention of researchers for a long time, and as a result, a wide body of knowledge has developed. Most significant outcomes have been in the field of early warning systems. Besides, the past experiences have generated a huge amount of data and information. In spite of existence of a wealth of information, there is a problem of 'accessing this information. With the spread of internet even this is being solved through formation of networks and data bases. But it should not be forgotten that access to internet is still limited. Therefore, conventional methods of knowledge dissemination and adaptation have to be taken up on an increased scale.

5.11.2 The India Disaster Resource Network (IDRN) - a web enabled centralised data base has been operationalised. Such databases can be useful if they are updated with correct information periodically otherwise they may foster a false sense of security.

5.11.3 It should however be borne in mind that the human aspects of disaster management should not be lost track of in our 'enthusiasm' for using science and technology. The same may be said for the use of traditional knowledge. Research has to give adequate attention to the social, economical and political aspects. It is also observed that the research carried out by researchers and disaster management functionaries in the field is often uncoordinated and, therefore, a national agenda to direct research in the desired field is required. NIDM is best suited to carry out this task under the guidance of NDMA.

5.11.4 Recommendations:

- a. NIDM should develop methodologies for effective dissemination of knowledge on disaster management.
- b. Disaster management plans should attempt to integrate traditional knowledge available with the communities.
- c. 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.
- d. It may be ensured that the IDRN network is updated regularly.

Box 5.12: India Disaster Resource Network

A web-enabled centralized data base for the India Disaster Resource Network has been operationalized. The IDRN is a nation-wide electronic inventory of essential and specialist resources for disaster response with both specialist equipment and specialist manpower resources. The IDRN lists out the equipments and the resources by type and by the functions it performs and it gives the contact addresses and telephone numbers of the controlling officers in-charge of the said resources. The IDRN is a live system providing for updating of inventory once in every quarter. Entries into the inventory are made at district and State levels. The network ensures quick access to resources to minimize response time in emergencies. The list of resources to be updated in the system has been finalized. It has 226 items. About 69,329 records in 545 districts throughout the country have already been uploaded since September 1, 2003 when the India Disaster Resource Network was formally inaugurated. The system will give, at the touch of the button, location of specific equipments/specialist resources as well as the controlling authority for that resource so that it can be mobilized for response in the shortest possible time. The data base will be available simultaneously at the district, state and national levels.

(Source: Disaster Management in India - A status report; August 2004; Ministry of Home Affairs)

EMERGENCY RESPONSE SYSTEM

6.1 Emergency Plan

6.1.1 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. The problem gets further compounded because of the following:

- o At the onset of any crisis the picture is often unclear and the situation usually gets chaotic, making organized relief and rescue difficult. The situation is further complicated in case disaster hits during night time.
- o The resources available are limited while the demand is very high. It becomes difficult to prioritise the allocation of the available resources, as there is pressing demand from all quarters for deployment of resources.
- o The first reaction is to act spontaneously without due planning and thinking.
- o Collapse of communication and transportation networks further worsens the situation.

Box 6.1: Lessons Learnt from Tsunami

1. Although the State Government's response was quick, 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.

(Source: NIDM)

6.1.2 Thus providing initial response when the onset and impact are sudden, is extremely challenging and very vital.

6.1.3 The district administration headed by the Collector provides government's first organized response to any crisis. This is not to belittle the efforts of other first responders, the community, NGOs, and the nearest government functionaries like the policemen, firemen, the village officer and the local government functionaries. Standard operating procedures (SOPs) lay down the drill in case of crisis. At the first sign of any crisis the trigger mechanism should spontaneously set the emergency quick response mechanism into action, without formal orders from anywhere as per the standard operating procedures. In large cities, there is blurring of responsibilities between the agencies of the state government and those of local bodies.

Box 6.2: Discretion and Judgement are Important

If one considers the observations of Albert Camus, the point that immediately emerges is that along with familiarity with governmental instructions and orders, codes and manuals on the subject, what is needed on the part of the administration is imagination, sympathy and initiative to cope with unprecedented situations. Discretion and judgement cannot be subordinated to the tyranny of the written word in the midst of crisis administration. Crisis administration is not a fossilized interpreter rules but a vibrant response to the dynamics of any unforeseen contingency. Consistency is not always a virtue in crisis administration. Moreover, these qualities are not values to be cherished in the abstract but they must inform the entire administrative machinery which should evolve in consonance with the dynamics of the situation.*

*T N Chaturvedi; *Crisis Administration: Public Administration Vision and Reality*; Indian Institute of Public Administration; New Delhi.

6.1.4 In crisis situations, the Emergency Response Plan should define the trigger point in unambiguous terms so that there is no delay on the part of the role players to initiate action as laid down in the plan. This would entail that the role players should have full knowledge about the tasks each has to perform. The Emergency Response Plan should also identify resources, including human resources, logistics, specialized equipments and the way to put them into action.

6.1.5 It has been observed that the District Emergency Response Plans are not always up to the mark. This is because 'crises' are considered low probability events and advance planning does not receive the attention it deserves. The plans are more often than not, prepared on assumptions (and not ground realities) and without intensive consultations with the role players. They are also not updated from time to time. Such plans also remain on paper as they are not backed by mock drills and the required building of teams and their capacity.

6.1.6 Recommendations:

- a. Since the initial response in any crisis/disaster should be timely and speedy, the Emergency Response Plans should be up-to-date and should lay down the 'trigger points' in unambiguous terms.

- b. The district emergency response plan should be prepared in consultation with all concerned. The plan should be known and accepted by all the role players. (This should be a part of the District Disaster Management Plan).
- c. Standard operating procedures should be developed for each disaster at the district and community level, keeping in mind the disaster vulnerability of the area. Disaster management plans at all levels should have handbooks, checklists, manuals with precise instructions for disaster management personnel, search and rescue teams, and Emergency Operations Centres.
- d. 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.
- e. The plan should be validated annually through mock drills and it should be backed by capability building efforts.
- f. Any plan would have its limitations as each crisis situation would vary from another. Plans are therefore, no substitute for sound judgement at the time of crisis.
- g. Handling of crisis should be made a parameter for evaluating the performance of officers.
- h. These principles apply to plans at other levels and also in case of metropolitan cities.

6.2 Coordinating Relief

6.2.1 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 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.

6.2.2 The biggest task is to ensure that the resources are deployed in such a manner that they reach all affected sections in an equitable manner. This calls for an effective coordination mechanism at the district and sub-district levels. It needs to be ensured that the needs are properly assessed and communicated to all agencies so that unwanted relief material is not mobilized.

6.2.3 It has been observed that the focus of relief effort is on food, clothing and shelter and aspects of public health and sanitation are often overlooked. Chances of spread of epidemics immediately following a disaster are very high. Therefore, ensuring supply of safe water and sanitized living conditions should receive as much priority as other items of relief.

6.2.4 The distribution of relief material often raises issues about political discrimination, partisan attitude and certain vulnerable sections getting left out. Total transparency should be followed in distribution and procurement of relief materials. It is desirable to constitute vigilance committees of the community to keep a watch over these activities and act as grievance redressal fora.

6.2.5 Each major disaster is followed by an 'assessment exercise'. Teams from Government of India are deputed to validate the assessments reported by the State Governments. This ad-hoc procedure has several drawbacks. There is need to evolve objective methods of assessing the damage so that there are no allegations of bias, distortions, exaggeration or arbitrary scaling down. Satellite imagery could be used as a tool to validate the reported damages and NDMA could draw up the necessary guidelines for the assessment teams. However, after the recovery phase, a more comprehensive assessment of all aspects of disaster management is required, which is dealt with in the chapter on 'Recovery'.

6.2.6 Recommendations:

- a. Effective coordination is essential at the district and sub-district levels for rescue/relief operations and to ensure proper receipt and provision of relief. During rescue and relief operations, unity of command should be ensured with the Collector in total command.
- b. In order to avoid mismatch between demand and supply, 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.

- c. Ensuring safe drinking water and sanitized living conditions should receive as much a priority as other basic means of livelihood.
- d. All procurement and distribution of relief materials should be done in a transparent manner.
- e. Monitoring and vigilance committees should be set up involving the stakeholders. These committees could also look into grievances.
- f. Trauma care and counseling should be made an integral part of the relief operations.
- g. There is urgent need to evolve objective methods of assessing the damage so that there are no allegations of bias, distortions, exaggeration or arbitrary scaling down. Satellite imagery could be used as a tool to validate the reported damages. NDMA should be requested to draw up the necessary detailed guidelines for assessment, to be followed by all authorities.

6.3 Role of Specialized Agencies

There are several agencies which have an important role in disaster management. Some of these are described in the following paras:

6.3.1 Civil Defence

6.3.1.1 The Civil Defence Policy of the Government of India till the declaration of emergency in 1962, was confined to making the States and Union Territories conscious of the need for civil protection measures and asking them to prepare civil protection plans for major cities and towns under the then Emergency Relief Organisation (ERO) scheme. The Chinese aggression in 1962 and the Indo-Pak conflict in 1965 led to considerable re-thinking about the policy and scope of Civil Defence. As a result, the Civil Defence Policy as it exists today was evolved and Civil Defence legislation was enacted in the Parliament in 1968. The country was subjected to further hostile attacks in December, 1971 when the Civil Defence Organisation acquitted itself commendably. (*Extracted from the website of Civil Defence Organisation*).

6.3.1.2 Civil Defence in the country has been raised on the strength of the Civil Defence Act, 1968, C. D. Rules, 1968 and Civil Defence Regulations, 1968. Although the Civil

Defence Legislation is a Central Act, the C. D. Regulations, 1968 delegate all the powers to implement and execute the C. D. Scheme to the State Government. However, the Union Government makes the policies and plans and also finances the States for implementing of the C. D. Scheme on discrete financial terms³⁶.

6.3.1.3 Although the Civil Defence Act, 1968 is applicable throughout the country, the organization is only raised in such areas and zones, which are tactically and strategically considered vulnerable from the point of view of enemy aggression. At present, Civil Defence activities are restricted to 225 categorized towns spread over 35 States/Union Territories. Civil Defence is primarily organized on voluntary basis except for a small nucleus of paid staff and establishment, which is augmented during emergencies. The present target of C.D. volunteers is 12.98 lakh, out of which 6.6 lakh volunteers alone have been raised.³⁷ Civil Defence Corps has the following 12 services in which volunteers are trained:-

- Headquarters Service
- Warden Service
- Communication Service
- Casualty Service
- Fire Fighting Service
- Rescue Service
- Welfare Service
- Salvage Service
- Corpse Disposal Service
- Depot & Transport Service
- Training Service
- Supply Service

6.3.1.4 The relevant provisions of the Civil Defence Act, 1968 are as follows:

- i. It extends to the whole of India {Section 1(2)}
- ii. 'civil defence' has been defined to include "*any measures, not amounting to actual combat, for affording protection to any person, property, place or thing in India or any part of the territory thereof against any hostile attack, whether from air, land sea or other places, or, for depriving any such attack of the whole or part of its effect, whether such measures are taken before, during at or after the time of such attack*".{Section 2(a)} (emphasis added).

³⁶Extracted from <http://dgcd.nic.in/>

³⁷Annual Report, Ministry of Home Affairs 2005-06.

6.3.1.5 Thus, 'civil defence' concerns itself with measures for protection of human life and property. The catchword, however, is the term 'hostile attack' against which such protective measures are envisaged. But its envisaged coverage is wide: it not only includes concurrent, in situ measures for protection, but also measures for preparedness, mitigation and post-incident relief and recovery.

6.3.1.6 The term 'hostile attack' has been defined in the Act to mean "*any attack by any person or body of persons, whether during any war, external aggression, internal disturbance or otherwise which endangers the security of any life, property, place or thing in India or any part of the territory thereof*". {Section 2(c)} (emphasis added)}

6.3.1.7 The inclusion of the phrase 'internal disturbance or otherwise' in the definition of 'hostile attack' gives it a wide import. It can be construed to include incidents of militancy, extremism, terrorism etc. as far as the application of the Act is concerned. The lacuna inherent in this definition, for the purposes of crisis management, is that it cannot be made applicable to natural disasters, thereby depriving it of a wider role in the administrative set-up for crisis management.

6.3.1.8 As a result, the civil defence structure still exists with its old wartime mandate. An examination of the powers vested in the Union Government to make rules in matters described under section 3(1) of the Act reveals that with very few amendments, the mandate of this Act can be extended to also include crisis/disaster management. This could be achieved by inserting the term 'disasters' in section 2(a) of the Civil Defence Act to give a wider meaning to the definition of 'civil defence'. Accordingly, a new sub-section 2(d) may be inserted in the Act to include the definition of 'disaster' which should be in congruence

Box 6.3: Civil Defence

The term 'civil defence' has been defined in the Protocol, additional to the Geneva Convention of 12th August, 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) adopted at Geneva on 8th June, 1977. The text of this Protocol is set out in the Fifth Schedule {inserted by the Geneva Convention (Amendment) Act, 1998} to the Geneva Conventions Act, 1962. Chapter VI of this Protocol pertains to 'Civil Defence', wherein it has been defined in Article 61 in the following manner:

"For the purposes of this Protocol:

'civil defence' means the performance of some or all of the undermentioned 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, but not limited to, planning and organization."

with the National Disaster Management Act, 2005. In the same vein, the provisions of section 3(1) of the Act may be streamlined to bring it in consonance with crisis management protocols as per international standards. Further, section 4(1) of the Act may be amended to insert the phrase '*all the districts within the State*' in place of the existing phrase '*any area within the State*'.

6.3.1.9 The whole structure of 'civil defence' may be left at the disposal of the State Governments (which is also provided in section 4 of the present Act). Further, section 17 of this Act provides that the State Government may, by notification, direct that all or any of the powers which may be exercised by it, shall be exercised by an officer not being inferior in rank to that of a District Magistrate (State Governments have notified the District Magistrate as this officer). As the District Magistrate is also the authority charged with the responsibility of looking after disaster management at the district level (both under the state and Union legislations on disaster management), specific provisions may be inserted in the civil defence legislation for making the powers of the District Magistrate co-terminous with those under the Disaster Management Act, 2005 and allowing induction of members of civil defence corps from the local community to make community participation an important ingredient of crisis management at the district level.

6.3.1.10 The existing enrollment of about 6 lakh volunteers is grossly inadequate for a vast country like India. Some of the developed countries keep a target of about 1% of the total population as civil defence volunteers. But with the high threat that India faces, this figure of 1% may not be sufficient. However, as a first step, efforts should be made to reach this target within 5 years.

6.3.1.11 The financial allocation for civil defence activities is very inadequate³⁸. There is need to increase this substantially. For this to be done without delay, the increase should not be linked to any matching contribution from the states. The HPC had recommended that donations from corporate sector should be permitted for civil defence activities. The Commission agrees with this.

6.3.1.12 Normally, the States have a common directorate for civil defence and home guards. With the expanded definition of 'Civil Defence', all activities of the Civil Defence Organization would be for crisis management. Therefore, the Directorate of Civil Defence should be brought under the control of the State Crisis Management set-up.

6.3.1.13 Recommendations:

- a. The Civil Defence Act should be amended as proposed so as to cover all types of disasters.

³⁸As per the Annual Report of the Ministry of Home Affairs the allocated budgetary provision was only Rs. 10 crores in 2005-06.

- b. Civil Defence should be constituted in all districts which are vulnerable not only to hostile attacks but also to natural calamities. The goal of community participation should be pursued primarily through the instrumentality of Civil Defence especially in urban areas.
- c. The objective should be to include 1% of the population within the fold of Civil Defence within five years. Efforts should be made to enlist paramedics as Civil Defence volunteers.
- d. Budgetary allocations relating to Central Financial Assistance for Civil Defence should be increased substantially.
- e. Civil Defence set-ups at all levels should be permitted to accept donations.
- f. The Civil Defence set up at the state level may be brought under the control of the Crisis/Disaster Management set-up.

6.3.2 Police, Home Guards and Fire Services

6.3.2.1 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. It is essential therefore, that policemen at field level who would be the first responders are sufficiently trained. The training need not be generic but specific to the types of crisis anticipated in an area. More importantly, they should be fully involved in the preparation of the local crisis/disaster plan and they should be fully conversant with the area.

6.3.2.2 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. The organization is spread over in all States and Union Territories except Kerala. Home Guards are raised under the Home Guards Act and Rules of the States/Union Territories. They are recruited from cross-sections of the society who are willing to give their spare time to the organization for betterment of the community³⁹.

³⁹Annual Report, Ministry of Home Affairs 2005-06.

6.3.2.3 Although, both Civil Defence and Home Guards are voluntary corps, the essential difference between the two is that Home Guards on duty are like any public servants. This is because the primary task of Home Guards is enforcement of law. Section (5) of the Bombay Home Guards Act reads as follows:

“5. Powers, protection and control -

(1) A member of the Home Guards when called out under section 4 shall have the same powers and protection as an officer of police appointed under any Act for the time being in force.

(2) No prosecution shall be instituted against a member of the Home Guards in respect of any thing done or purporting to be done by him in the discharge of his functions or duties as such member except with the previous sanction of the District Magistrate”.

6.3.2.4 Thus, a Home Guard could be very effective in any activity assigned to him during crisis management, provided he is properly trained in that activity. Therefore as has been suggested for policemen, each Home Guard should also be mandatorily trained in crisis management. The HPC recommended that the Home Guards should be placed under the operational and administrative control of the State Level Disaster Management Agency. The Commission is not in favour of this, as basically Home Guards perform policing functions and it is best that they are under the control of police. In case of crisis, they would, however, perform the tasks assigned to them by the concerned authority.

6.3.2.5 Also in several state laws it is prescribed that the qualification of a person to be a Home Guard should be ‘Primary Pass’. This should be revised to at least a pass in the 10th class given the increasing responsibility and complexity of tasks to be entrusted to them.

6.3.2.6 The fire services have been set up by the state governments with the Government of India providing technical and financial support. There is, however, no uniform structure of Fire Services in the country. In some states they are managed by the municipal authorities whereas in a few states, the police controls the fire services but in a large number of states it is organized as a department, with fire stations spread all over the state. In most of the states the Fire Services are not supported by legislation. Although Fire Services have been playing a crucial role in all types of disasters, the focus has been on fire related crises. There is an urgent need to train and equip the Fire Services to handle all types of crisis/disasters in line with international best practices where they have been modernized as multi-hazard forces. It would also be appropriate if they are renamed as **Fire and Rescue Services**.

6.3.2.7 A Standing Fire Advisory Committee was constituted by the Ministry of Home Affairs on the recommendation of the Conference of Chiefs of Fire Services in India in 1955. The Standing Fire Advisory Committee was renamed Standing Fire Advisory Council in the

year 1980. This Council has been giving recommendations to the Government of India on various issues pertaining to Fire Services.

6.3.2.8 An issue which arises while examining the structure of Fire Services is whether they should be handed over to the municipal authorities or they should continue as a department of the State Government. Bigger cities like Mumbai have their own Fire Services under the control of the Municipal Corporation. If Fire Services are kept with the local governments, this may ensure a well-coordinated response by all the concerned agencies in case of a crisis. However, small municipalities may not be able to support a separate Fire Service wing. An added problem would be of jurisdiction in case the crisis arises outside the limits of any such municipal body. Moreover, it is necessary to get the latest practices, equipment and technology in disaster and rescue management, and this would be possible only if there is a centrally located body which carries out research and keeps itself abreast with the latest developments and then disseminates these through appropriately designed training programmes and is able to procure expensive equipment that may be beyond the financial capacity of local bodies. The Commission, on balance, feels that for bigger cities (population exceeding 2.5 million), Fire Services should be totally under the control of the municipal authorities. In the remaining parts of the state, the Fire Services should be organized as a department. However, within a district, full operational control should be given to the District Crisis/Disaster Management Authority. However, in the long run, as the capabilities of municipal bodies are built up, Fire Services may be transferred to them in a phased manner. The state level set up should lay down policy guidelines, carry out capacity building programmes, carry out research and development etc. The department should also be professionalized by inducting persons with the required expertise at all levels.

6.3.2.9 A model bill for the Fire Service was drawn up in October, 1956 in consultation with the Law Ministry and was examined and finalized by the Standing Fire Advisory Committee, after the State Governments had been consulted. The finalized draft model bill was circulated to all Central Ministries and State Governments (Ministry of Home Affairs letter No.28/3/56-ER-II, dated the 17th October, 1958). The Bill provides guidelines to formulate the State Fire Service Act and includes matters pertaining to the setting up and maintenance of the Fire Service, the appointments of various ranks, discipline, deployment, powers of the members of the Fire Service, levy and collection of fire tax etc. The Standing Fire Advisory Council in its various meetings has been recommending the adoption of this bill by the states.

6.3.2.10 The model bill proposed in the 1950s is quite out of date. It would be desirable to have these provisions revised. It would be better if the Fire and Rescue Services are structured under the Crisis/Disaster Management Law. The law should inter-alia provide a mandate for

dealing with all types of crisis/disasters. The mandate of the erstwhile Fire Services should be broadened and Fire and Rescue Services should become an integral part of the State Crisis/Disaster Management set up. The role of the local governments and the District Crisis/Disaster Management set up vis a vis the Fire and Rescue Services should be clearly laid down in the law. It should be ensured that the operational control of the Fire and Rescue Services is given to the local authorities/District Disaster Management Authorities.

6.3.2.11 Recommendations:

- a. Policemen, Firemen and the Home Guards at the field level who are among the first responders 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 and also be fully conversant with them.
- b. 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.
- c. A section of Home Guards should also be given para-medical training.
- d. Fire Services should more appropriately be renamed as Fire and Rescue Services with an enhanced role to respond to various types of crises.
- e. While in the long run, it would be desirable to place the Fire Services under the control of all municipal bodies, as a first step, this may be done in bigger cities (population exceeding 2.5 million). In the remaining parts of the state, the Fire Services should be organized as a department but within a district, full operational control should be given to the District Crisis/Disaster Management Authority. Transfer of these services to municipal authorities should be accompanied by transfer of commensurate financial resources.
- f. Only persons with expertise in crisis/disaster management should be inducted into the top management of the Fire (and Rescue) Services.
- g. Fire and Rescue Services should be brought under the control of the State Crisis/Disaster Management set up under the Disaster Management Law.
- h. The NDMA may be requested to suggest model provisions regarding these services for inclusion in the Disaster Management Act/s.

6.3.3 Armed Forces/Territorial Army/Ex-Servicemen

6.3.3.1 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 crisis management 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.

6.4 Setting up Integrated Emergency Operations Centre (EOC)

6.4.1 As stated in para 3.12.3.8, the responsibility for disaster management at the national level has been shifted to the Ministry of Home Affairs (after the Gujarat earthquake) except drought (which continues to be with the Ministry of Agriculture) while specific types of disasters like rail accidents, atomic accidents, chemical disasters, biological disasters etc are dealt with by the subject ministries, some of which have round the clock EOCs. In all types of crises, getting early warning is critical to take precautionary measures or mount appropriate rescue and relief efforts without any delay. This would be possible if all the nodal ministries (for the designated type of crisis) have full time EOCs. It would be even better if there is only one unified EOC at the national level with personnel equipped and trained to handle information related to any type of crisis. If a ministry is already running a control room, the same could be housed in this integrated EOC. Such an integrated EOC could then be accessed by all agencies in the country or even by an international agency to pass on any information about an impending crisis. It would also be possible to have a robust communication link for this EOC with a large degree of redundancy built in so that the communication system becomes virtually fail proof. After getting the first information about any crisis, the concerned nodal ministry may immediately take steps to bolster the EOC by deputing more staff. Such an EOC should also have links to various electronic media channels and try to capture information about any crisis from these media channels, as many channels now have excellent reporting systems right down to the district/block levels. A similar arrangement should also be made at the state and district levels.

6.4.2 Recommendation:

- a. 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.

6.5 Organising Emergency Medical Relief

6.5.1 One important facet of crisis management which is greatly neglected is the emergency relief for gravely ill patients, accident and fire victims, and others who need immediate attention. Most of these catastrophes / emergencies may be of individual and group nature, and may not affect large communities. Therefore, the administration in general is not involved. Nevertheless, a legal and institutional framework is necessary to provide emergency relief and immediate access to medical attention in order to save precious lives.

6.5.2 In many developed countries, systems exist to handle such emergencies. For instance, in USA, the 911 telephone number is reserved for seeking emergency assistance of all kinds. The cost of relief is met through imposition of a small additional tariff on all telephone calls in the country. Similarly, in Europe, 128 is the number any person can dial in an emergency. In these advanced countries, the medical, fire, police and other emergency care services are well-prepared to meet all contingencies with reasonable effectiveness.

6.5.3 In India, the police and fire services are legally entrusted with specific duties and are geared to respond to emergencies involving their intervention, subject to personnel and infrastructure limitations. Public health infrastructure is grossly inadequate and generally unsatisfactory whereas private health care is both costly and somewhat reluctant to deal with emergency management given the medico-legal complications and absence of health insurance coverage.

6.5.4 In this backdrop, we need to create a legal and institutional framework throughout the country to deal with emergencies – medical or others. A non-profit initiative called EMRI⁴⁰ has been established in Andhra Pradesh recently (in 2005), and is now providing services to callers in 32 towns and cities and neighbouring areas. A phone number 108 has been reserved for emergencies, and the state agencies like the police and fire services are increasingly collaborating with the private, non-profit initiative in receiving and sifting calls, and responding to emergencies.

6.5.5 In effect, the call centre of EMRI with emergency number 108 has become the nodal centre for receiving all distress calls. Calls relating to police (burglary, murder, violence etc) and fire services are transferred instantly to state agencies, and calls for emergency medical assistance are handled by the EMRI. The EMRI provides transport immediately, and an emergency medical unit provides immediate rescue and emergency care. The patient is then sent to a hospital of her/his choice; or a public hospital. MOUs are entered into between EMRI and private hospitals.

6.5.6 The experience of EMRI shows that there is great need for a nation-wide service of a similar kind, and thousands of lives can be saved annually through such a service. Also, in some parameters, we, in India, can improve upon the benchmarks set by the West, thanks to the rapid progress in information and communication technologies and innovations based on best practices. In order to institutionalize such an emergency response system, several legal and institutional arrangements need to be put in place all over the country for effective emergency response. We may need a law dealing with emergency medical services in the private sector and another law establishing an Indian Emergency Number Authority (IENA), dealing with protocols regarding a toll-free number for emergency dialing and coordination among various state and non-state agencies. A statutory authority may have to be created to monitor emergency medical management. A viable and sustainable funding mechanism may need to be evolved to make such a system work.

6.5.7 Recommendations:

- 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.**
- b. **This arrangement envisages involvement of the private hospitals. The enunciation of the role of various role players may be through legislation.**

7.1 Relief and Rehabilitation

7.1.1 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”.

7.1.2 While emergency response is vital as it is aimed at saving human lives and providing relief, the ultimate objective of any crisis management is restoration of devastated livelihoods. This restoration should not only encompass social, economic and psychological rehabilitation, but go beyond by addressing the underlying cause of disaster. Recovery efforts following rescue and relief in any disaster, can be classified into short term and long term. The short term activities for recovery are debris clearance, providing semi-permanent shelter and ensuring sanitation and restoring lifelines, while the long term activities involve building a safer and more sustainable livelihood.

7.1.3 The damage caused by floods, earthquakes and cyclones is on a much larger scale than other disasters and recovery after these disasters poses a challenge. In disasters like drought, the relief phase is prolonged and since there is no damage to the infrastructure and property, the rehabilitation is confined to restoration of livelihoods which can get subsumed in normal development programmes. Recovery in case of epidemics is more in the form of sanitizing the locality against any future recurrence and may involve counselling of the victims. Industrial disasters being quite varied in nature, the rehabilitation in major ones like the ‘Bhopal Gas Tragedy’ could involve rehabilitation efforts spanning over a generation of victims apart from restoring livelihoods and providing social and psychological assistance. Rehabilitation following disasters such as landslides and

Box 7.1: From Relief to Recovery: The Gujarat Experience: UNDP

.....whatever the type and scale of disaster, the period of transition from relief to recovery is the most critical. During the relief phase, huge volumes of resources pour in from a range of entities such as government, the private sector, international aid agencies and civil society organizations (CSOs), each with diverse agendas and interests. As the relief phase draws to a close, public and donor interest wanes, and government and other agencies embark on a long process of recovery. In the period when relief is done but recovery is yet to begin, vulnerable groups are especially at risk.

avalanches is localized and is of a similar nature as in earthquakes but on a smaller scale. Finding safer sites near such locations often poses challenges and resistance.

7.1.4 The first step after stabilizing the situation by providing sufficient relief is to assess the damage. A meticulously executed assessment exercise would provide an ideal base for the rehabilitation efforts. This exercise is best carried out through multi-disciplinary teams which go into all aspects of damage (social, economical, psychological) in participation with the local community - based on guidelines already referred to (para 6.2.6).

7.1.5 Based on the assessment of the damage and the needs, a recovery strategy has to be formulated. The strategy should include all interventions - economic, social, political and psychological. The resources should be identified and the roles and responsibilities of all concerned should be defined.

Box 7.2: 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.

(Source: From Relief to Recovery: The Gujarat Experience:UNDP)

7.1.6 Following any major disaster, a number of players arrive on the scene and as already stated, ensuring proper coordination amongst them becomes very important. Recovery activities are taken up by government agencies, local bodies, international agencies, Voluntary Organisations and others, through separate, overlapping and uncoordinated interventions. This leads to imbalances in the scale of operations, duplication of efforts in some areas, gaps in others and leakage and misuse of resources. Therefore establishing a framework for coordination is necessary for effective recovery. The role of Voluntary Organisations including international ones like the Red Cross is extremely useful for downscaling the impact of disaster. Voluntary Organisations are often better equipped to handle some aspects of accident relief and post-disaster rehabilitation. The district administration should set up a Voluntary Organisations’ coordination centre to coordinate the relief and rehabilitation activities of the Voluntary Organisations so that they are not concentrated in a few pockets.

Box 7.3: 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 to specific agricultural needs such as grain storage, cattle-rearing and milk-processing.

(Source: From Relief to Recovery: The Gujarat Experience:UNDP)

7.1.7 It is often observed that post-disaster recovery efforts tend to focus on rapid and visible solutions to

restore normalcy at the cost of sustainable development. The post-disaster recovery phase provides a 'window of opportunity' for disaster risk reduction and risk reduction aspects should therefore be built into the redevelopment process. This aspect in respect of shelter is highlighted by UNHSP.

7.1.8 "Shelter is one of the most visible and immediate needs in post-crisis settings. Relief efforts are often focused on providing shelter quickly, without taking into account the impact of short-term shelter strategies. Long-term shelter strategies help not only to focus on determination and implementation of realistic and permanent reconstruction plans for the affected communities, but also to tie up with rebuilding community confidence and support structure for civic responsibility and urban governance, through participatory planning of reconstruction. Shelter issues are closely bound to mitigation aspects as well. The development of disaster resistant housing is a major factor reducing vulnerability to disasters. However, shelter issues in mitigation go beyond the structural. Rights to ownership and security of tenure make an enormous difference to the maintenance, management and development of shelter, particularly in urban areas. When people have security where they live, they are better able to manage space and engage in activities that will reduce, rather than increase their vulnerability⁴¹."

7.1.9 Normally, it is seen that the recovery efforts have a tendency of tapering off with the passage of time. The Bureau for Crisis Prevention and Recovery has also observed "the general experience that once the initial flurry of activities of providing rescue and relief is over, the attention received by the recovery efforts goes on declining steadily over a period of time and 'business as usual' sets in"⁴². This decline in recovery effort with the passage of time needs to be arrested. This could be achieved by setting up monitoring mechanisms in which the community is involved and periodically taking up impact evaluation studies through independent agencies. The recovery plan should incorporate measures to reduce vulnerability by building community resilience. This could be achieved by capability building of the community and awareness generation and preparing local crisis management plans.

Box 7.4: Guiding Principles for Post-Disaster Recovery

1. Mainstreaming disaster risk reduction in the recovery/development process
2. Improving/maintaining coordination
3. Promoting participatory approaches and decentralized planning and programming for recovery
4. Enhancing safety standards and integrating risk reduction in reconstruction and development
5. Improving the living conditions of the affected communities and sectors
6. Building local and national capacities for increased resilience, risk management and sustainable development
7. Taking advantage of ongoing initiatives
8. Gender sensibility
9. Demonstrative effects
10. Monitoring, evaluating and learning

(Source: United Nations Development Programme Bureau for Crisis Prevention and Recovery - Disaster Reduction Unit)

⁴¹Theme paper on sustainable relief and reconstruction in post-conflict, natural and human made disasters. Governing Council of United Nations Human Settlements Programme ([www://unhabitat.org](http://www.unhabitat.org)).

⁴²United Nations Development Programme; Bureau for Crisis Prevention and Recovery - Disaster Reduction Unit

7.1.10 A system of accountability needs to be evolved during the relief and rehabilitation phase. This system should ensure that the relief material reaches the target groups and that the funds are being utilized efficiently and optimally. A grievance redressal mechanism should also be put in place.

7.1.11 After the recovery phase, it is necessary to conduct a detailed evaluation of all aspects of crisis management. This should bring out the strengths and weaknesses of the disaster management machinery and also provide the basis for future improvements. Such an evaluation should be carried out by an independent professional agency through the NIDM, in all major disasters. This evaluation should also include a quick audit of the expenditure incurred.

7.1.12 Recommendations:

- a. **Damage assessment should be carried out by multidisciplinary teams in a transparent and participatory manner in accordance with guidelines laid down by NDMA. (refer para 6.2.6 g).**
- b. **The efforts of NGOs and other groups have to be coordinated with government activities at the district and state levels.**
- c. **A recovery strategy should be evolved in consultation with the affected people and concerned agencies and organisations. The recovery strategy should include all aspects of rehabilitation - social, economic and psychological.**
- d. **Minimum standards of relief should be developed to address the requirements of food, health, water, sanitation and shelter. Focus should be placed on the special needs of the vulnerable population that is, children, women, the elderly and the physically challenged.**

Box 7.5: Inadequate Planning and Preparation in Rescue and Relief may Lead to Further Disasters

42 die in stampede at Chennai flood relief camp.

They came in droves seeking relief from their tragedy. But instead they fell victim to another tragedy as a stampede on Sunday (18-12-05) at a relief camp for flood victims in this Tamil Nadu capital left 42 people dead and 40 injured.

Hundreds of people ran for cover following a sudden downpour and fell on each other, crushing women and children in their wake.

The tragedy occurred at 4.30 a.m. as a crowd of around 4,500 - largely poor people - gathered in front of the locked gate of Arignar Anna Corporation Higher Secondary School at K.K. Nagar in west Chennai to receive food and other relief goods. The K.K. Nagar relief camp in the school was one of 141 such camps in and around Chennai distributing relief to victims of floods caused by unprecedented rains in different parts of the state since October.

(Source: <http://timesfoundation.indiatimes.com/articleshow/1336840.cms>)

- e. Implementation of the rehabilitation efforts should be carried out by the village panchayat/local bodies. The first priority should be to get the beneficiary oriented works executed through the beneficiaries themselves.
- f. Concurrent monitoring and a quick financial audit should be carried out to prevent misuse of funds.
- g. Risk reduction aspects should be incorporated into the recovery plans. Land use plans which ensure safety of the inhabitants should be brought into effect during reconstruction.
- h. All new civil constructions should mandatorily be made disaster resistant as per prescribed standards.
- i. A mechanism for redressal of grievances should be established at the local and district levels.
- j. For all major disasters, NIDM should conduct a detailed evaluation exercise through independent professional agencies.

7.2 Revisiting the Financial Procedures

7.2.1 In pursuance of their mandate to recommend measures for “financing relief expenditure on account of natural calamities”, successive Finance Commissions have included recommendations to enable states to respond to the immediate requirements of funds to deal with the emergencies caused by such calamities. At present, such arrangements are in the form of the Calamity Relief Fund (CRF), a readily available source of meeting immediate expenditure sharable between the Union and the states in the ratio of 3:1; and the National Calamity Contingency Fund (NCCF), a source of meeting additional fund requirements for particularly severe natural calamities financed solely by the Union Government from the surcharge on certain central taxes. These funds have generally enabled the states to respond to alleviate the immediate distress caused by natural calamities and give some compensation for loss. Long term rehabilitation and preparation could not receive the requisite attention due to paucity of resources.

7.2.2 Section 46 of the Disaster Management Act, 2005 envisages establishment of two funds, namely, “National Disaster Response Fund” and “National Disaster Mitigation Fund”. Similar funds are also to be established at the State and District levels.

7.2.3 Long term mitigation measures, being capital intensive, have to be carried out as part of the national plan or the state plan of the concerned Ministry/Department. Modalities of integrating projects taken up under the Mitigation Fund and other projects taken up under different schemes would have to be worked out. NDMA may be requested to finalise such modalities and also recommend guidelines for use of the Mitigation Funds at the National, State and District levels. Similar guidelines would also have to be worked out for the ‘Response Fund’.

7.2.4 With the establishment of the National Disaster Response Fund, and the National Disaster Mitigation Fund, the CRF and NCCF may cease to exist at the end of the award period of the Twelfth Finance Commission (2005-06 to 2009-10). The quantum of assistance from these new funds for each state and its details and conditions of release may be suggested by NDMA - on the basis of a transparent criteria - rather than once in five years by the Finance Commission. It is desirable that both the funds are made operational from April 1, 2007, with an initial annual contribution of Rs 5000 crores each from the Government of India, in addition to the CRF and NCCF, which may cease to exist at the end of the award period of the Twelfth Finance Commission.

7.2.5 Experience of the manner in which the existing funds have been administered has brought to light a number of anomalies. Some of these are:

- (i) Delay in initiation of relief expenditure, particularly from the CRF in case of droughts where states often wait for additional allocations from the NCCF before commencing distribution of relief on the ground.
- (ii) Absence of accounts for relief expenditure separately for a calamity under ‘each head of relief’; at present annual accounts are compiled on ‘over-all’ basis.
 - (a) Lack of transparency about the basis on which assistance from the NCCF is sanctioned.
 - (b) Absence of concurrent evaluation of relief efforts - this leads, among other things, to allegations of misuse and partisanship, with or without justification.

7.2.6 Recommendations:

- a. Both the funds (National Disaster Mitigation Fund and the National Disaster Response Fund) may be operationalised from April 1, 2007 with an initial annual contribution of Rs. 5000 crores each from the Government

of India. This would be in addition to CRF and NCCF for the present. The CRF and NCCF would cease to exist at the end of the award period of the Twelfth Finance Commission.

- b. NDMA may recommend to Government of India the quantum and criteria of assistance and conditions of release from the two new funds as well as manner of replenishment of these funds from different sources.
- c. A system of compiling accounts for each calamity separately with reference to each head of relief expenditure should be initiated. The Comptroller and Auditor General of India may consider laying down a standardized format in this regard.
- d. Accounts as above may be available on the website of the state level nodal agency at such intervals as may be laid down.
- e. The basis for calculation of assistance from the funds should be available on appropriate websites.

GENDER ISSUES AND VULNERABILITY OF WEAKER SECTIONS

8.1 It has been noted that women and children are the most adversely affected in disasters, particularly natural disasters, and consequently suffer the most. This was evident during the recent Tsunami in India where in Nagapattinam district, 2406 women died as compared with 1883 men. 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 dependant 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.

Box 8.1: Women in Disaster

In Nagapattinam, the worst affected district of Tamil Nadu in South India, government statistics state that 2406 women died, compared with 1883 men. In Cuddalore, the second most affected district, almost three times as many women were killed than men, with 391 female casualties, compared with 146 men. In Devanampattinam village in Cuddalore, for example, 42 women died compared with 21 men. In Pachaankuppam village, the only people to die were women.

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 Batticaloa District, the tsunami hit at the hour women on the east coast usually took their baths in the sea.

(Source: Oxfam's report on Tsunami Impact on Women-http://www.mumindia.org/News/Round_up/oxfam%20report.htm)

8.2 This disadvantaged situation obviously gets aggravated in crisis situation. As a result, whether it is 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 are not adequately addressed. It is, therefore, necessary that all disaster management policies/plans including disaster preparedness and mitigation relief and rescue operations specially address the vulnerability of both women and children during disasters. This would necessitate involving women in all disaster preparedness and mitigation plans. The same principles apply to other vulnerable sections like the children, the elderly and the physically challenged.

8.3 Recommendations:

- a. The vulnerability analysis should bring out the specific vulnerabilities of women and these should be addressed in any mitigation effort. Disaster mitigation plans should be prepared, in consultation with womens' groups. Similar steps should be taken for other vulnerable groups.
- b. Rescue and relief operations should focus on the most vulnerable groups - women, children, the elderly and the physically challenged.
- c. Relief measures should take into account the special requirements of women and other vulnerable groups. Particular attention needs to be given to their physical and mental well being through health care and counselling.
- d. 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, providing micro-finance, marketing facilities etc.
- e. The title of new assets created should be in the names of both husband and wife.
- f. Camp managing committees should have adequate number of women representatives.
- g. 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.
- h. 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

9.1 Risk Reduction

9.1.1 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 - (i) the onset is slow giving adequate warning, (ii) it affects livelihoods of people over a large area, (iii) the duration of the disaster is much longer and so the relief efforts have to be sustained over this stretched time period, (iv) 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, and (v) 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.

Box 9.1: Drought-prone Area Development

Drought-prone areas should be made less vulnerable to drought-associated 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 drought-prone areas should be given priority.

Relief works undertaken for providing employment to drought-stricken population should preferably be for drought proofing.

(National Water Policy)

9.2 Revisiting Long Term Interventions

9.2.1 Unlike other disasters, risk reduction measures in drought in the form of DPAP, DDP and Watershed Development Programmes, have been undertaken for quite sometime. There is strong circumstantial evidence, however, that these schemes have not lived up to their full or promised potential.

9.2.2 It is also noteworthy that while the net irrigated area which was 20.85 million hectares in 1950-51 rose to 53.07 million hectares in 2002-03 (representing an increase of more than 150%), the corresponding decline in areas vulnerable to repeated droughts has been no more than 20%. A major constraint in developing this theme further is absence of an over-

all Impact Evaluation of DPAP and DDP. So far only specific projects viz. individual blocks or a cluster of blocks in geographically contiguous area have been assessed and positive 'local' findings (like improvement in vegetative cover, and water table and improved productivity etc) have been arrived at such local levels. There has been no assessment, for instance, of DPAP making any difference to frequency and intensity of droughts. Similarly, no study of "drought proofing" actually achieved, by extension of irrigation coverage in the peninsular region is as yet available. The point that emerges, therefore, is that much work remains to be done to ascertain the reasons why droughts continue to occur even in areas where irrigation is now available or other major ameliorative interventions have been made.

9.2.3 Another aspect which needs to be seriously studied is the long term impact of water harvesting on the local ecosystems as such measures, though of great immediate utility, have the potential of altering, to some extent, the natural 'pathways' of water flow, changes in such pathways and their possible impact on acute droughts need to be studied in detail, unfettered by presumptions.

9.2.4 A long term impediment in understanding the causes (and remedies) for occurrence of droughts is the absence of integrated expertise in water. There are institutions of excellence in hydrology, concerning scientific and engineering aspects of water and those concerned with ground-water and water requirements of crops etc. The diverse 'water centered' expertise scattered in such institutions is currently difficult to be integrated to generate the requisite multi-disciplinary approach for optimum results. The Commission therefore feels that a National Institute of Drought Management should be set up. Such an institution should take the lead in carrying out research on various aspects of drought as a multi-disciplinary problem. It should be a resource centre on droughts and also have the expertise to carry out impact evaluation studies of the drought management efforts, etc.

9.2.5 Recommendation:

- a. 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.

9.3 Livelihood Management in Extremely Drought Prone Areas

9.3.1 Areas suffering repeated droughts over the millennia have highly degraded land resources. Such areas are found in pockets in many parts of the country and the subsistence/

unsustainable agriculture practiced in such areas make them easy prey to even a modest drought. Human populations in many such degraded spots have adapted their life-styles to deal with the vagaries of nature through a predominantly pastoral mode of existence. There are a number of studies which show that such well-adapted populations have developed greater resilience and coping capabilities. There are, however, areas where deep attachment to agriculture tends to dissuade frequently drought affected communities from looking at ecologically more compatible livelihoods. Programmes like the DDP have contributed significantly to promoting alternative and more sustainable non agricultural livelihoods. The issue of concretizing a strategy of facilitating pursuing of livelihoods appropriate to an ecosystem is beyond the remit of the Commission; there are, however, some aspects which need to be addressed urgently to mitigate frequent crises which result from 'unsustainable agriculture'. These measures could include identification of areas where conventional agriculture is not sustainable and devising methods to motivate people in such areas to switch over to appropriate livelihood regimen etc.

9.3.2 Recommendation:

- a. A strategy for making people pursue livelihoods compatible with their ecosystems needs to be evolved. Some concrete steps in this direction could be:
 - (i) 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.
 - (ii) Alternate means of livelihood have to be evolved in consultation with the communities, in such areas.

9.4 Codifications of Management Methodologies

9.4.1 Following the famines in the 19th century, two Royal Famine Commissions were appointed. Their recommendations led to the Famine Codes which laid down a framework for keeping a watch on emerging situations detecting signs of distress, apportioning responsibilities and delegating powers for provision of relief and the system of monitoring and supervision etc. In the first half of the last century, the Codes were generally kept up-to-date; around that time floods were added to famines and subsequently a distinction – sign of the changing times - was drawn between "famines" and "scarcity" etc. It is noted that the Codes/Manuals were generally left untouched in the second half of the century - updating was either not carried out or was done very fitfully through "correction slips" endowing the

once comprehensive Codes with a degree of asymmetry. Out of date Codes and Manuals are not only counter productive but can also create serious confusion as the subordinate functionaries tend to place considerable reliance on these archaic *vade mecum*s.

9.4.2 Many developments in the last half a century or so have made considerable difference to the way droughts are diagnosed and handled. Chief among them are powerful tools like satellite imagery, long term forecast of Monsoons and discovery of sophisticated determinants of the movement of the Monsoon. Over-exploitation of ground-water and extension of surface irrigation from 'non-snow melt sources' (particularly in the peninsular region), crop diversification from coarse grains to cash crops and availability of a wide variety of alternate crops are important developments with a bearing on occurrence and management of droughts – these do not find place in the manuals. Added to this is the emergence of new Departments and agencies both in the Government of India and the State Governments. A related matter is the advances made in respect of other natural disasters, notably cyclones and floods – often the guiding document remains the same Relief Code. The Commission therefore feels that these Codes need to be re-written keeping in view the latest developments.

9.4.3 Recommendations:

- (i) State Governments need to rewrite the Relief 'Manuals' in the light of recent developments including inputs from the NDMA and their own experience and update them once in a few years.
- (ii) Ministry of Science and Technology may compile from time to time a document incorporating details of available scientific and technical inputs/facilities for detecting the onset and progress of drought; and inter-face between scientific and technical organizations with disaster management agencies of the Union and State Governments.

9.5 Rationalization of Drought Declarations

9.5.1 Requirements of revenue laws or executive instructions of Famine/Scarcity Codes entail a formal declaration of droughts. In many states, relief works can commence only after such a declaration. Such declaration has the effect of wholly or partly extinguishing the liability of the land-holder to pay land revenue. In the days when land revenue constituted a major resource for the state, issue of such declarations had major fiscal consequences unconnected with the management of disaster per se. Not surprisingly, therefore, issue of declarations has become a rather cumbersome process preceded by 'crop cutting' experiments variously called 'Paisewari', 'Anawari', 'Relief Khatauni' or 'Kharaba' etc. For 'Kharif' droughts the earliest declarations have not been possible before October i.e. at least three months into a severe

drought. Some states do have an enabling provision about 'eye estimations' in case of a very severe drought. This involves an assessment of area that is left unsown due to severe moisture distress or withering of plants soon after germination. The Commission is of the view that the drought declaration process needs to be rationalized and made uniform in all states. It would not be appropriate to base such declaration upon the crop yields as it delays the commencement of drought relief measures. Therefore, the declaration would have to be based upon an estimate of the cropped area. To begin with, these would have to be eye estimates. With advances in satellite imagery, these estimates could be corroborated and ultimately the entire exercise could be based on remote sensing. These could be finalized in consultation with the states and under the guidance of NDMA.

9.5.2 Recommendations:

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:

- (a) 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.
- (b) 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'.

9.6 Deployment of Remote Sensing for Diagnosis and Prognosis of Drought Situations

9.6.1 Satellite imagery and similar techniques are powerful tools in anticipating the occurrence and assessment of the effect of 'extreme weather events'. Crop Acreage and Production Estimation (CAPE) was initiated in 1995 with the sponsorship of the Department of Agriculture and Cooperation. Under this project, multi-date IRS satellite data are used for pre-harvest acreage and production estimation for major food crops as well as cotton. The estimates are provided for kharif rice in Bihar, rabi rice in Orissa, mustard in Assam, Gujarat, Haryana, Rajasthan and West Bengal, wheat in Bihar, Himachal Pradesh, Gujarat, Madhya Pradesh, Rajasthan and Uttar Pradesh and sorghum in Maharashtra. Based on the

outcomes of CAPE, an enlarged and comprehensive scheme known as Forecasting Agricultural output using Space, Agrometeorology and Land based observations (FASAL) has been taken up.

9.6.2 Remote sensing has not yet been dovetailed in the routine institutional framework, as for instance, is the case of communication technologies. The process calls for innovative solutions which apart from being cost effective leave room for technological and professional innovation. A workable, indicative, model would involve positioning of technical personnel of the National Remote Sensing Agency (NRSA) at the District level on the analogy of similar arrangements by the National Informatics Centre. The NRSA personnel will function in close association with the Revenue functionaries of the District to generate information that is constantly buttressed by 'ground truth verification'. A state level cell of the NRSA will have the responsibility of collating district-wise information on as near 'real time' basis as possible. Such arrangements lend themselves eminently to being codified in the form of a 'doable' manual to be drawn up nationally by the NRSA in conjunction with experts from the states with minor (though significant) state level variations being appended 'locally'.

9.6.3 Recommendation:

- a. **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.**

9.7 Making Rivers Perennial

9.7.1 The bane of frequent droughts in the peninsular region has been traced as much to many of the areas in the region falling in 'rain-shadow' zones as to the seasonal nature of the rivers in this region. This is also borne out by the fact that in the Northern region even major deficits in precipitation do not so adversely impact the ecosystems as most of the rivers in this area depend on the snowmelt and are thus perennial.

9.7.2 Irrigation systems based on perennial rivers retain their efficacy even during severe droughts while there is, at times, a total collapse of this system in areas served by seasonal streams. It is not surprising, therefore, that the issue of upgrading seasonal rivers to the 'perennial status' has engaged attention of scientists, engineers and policy makers from time to time. The Revenue Reforms Commission of Karnataka, 2003 for instance, has

examined this issue. That Commission envisaged a system of regulated inflow of discharge in rivers from the catchment areas, mainly within the forests, though rigorous and accurate monitoring of inflows and outflows and engineering interventions through close collaboration between the Forest and Irrigation Departments.

9.7.3 The Commission feels that this neglected aspect deserves much greater attention and approaches and methodologies for achieving it need to be standardized and evaluated. Technical agencies under the Ministries of Water Resources, Environment and Forests and Science and Technology should immediately carry out river specific feasibility studies to determine the ecological and hydrological implications of this approach in different habitats.

9.7.4 Recommendation:

- a. **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.**

9.8 Rainfed Areas Authority

9.8.1 The Commission understands that the constitution of a National Rainfed Areas Authority is under active consideration and the Authority can deal inter alia, with the above aspects and also the formation of National Institute of Drought Management referred to earlier.

9.8.2 Recommendation:

- a. **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.**

10 MANAGEMENT OF SPECIFIC CRISIS SITUATIONS (EPIDEMICS AND DISRUPTION OF ESSENTIAL SERVICES)

10.1 Epidemics

10.1.1 That epidemics may assume crisis proportions when an outbreak is geographically widespread and the causative strain is of a particularly virulent variety is understood. 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.

10.1.2 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:

List-I; entry 28 “quarantine” and entry 81 “inter-State quarantine”;

List-II; entry 6 “Public health and sanitation”;

List-III; entry 29 “prevention of the extension from one State to another of infectious or contagious diseases”.

10.1.3 Pending the enactment of a new law which is under consideration of the Government, the Epidemic Diseases Act, 1897 continues to deal with management of epidemic related diseases. It is an omnibus legislation which essentially supercedes all laws in force in the event of outbreak or a threatened outbreak of a ‘dangerous epidemic disease’ and authorizes the Union and State Governments (when authorized by the Union), to resort to all necessary measures to deal with the emergency through temporary regulations. The Act also empowers search of vessels and other means of transport and detention and segregation of any persons suspected to be suffering from an epidemic disease. Power has also been given to the governments on how funds required to deal with operational requirements including payment of compensation, will be provided.

10.1.4 This legislation is outdated and needs comprehensive modifications. This is evident from the fact that to deal with the situation arising out of the detection of Avian Influenza in certain parts of Maharashtra, this year, slaughter of poultry birds in the affected areas had to be ordered under the provisions of the Bombay Police Act! While such ad hoc measures display commendable innovation, it is clear that epidemics-related emergencies need to be dealt with more normatively.

10.1.5 The Public Health Emergency Bill currently being considered by the Ministry of Health and Family Welfare in the light of responses of the State Governments and other agencies concerned seeks to achieve this end. There is a provision for the Union or State Governments to declare a particular area as ‘epidemic or bio-terrorism affected’. Upon such declaration, action can be initiated under the provisions which apart from measures like inspection and quarantine etc., also seeks to empower government to prohibit activities which lead to or are likely to lead to epidemics or bio-terrorism. The schedule annexed to the proposed legislation also lists out epidemics which fall within the purview of the Act.

10.1.6 Many states also have laws on the public health system as a whole which has the responsibility of preventing, containing and managing epidemics. Mention may illustratively be made of the Madras Public Health Act, 1939 which deals with a whole range of issues with a bearing on all aspects of public health and sanitation relevant to prevention and management of epidemics. The legislation treats public health in its entirety and covers aspects like water supply, sanitation and drainage within the same framework. An innovative feature of this law is that it includes what can be referred to as quality of life within the domain of public health and introduces control of all activities or inactions that may cause ‘annoyance’ to the public thereby bringing in irritants like sound pollution within its purview. Such legislations, it need hardly be emphasized, are more conducive to comprehensive management of epidemics.

10.1.7 The Commission’s terms of reference requires it to deal with crisis management aspect of epidemics in the context of administrative reforms. The Commission would, therefore, not like to address technical and general public health issues even though they are germane to an effective management of epidemics-related crises. The Commission would only like to note that a comprehensive, well planned public health system is the most dependable bulwark against epidemics-related crises and to deal with such crises, should they arise despite preventive measures. In this connection the Commission notes the efforts to develop a model indicative Public Health Bill and strongly recommends its early finalization with the hope that State Governments will move speedily for its enactment.

10.1.8 The Commission also notes that the enactment of the Public Health Emergencies Bill is now proceeding satisfactorily in the light of the feedback received from the States. The emerging scourge of bio-terrorism also needs to be taken adequate note of and care has also to be taken to facilitate incurring of expenditure on emergent basis (for which enabling provision exists in the 1897 Act).

10.1.9 The manner in which the Disaster Management Act, 2005 defines the term 'disaster' leaves no doubt that an epidemic of extraordinary severity spreading rapidly is covered by it. The Act also overrides the provision of any other law (Section 72). As such, it is clear that management of epidemics-related crisis would also fall within the jurisdiction of the National Disaster Management Authority and that apart from the legislation being contemplated by the Ministry of Health and Family Welfare, it will be imperative that the planning and preparatory exercises envisaged in the Disaster Management Act, 2005 are also undertaken. In any case, bio-terrorism is the cutting edge between the public health and general disaster management systems as the National Disaster Response Force will be a substantive 'first responder' in such contingencies under the technical supervision of public health professionals. The Public Health Emergencies Bill has to provide for this coordination.

10.1.10 Further, while the public health infrastructure in the country is being upgraded and strengthened, it is quite possible that a severe, widely prevalent epidemic could overwhelm the coping capacity of the functionaries. It is, therefore, also imperative that the contingency plans dealing with such situations draw upon the general system of disaster management by developing formal and well defined linkages.

10.1.11 Keeping in view the above considerations, the Commission would like to make the following recommendations:

10.1.12 Recommendations:

- (i) 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.
- (ii) 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.

- (iii) 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.
- (iv) While surveillance and management of epidemics are the responsibility of public health professionals, it is clear that a particularly severe outbreak could overwhelm the capacities of the 'line organizations'. 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 organisations wherever a situation so warrants.
- (v) 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.

10.2 Disruption of Essential Services

10.2.1 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. Dealing with such situations would have specific technical aspects but there could be a host of administrative measures which would be required to mitigate hardships during such crisis. The Commission is not going into the details of each one of these situations but would like to emphasise that while drawing up disaster management plans these types of crises should not be lost sight of. It is essential to formulate 'standard operating procedures' and mitigation plans for these crises also.

10.2.2 Recommendations:

- (i) All crisis/disaster management plans should include plans for handling possible disruptions in essential services.
- (ii) All agencies/organizations engaged in the supply of essential services should have their own internal crisis management plans to deal with emergencies.
- (iii) Regulatory authorities of the respective sectors may lay down the required framework for drawing up standard operating procedures and crisis management plans.

CONCLUSION

11.1 In terms of the reference made to it, the Commission was asked to suggest ways to quicken the emergency responses of the administration and increase its effectiveness to meet crisis situations and enhance crisis preparedness. The Commission, however, has taken a holistic view of the entire gamut of crisis management, and in the process, has gone beyond its mandate of looking at response and preparedness. In doing so, the Commission has been influenced by the cumulative experience of crisis management over the years, which points to an urgent need to move from fatalism to prevention, from response to preparation, and from mobilizing resources after the fact to reducing risk before the fact.

11.2 Systematic preparedness, early warning, quick response and sustainable recovery have been the cornerstones of the Commission's approach to crisis management. The Commission is of the view that to reduce vulnerability, a strategy that emphasises all four is better than one of mere response. To that end, the Commission has recommended a comprehensive preparedness, early warning, quick response and recovery strategy, with two goals: to protect people and structures from disasters and to increase the effectiveness of crisis response and recovery.

11.3 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.

11.4 While making its recommendations, the Commission has taken due note of the mechanisms that synergize pre-disaster and post-disaster activities. The Commission is of 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. Working in that perspective, the Commission has attempted to delineate a road map involving all stakeholders, agencies and organizations at all levels during all phases of a crisis.

SUMMARY OF RECOMMENDATIONS

1. Constitutional provision - Is there need for a separate entry (Para 4.1.5)

- a. A new entry, "Management of Disasters and Emergencies, natural or man-made", may be included in List III (Concurrent List) of the Seventh Schedule of the Constitution.

2. Analysis of the Disaster Management Act, 2005: (Para 4.2.3.5)

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

- a. Disaster/Crisis Management should continue to be the primary responsibility of the State Governments and the Union Government should play a supportive role.
- b. 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 - detailed guidelines may be stipulated by the NDMA on this subject.
- c. The functions of the National Disaster Management Authority should be: 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; to advise on parameters of categorization and on declaration of national and state disasters; 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 system and deploy specialized manpower and machinery in support of local/state governments, where required; to advise on the constitution and use of the Disaster Management Funds; and to give recommendations on all matters relating to crisis/disaster management to the government.

- d. 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.
 - e. 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.
 - f. 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.
 - g. The law should make provisions for stringent punishment for misutilization of funds meant for crisis/disaster management.
 - h. The role of the local governments should be brought to the forefront for crisis/disaster management.
 - i. 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 (refer para 4.3.3).
 - j. 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.
- ### 3. Coordination at the Apex Operational Level: (Para 4.3.3.3)
- a. There is no need for a separate ministry/department of disaster management at the national or the state level.
 - b. The NEC as stipulated under the Disaster Management Act, 2005 need not be constituted, and the NCMC can continue to be the apex coordination body. At the state level, the existing coordination mechanism under the Chief Secretary may continue.
 - c. Notwithstanding the establishment of NDRE, the role of the Armed Forces, particularly the Army, in coming to the aid of victims of disasters should

be retained and the special capabilities acquired by the Armed Forces in search and rescue and on-the spot medical attention need to be maintained.

4. Role of Local Self-Governments: (Para 4.3.4.2)

- a. 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.

5. Crisis Management Set Up for Metropolitan Cities: (Para 4.3.5.2)

- a. 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.

6. Creation of Legal and Institutional Framework for Managing Floods in Inter-State Rivers: (Para 4.3.8.2)

- a. Using powers under Entry 56 in the Union List, a Law may be enacted to set up mechanisms for collection of data, managing flow in rivers and release of water from reservoirs, so as to prevent disasters, with inter-state ramifications.

7. Empowering the Relief Commissioners/Disaster Management Departments to Effectively Discharge Disaster Related Responsibilities: (Para 4.3.9.2)

- a. The State Disaster Management organisations need to be strengthened for dealing with crises. This could be achieved in the following manner:
 - (i) A framework should be in readiness to be put in place immediately during crisis or on fulfillment of some pre-arranged scenarios – the ‘trigger mechanism’ needs to be well defined to ensure that the ‘framework’ is put in active operation instantaneously.
 - (ii) The ‘framework’ may consist of officers (designated by name) drawn from Revenue, Police, Agriculture, Animal Husbandry, Public Health Engineering, Water Resources, Women & Child Development, Welfare, Public Works, Highways, Irrigation, Health, and Treasury & Accounts Departments. The designated officers must undergo a week’s orientation every year, though they may continue to discharge

their normal departmental responsibilities except when seconded to the nodal point in the manner suggested above.

- (iii) The designated officers will work as a cohesive integrated team under one roof on whole-time basis during crisis situations, under the leadership of the nodal officer and be responsible entirely for the functioning of their department insofar as it relates to drought/disaster management.
- (iv) The role and responsibility of each department needs to be specifically identified and defined on the lines the Ministry of Agriculture has specified the responsibilities of various Union Government agencies during severe droughts.
- (v) The designated departmental officer should be delegated powers and responsibilities defined in advance and will deal with other departmental functionaries directly.

8. Institutional Support from Science and Technology Institutions to Disaster Management: (Para 4.3.10.3)

- a. The National Disaster Management Authority, assisted by NIDM, may facilitate a common platform between the Science and Technology organizations and the users of the technologies. Such a mechanism may be operationalised both at the Union and State levels.

9. Strengthening of National Institute of Disaster Management (NIDM): (Para 4.3.11.2)

- a. NIDM may continue as an autonomous body and function as an apex professional institution in disaster management. In addition to research and studies, the institution needs to engage itself in documenting and disseminating global and national best practices and in developing planning, training and evaluation methodologies.

10. Professionalization of Disaster Management: (Para 4.3.12.3)

- a. ‘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.

- b. 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.

11. Enunciating a Policy Towards Crisis Management Which Emphasizes Risk Reduction: (Para 5.2.3)

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:

- a. Disaster Management to be professionalized.
- b. Risk management to be brought to the centre stage in all disaster mitigation plans.
- c. All efforts for disaster management to be based on hazard and vulnerability analysis.
- d. Communities and local governments to be made aware of the hazards and the vulnerabilities.
- e. Communities and local governments to be involved in formulating disaster management plans.
- f. The primary responsibility for disaster management to be that of the State Government, with the Union Government playing a supportive role.
- g. Effective implementation of land use laws, building byelaws, safety laws and environmental laws.
- h. Setting up a framework to coordinate the responses from different sections like donors, voluntary organisations, corporate bodies etc.
- i. Special needs of women, children, elderly and physically challenged persons to be addressed.

12. Assessment of Risk - Hazard and Vulnerability Analysis: (Para 5.3.8)

- a. Hazard and vulnerability analyses should be made an essential component of all crisis/disaster mitigation plans.
- b. 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.
- c. Geographical Information System tools should be used to integrate spatial data such as topography, hydrology, land use, land cover, settlement pattern and built structure as well as non-spatial data such as demography, socio-economic conditions and infrastructure in a common platform. This should be integrated with satellite and aerospace data as well as data from Geographical Positioning Systems for real time monitoring of crisis situations and for scientific assessment of damages.
- d. 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 for crisis management. This exercise should generate base hazard maps for district and sub-district levels and should be completed by the end of Eleventh Plan. Till such time the GIS based hazard maps are prepared, the conventional maps have to be used. These maps should form the basis for hazard analysis.
- e. A detailed vulnerability analysis should be carried out in all hazard prone areas. Such an analysis would prioritize the areas in order of vulnerability; it should also highlight the vulnerability of different sections of society and infrastructure.

13. Generating Awareness about Risk: (Para 5.4.4)

- a. Awareness generation programmes should be undertaken using tools of social marketing.
- b. A responsible media, which is also well informed about all aspects of disaster, is a very powerful tool for sensitizing people. Proactive disclosures about all aspects of disaster management would build a healthy relationship between the media and disaster management agencies.
- c. Details of past accidents and disasters and the lessons learnt, should be documented and kept in the public domain. The Disaster Management Authorities have to take up this task.

14. Preparation of Disaster Management Plans: (Para 5.5.9)

- a. Crisis/disaster management plans as stipulated under the Disaster Management Act, 2005 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. The State Disaster Management Authorities should set up a mechanism in place to evaluate these plans periodically, and ensure the effectiveness of the plans.
- b. The District Disaster Management Plan needs to have two components:
 - i. Long Term Mitigation Plan.
 - ii. Emergency Response Plan.

The Long Term Mitigation Plan, in turn, should have the following components:

 - i. Long Term Development Plan.
 - ii. Long Term Enforcement Plan.

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.
 - c. 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. The State Disaster Management Authorities should set up a mechanism in place to evaluate these plans periodically.
 - d. 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.
 - e. 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.
 - f. All crisis/disaster management plans should be tested periodically through mock drills.
 - g. It should be the responsibility of the state level 'nodal department' to ensure that adequate assistance is available at the district level for drawing

- up and periodically updating the plans. The nodal department must engage agencies and experts on a continuing basis to examine the plans and bring methodological and substantive deficiencies to the notice of agencies formulating the plans.
- h. The same principles would apply to plan at other levels.
15. Making Crisis/Disaster Management Plans a Part of Development Plans: (Para 5.6.3)
 - a. The activities in the disaster management plans should be included in the development plans of the line agencies and the authorities like panchayats and municipal bodies.
 - b. The supervisory level of each agency should ensure that the annual plan of that agency incorporates the activities listed out in the disaster management plan on a priority basis.
 - c. Incorporation of disaster mitigation plans into the development plans should be specially monitored at the five-year and annual plan discussions at State and Union (Planning Commission) levels. The Planning Commission, State Planning Boards and Planning Departments must revise on priority basis the proforma for formulating plan proposals to ensure that the process adequately takes into account the disaster prevention concerns.
 16. Instruments for Mitigation of Hazards: (Para 5.7.1.2)
 - a. Environment management should be made an integral part of all development and disaster management plans.
 17. Construction of Disaster Resistant Structures: (Para 5.7.2.3.13)
 - a. Structural prevention measures should be a part of long term disaster management plan for an area.
 - b. Appropriate Zoning Regulations need to be extended to all areas. Phasing of the areas to be covered should be done based on the intensity of the hazard anticipated. This would require strengthening of the Town and Country Planning Departments of State Governments. Local bodies can be given financial incentives for preparation of Zoning Regulations. The hazard zonation maps prepared should be one of the inputs for preparation of Zoning Regulations.

- c. Building byelaws should incorporate the disaster resistant features of buildings. Since safety codes are complex and technical, it is necessary to issue simplified guidelines which could be understood by the citizens. Further, these codes should be implemented in the most hazard prone areas, on priority.
 - d. The importance of disaster resistant constructions and simplified safety guidelines should be widely disseminated so as to promote compliance. In so far as the rural areas are concerned, other methods of dissemination including setting up of Building Technology Demonstration Centres and undertaking demonstrative disaster constructions in severe hazard prone areas should be taken up. Demonstration camps should also be used to make the people aware of the concerns and the solutions.
 - e. The existing system of enforcement of building regulations needs to be revised. It should be professionalised by licensing architects and structural engineers for assessment of structures and certification of safe buildings. The units of local bodies dealing with enforcement of building byelaws and zoning regulations also need to be strengthened.
 - f. The standards prescribed by BIS for disaster resistant buildings should be available in the public domain, free of cost. This should be posted on websites of the concerned government agencies to promote compliance.
 - g. Among the existing buildings, government buildings used by the public should be evaluated and retrofitted first, giving preference to buildings housing essential services. It would be advisable to fix a schedule for all such buildings in hazard prone areas. Private buildings used by the public should also be tackled on priority. A mix of regulatory and financial incentives could be used for this purpose by the local bodies.
 - h. All these measures should become an integral part of long term disaster/ crisis management plans.
18. Effective Implementation of Laws and Regulations: (Para 5.7.3.2)
- a. Effective enforcement of laws on encroachments, public health and safety, industrial safety, fire hazards, safety at public places should be ensured. The same applies to Zoning Regulations and Building Byelaws.

- b. Third party audit of all major alleged violations needs to be introduced in the respective regulation governing the activity.
 - c. All records pertaining to permissions/licenses should be brought in the public domain *suo motu*.
 - d. There should be periodic inspections of all such places/facilities by a team of stakeholders assisted by experts.
 - e. A scheme for enforcement of laws should be part of the long term mitigation plan.
 - f. Public education on consequences of violations is important.
19. Early Warning Systems: (Para 5.8.3)
- a. Though it is the responsibility of the government machinery and the local bodies to disseminate the warning, peoples' participation has to be enlisted. For this purpose, the role of community leaders, NGOs and others should be clearly defined in the emergency response plan and they should be fully trained and prepared for their respective roles.
 - b. Communications networks, with sufficient redundancies should be established between the data collection point to the points where hazard is likely to occur. The communication channels from the point of alert generation to the point of disaster should have enough redundancies so as to maintain line of communication in the event of a disaster striking. Care has to be taken to put in place systems to disseminate warnings to all sections of the people.
 - c. The early warning system should be evaluated after each disaster to carry out further improvements.
20. Building Community Resilience: (Para 5.9.2)
- a. Location specific training programmes for the community should be executed through the panchayats.
 - b. Crisis management awareness needs to be mainstreamed in education. For the purpose, an appropriate component of disaster awareness should be introduced in school, college, university, professional and vocational education.

- c. 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.
- d. 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.
- e. NIDM and NDMA would have to play a vital role in working out the details of these suggestions for implementation by different authorities.

21. Financial Tools for Risk-Reduction: (Para 5.10.4)

- a. Government and the insurance companies should play a more pro-active role in motivating citizens in vulnerable areas to take insurance cover. This could be done through suitably designed insurance policies, if required, with part funding from government. NDMA could play a major facilitating role in this area.

22. Research and Use of Knowledge: (Para 5.11.4)

- a. NIDM should develop methodologies for effective dissemination of knowledge on disaster management.
- b. Disaster management plans should attempt to integrate traditional knowledge available with the communities.
- c. 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.
- d. It may be ensured that the IDRN network is updated regularly.

23. Emergency Plan: (Para 6.1.6)

- a. Since the initial response in any crisis/disaster should be timely and speedy, the Emergency Response Plans should be up-to-date and should lay down the 'trigger points' in unambiguous terms.
- b. The district emergency response plan should be prepared in consultation with all concerned. The plan should be known and accepted by all the role players. (This should be apart of the District Disaster Management

Plan).

- c. Standard operating procedures should be developed for each disaster at the district and community level, keeping in mind the disaster vulnerability of the area. Disaster management plans at all levels should have handbooks, checklists, manuals with precise instructions for disaster management personnel, search and rescue teams, and Emergency Operations Centres.
- d. 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.
- e. The plan should be validated annually through mock drills and should be backed up by capability building efforts.
- f. Any plan would have its limitations as each crisis situation would vary from another. Plans are, therefore, no substitute for sound judgement at the time of crisis.
- g. Handling of crisis should be made a parameter for evaluating the performance of officers.
- h. These principles apply to plans at other levels and also in case of metropolitan cities.

24. Coordinating Relief: (Para 6.2.6)

- a. Effective coordination is essential at the district and sub-district levels for rescue/relief operations and to ensure proper receipt and provision of relief. During rescue and relief operations, unity of command should be ensured with the Collector in total command.
- b. In order to avoid mismatch between demand and supply, 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.
- c. Ensuring safe drinking water and sanitized living conditions should receive as much a priority as other basic means of livelihood.
- d. All procurement and distribution of relief materials should be done in a transparent manner.

- e. Monitoring and vigilance committees should be set up involving the stakeholders. These committees could also look into grievances.
- f. Trauma care and counselling should be made an integral part of the relief operations.
- g. There is urgent need to evolve objective methods of assessing the damage so that there are no allegations of bias, distortions, exaggeration or arbitrary scaling down. Satellite imagery could be used as a tool to validate the reported damages. NDMA should be requested to draw up the necessary detailed guidelines for assessment, to be followed by all authorities.

25. Civil Defence: (Para 6.3.1.13)

- a. The Civil Defence Act should be amended as proposed so as to cover all types of disasters.
- b. Civil Defence should be constituted in all districts which are vulnerable not only to hostile attacks but also to natural calamities. The goal of community participation should be pursued primarily through the instrumentality of Civil Defence especially in urban areas.
- c. The objective should be to include 1% of the population within the fold of Civil Defence within five years. Efforts should be made to enlist para-medics as Civil Defence volunteers.
- d. Budgetary allocations relating to Central Financial Assistance for Civil Defence should be increased substantially.
- e. Civil Defence set-ups at all levels should be permitted to accept donations.
- f. The Civil Defence set-up at the state level may be brought under the control of the Crisis/Disaster Management set-up.

26. Police, Home Guards and Fire Services: (Para 6.3.2.11)

- a. Policemen, Firemen and the Home Guards at the field level who are among the first responders 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 and also be fully conversant with them.

- b. 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.
- c. A section of Home Guards should also be given para-medical training.
- d. Fire Services should more appropriately be renamed as Fire and Rescue Services with an enhanced role to respond to various types of crises.
- e. While in the long run, it would be desirable to place the Fire Services under the control of all municipal bodies, as a first step, this may be done in bigger cities (population exceeding 2.5 million). In the remaining parts of the state, the Fire Services should be organized as a department but within a district, full operational control should be given to the District Crisis/Disaster Management Authority. Transfer of these services to municipal authorities should be accompanied by transfer of commensurate financial resources.
- f. Only persons with expertise in crisis/disaster management should be inducted into the top management of the Fire (and Rescue) Services.
- g. Fire and Rescue Services should be brought under the control of the State Crisis/Disaster Management set up under the Disaster Management Law.
- h. The NDMA may be requested to suggest model provisions regarding these services for inclusion in the Disaster Management Act/s.

27. Setting-up Integrated Emergency Operations Centre (EOC): (Para 6.4.2)

- a. 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.

28. Organising Emergency Medical Relief: (Para 6.5.7)

- 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.

- c. This arrangement envisages involvement of the private hospitals. The enunciation of the role of various role players may be through legislation.

29. Relief and Rehabilitation: (Para 7.1.12)

- a. Damage assessment should be carried out by multi-disciplinary teams in a transparent and participatory manner in accordance with guidelines laid down by NDMA. (refer para 6.2.6 g).
- b. The efforts of NGOs and other groups have to be coordinated with government activities at the district and state levels.
- c. A recovery strategy should be evolved in consultation with the affected people and concerned agencies and organisations. The recovery strategy should include all aspects of rehabilitation - social, economic and psychological.
- d. Minimum standards of relief should be developed to address the requirements of food, health, water and sanitation shelter requirements. Focus should be placed on the special needs of the vulnerable population that is, children, women, the elderly and the physically challenged.
- e. Implementation of the rehabilitation efforts should be carried out by the village panchayats/local bodies. The first priority should be to get the beneficiary oriented works executed through the beneficiaries themselves.
- f. Concurrent monitoring and a quick financial audit should be carried out to prevent misuse of funds.
- g. Risk reduction aspects should be incorporated into the recovery plans. Land use plans which ensure safety of the inhabitants should be brought into effect during reconstruction.
- h. All new civil constructions should mandatorily be made disaster resistant as per prescribed standards.
- i. A mechanism for redressal of grievances should be established at the local and district levels.
- j. For all major disasters, NIDM should conduct a detailed evaluation exercise through independent professional agencies.

30. Revisiting the Financial Procedures: (Para 7.2.6)

- a. Both the funds (National Disaster Mitigation Fund and the National Disaster Response Fund) may be operationalised from April 1, 2007 with an initial annual contribution of Rs. 5000 crores each from the Government of India. This would be in addition to CRF and NCCF for the present. The CRF and NCCF would cease to exist at the end of the award period of the Twelfth Finance Commission.
- b. NDMA may recommend to Government of India the quantum and criteria of assistance and conditions of release from the two new funds as well as manner of replenishment of these funds from different sources.
- c. A system of compiling accounts for each calamity separately with reference to each head of relief expenditure should be initiated. The Comptroller and Auditor General of India may consider laying down a standardized format in this regard.
- d. Accounts as above may be available on the website of the state level nodal agency at such intervals as may be laid down.
- e. The basis for calculation of assistance from the funds should be available on appropriate websites.

31. Gender Issues and Vulnerability of Weaker Sections: (Para 8.3)

- a. The vulnerability analysis should bring out the specific vulnerabilities of women and these should be addressed in any mitigation effort. Disaster mitigation plans should be prepared, in consultation with women's groups. Similar steps should be taken for other vulnerable groups.
- b. Rescue and relief operations should focus on the most vulnerable groups-women, children, the elderly and the physically challenged.
- c. Relief measures should take into account the special requirements of women and other vulnerable groups. Particular attention needs to be given to their physical and mental well being through health care and counselling.
- d. 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 micro-finance, marketing facilities etc.
- e. The title of new assets created should be in the names of both husband

and wife.

- f. Camp managing committees should have adequate number of women representatives.
- g. 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.
- h. 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.

32. Revisiting Long Term Interventions (Droughts): (Para 9.2.5)

- a. 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.

33. Livelihood Management in Extremely Drought Prone Areas: (Para 9.3.2)

- a. A strategy for making people pursue livelihoods compatible with their ecosystems needs to be evolved. Some concrete steps in this direction could be:
 - (i) 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.
 - (ii) Alternate means of livelihood have to be evolved in consultation with the communities, in such areas.

34. Codifications of Management Methodologies: (Para 9.4.3)

- (i) State Governments need to rewrite the Relief 'Manuals' thoroughly in the light of recent developments including inputs from the NDMA and their own experience and update them once in a few years.
- (ii) Ministry of Science and Technology may compile from time to time

a document incorporating details of available scientific and technical inputs/facilities for detecting the onset and progress of drought; and inter-face between scientific and technical organizations with disaster management agencies of the Union and State Governments.

35. Rationalization of Drought Declarations: (Para 9.5.2)

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:

- (a) 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.
- (b) 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'.

36. Deployment of Remote Sensing for Diagnosis and Prognosis of Drought Situations: (Para 9.6.3)

- a. 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.

37. Making Rivers Perennial: (Para 9.7.4)

- a. 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.

38. Rainfed Areas Authority: (Para 9.8.2)

- a. 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.

39. Epidemics: (Para 10.1.12)

- (i) 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.
- (ii) 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.
- (iii) 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.
- (iv) 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.
- (v) 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.

40. Disruption of Essential Services: (Para 10.2.2)

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

**Speech of the Chairman, Administrative Reforms Commission at
the Round-table held at NIDM,
New Delhi on 9th December, 2005**

Dear Participants

I have great pleasure in welcoming you to this brainstorming session on Crisis Management. The Second Administrative Reforms Commission, which was constituted recently, has been given the daunting task of recommending reforms in the governance system of the country. The Commission has decided that one of the subjects it should deliberate upon is Crisis Management and that a report should be submitted to the Government by the end of March, 2006. I am happy that those assembled here today represent the best and brightest in the area of Crisis Management. The Commission is looking forward to utilize your domain knowledge and insight in the important area of Crisis Management.

Disasters are major catastrophic events caused by vagaries of nature, often aggravated by human intervention, resulting in adverse conditions which affect both natural resources and human habitats and causing untold misery and havoc to life and property. They range from intense to the diffuse, from predictable to the unpredictable and from those that are preventable to those whose consequences can at least be mitigated. The severity of natural disasters is often measured in terms of number of deaths and injuries but the implications of such calamities are much more profound and extend well beyond what is implied by conventional indicators.

Considering the large number of disasters that occur, a generic categorization of disasters could be made that would include:

- a) Water and Climate related, such as floods, droughts, cyclones, tsunami
- b) Geologically related, such as earthquakes, land slides, sea erosion, dam bursts
- c) Chemical, Industrial and Nuclear related
- d) Accident related
- e) Epidemics

The impact of natural disasters has been particularly severe on the population and economy of developing countries such as India. It is an irony of nature, that over 60% of all the reported major natural disasters have occurred in the developing countries, some of which

have the least capacity to sustain heavy losses. Major disasters since 1900 have caused over 45 million deaths and affected over 3.7 billion people globally, resulting in massive damage and destruction of property and infrastructure. The highly populated and vulnerable Asian continent has been the largest victim of such disasters accounting for over 60% of deaths and 85% of affected people globally. Of all these disasters, drought (including famine) and flood head the list, responsible for the largest number of deaths (over 53%), causing irreparable damage and economic loss. In the last 20 years alone, extreme natural disasters have caused destruction to property estimated between 50 and 100 billion dollars, loss of nearly three million lives and have affected over 800 million people, nearly one-sixth of the global population. According to one recent estimate, roughly 44% of the damage due to natural disasters worldwide is attributable to floods alone. The impact of recurring disasters due to storm surges is even more devastating, as evidenced from the number of people killed in the Bay of Bengal. About 60% of all deaths due to storm surges, have occurred in the low-lying coastal areas of the countries bordering the Bay and the adjoining Andaman Sea. The above underscores the need to improve capabilities to deal with such calamities, strengthen organisational structures and empower local bodies to undertake preventive, mitigative and timely ameliorative measures.

Practically all the developing countries, being primarily agrarian, are very much dependent on the vagaries of seasonal rainfall and climatic conditions. The picture of erratic rainfall causing floods in certain areas and drought in other parts of the country resulting in widespread famine conditions is a common occurrence in the developing countries. These natural disasters result in increased soil erosion and degradation of catchments areas, which in turn cause frequent flash floods due to a reduction in the natural storage capacity. On an average, statistics indicate that severe drought occurs once every five years in most of the tropical countries, though often they occur during successive years, causing untold misery to human life and property.

Extreme events in the form of natural hazards, will continue to occur, causing extensive damages to property and life, the economic impact of which is often beyond the survival capability of developing countries. Extensive deforestation, land degradation, no conservation of soil and water resources and destabilization of the greenhouse equilibrium have, in the recent times, resulted in the alarming increase in the frequency, intensity and the magnitude of the impact of extreme natural disaster events. Humanity, so far, has continued to coexist with natural disasters, implicitly accepting these extreme events as 'acts of God' and suffering silently. Today, however, scientific and technological advances have not only helped us to understand the mechanisms of many of these natural disasters but have also provided tools

to predict and combat most of them. Although prevention of earthquakes, volcanic eruptions, cyclones and other violent natural events is beyond our capability, there is much that can and should be done to protect life and property against them by taking appropriate timely measures. This requires implementation of effective strategies and policies, use of the best available techniques and information and concerted national and international efforts to reduce the vulnerability of population to natural disasters. The designation of the 1990s as the International Decade for Natural Disaster Reduction (INDUR) by the United Nations is a testimony to the growing worldwide concern about natural disasters and the recognition that calamities, if not preventable, are at least mitigatable to a large extent.

The recently concluded world Conference on Disaster Reduction at Kobe, Japan in January, 2005 also reflected the worldwide concern about disasters. The deliberations in Kobe set in motion a collective vision to mitigate the natural disasters by mainstreaming sustainable development, multi-hazard prevention strategies and well-knit institutional infrastructure for early warning systems. Visibly, there is a paradigm shift worldwide from a traditional relief approach to disaster preparedness, a more holistic and long-term strategy which incorporates vulnerability reduction as part of the development planning process. This comprehensive approach recognizes the fact that disaster reduction is most effective at the community level if the specific local needs are met. Crisis Management consists of an entire process that includes different phases from preparedness and mitigation before a disaster strikes; to emergency response, relief, and rehabilitation in the immediate aftermath; to reconstruction in the long-term. Since the tsunami in the Indian Ocean, we have become increasingly aware of disasters and the potential and likely devastation they can cause. I think preparedness for and mitigation of disasters is a positive result of this awareness. But a comprehensive crisis management plan is one that best uses available resources in all phases - preparedness, immediate response and long-term recovery. To make sure that a crises management plan is as effective as possible, the risks should be identified, vulnerabilities assessed and then preparation made on that basis.

Crisis management and development are closely linked and mutually reinforcing. The best crisis management systems are ones that are most effective at limiting a disaster's impact on people, property, economy and the environment. And of course, the poorest people usually suffer the most from disasters. Many of the steps that help protect people are also good for long term, sustainable development. For example, to move people and vulnerable communities out of a vulnerable area such as an earthquake zone or flood plain may have some upfront costs, but when disaster does strike, the payoff is great.

India is susceptible to multiple natural hazards with some regions/states being prone to more than one natural hazard. A disaster management plan in the context of India must address these multiple hazards and diverse vulnerabilities arising on account of peculiar socio-economic factors.

The templates for preparing disaster management plans at the District, Block and Gram Panchayat levels should be developed and shared with the State Governments. The templates should serve as broad guidelines to be utilized for developing disaster management plans at various levels. The broad components addressed in these plans should consist of district profile, hazard-risk and vulnerability analysis, institutional mechanism, mitigation plan, response plan, recovery and reconstruction plan, standard operating procedures, linking with the developmental plan, budget and other financial allocations and monitoring and evaluation.

I am happy to say that the Government of India has put in place a national disaster management framework laying down the gamut of activities proposed to be undertaken for building capacities at all levels for holistic disaster management. Post-tsunami, the primary emphasis has been on putting in place an appropriate institutional, policy and legislative framework at the national, state and district levels.

The development of a national disaster management plan is a complex, intricate and long-drawn process in a country like India with diverse climatic zones, differential vulnerabilities with differential impacts and varying prevention, mitigation and preparedness measures necessitating a multi-dimensional and multi-sectoral approach. It should mandate incorporation of inputs from experts and related institutions of excellence. Moreover, a national disaster management plan has to take into account the disaster management plans developed by the State Governments.

There are four pillars, viz., policy, institutional framework, technology matrix and financial regime, which should ideally work in synergy towards managing crises. For example, advances in technology matrix, unless appropriately supported by compatible institutional framework at various levels and also not in harmony with policies and financial regimes, will not get absorbed. It is therefore necessary to evolve a strategy, which should aim at establishing synergy among all the four.

Although the institutional and policy mechanisms for carrying out response, relief and rehabilitation have been well-established since independence and have proved to be quite

robust and effective, a need has been felt to reappraise and reorient the existing institutional, policy and legislative mechanisms required for the same in view of the increasing frequency and ferocity of natural disasters inflicting a mounting human and economic toll. The changed policy approach mandates adoption of a holistic and comprehensive strategy for disaster management addressing an entire gamut of issues relating to disaster prevention, mitigation, preparedness, response, relief, rehabilitation and reconstruction.

Recognising that structural mitigation measures are the key to minimizing the impact of disasters, there is a need to review and, if necessary, amend the building byelaws to incorporate seismic codes for construction in the concerned zones. Similarly, appropriate amendments need to be made to the existing Town & Country Planning Acts, land use zoning regulations, development control regulations & building bye-laws to upgrade the existing legal instruments. It should also be ensured that the building bye-laws should provide for safety aspects to be taken care of in all new constructions and upgrading the strength of existing structurally vulnerable constructions.

In India, the Finance Commission makes recommendations with regard to devolution of funds between the Union Government and the State Governments. The terms of reference of the Twelfth Finance Commission were enlarged to look at mitigation and prevention aspects too. It is necessary that where there is a shelf of projects, the projects addressing mitigation should be given priority. It should also be stipulated that each project in a hazard-prone area would have disaster prevention and mitigation as a term of reference and the project document has to reflect as to how the project addresses it. Apart from environmental impact assessment (EIA), studies to assess whether the project introduces a new risk or accentuates an existing one, should also be conducted. Feasibility analysis of a proposal to link grant of housing and infrastructure development loans by banks and financial institutions with incorporation of hazard-resistant construction features should also be undertaken.

The potential for technology use in crisis management is huge. We need to take cognizance of technologies such as IT, space, early warning systems for extreme events such as tsunami, cyclone, floods etc and the knowledge products and services. There are very useful products from communications systems to internet-based software programmes that serve as virtual operations centre to keep responders connected, to early warning siren systems to alert people of an impending earthquake, hurricane or tsunami. GIS has been effectively used in many of these products. In general, GIS is relevant in all phases of crises management because geographical representation of reality allows people to analyse problems in a different way. Whether in earthquake-modeling, in organizing relief logistics or as a tool to identify

and map out the locations of vulnerable populations, GIS has a lot to contribute to disaster management field. There are, however, gaps in the technological products and services vis-a-vis their absorption and effective utilizations down the line.

The urgent task before us today is to evolve a response system that is quick, comprehensive and effective and this is where today's deliberations by all of you will be of immense help to the Commission. Crises in the context of a disaster threaten the whole of society and, therefore, their management calls for a mechanism which will enable a TOTAL & EFFECTIVE RESPONSE. It is also necessary that such a response mechanism should encompass the coordinated response of the entire governmental system and the whole of civil society. This would call for meticulous planning and coordination between various role-players in order to prevent disasters and to mitigate their impact whenever they occur. Apart from incorporating the traditional coping mechanisms, it should also have a human rights' perspective. A human rights' perspective to crises management is particularly crucial because it is the poorest and weakest sections of society which suffer most in terms of loss of life and property, whenever a disaster strikes. If such human rights' concerns can be taken care of effectively and at the earliest, then only can the impact of disasters be mitigated to the maximum.

What are the concerns that need to be addressed while evolving such a response system? To my mind, the following are the barest minimum:

- a. The governmental system in India comprises of the Union Government in New Delhi & the State Governments in the state capitals. The district administration represents the governmental system closest to people and the community followed by the block development agencies. The first response in any disaster situation is from the community, which has traditionally risen invariably to provide succour to the needy at the earliest. How can the Panchayati Raj system be empowered to come to the aid of the community in a disaster situation? Is it possible to have a group of volunteers trained to provide hands-on relief at say, every district headquarters to enable quick response whenever needed? If so, what should be its size? Can home guards fulfill this role? Shouldn't the civil police be trained for emergency relief work? Can this help in changing their public image?
- b. Community based disaster management, which seeks to empower community directly to enhance their indigenous coping mechanisms is a must. But, then, the following questions arise: apart from empowering Panchayati Raj system, what could be the

strategies to enhance the community resilience? What are the types of technological, financial and physical interventions to strengthen indigenous coping mechanisms, promote collective wisdom and social networking?

- c. Technology is a major advantage, which is available today to managers of disasters. There are, however, gaps in the technological products and services vis-a-vis their absorption and more effective utilization down the line. Early warning products, for example, need to be 'actionable' at the community level. What all technologies can you suggest to provide assistance in managing disasters? Whether there is access to, availability and usefulness of those technologies? What are the gaps? What could be the perspectives on closer integration of knowledge institutions, disaster management agencies and community-based organizations?
- d. Restorations and rehabilitation are an important part of crisis management. Every disaster traumatizes the affected population specially the women & children. How can this phenomenon be addressed, considering that revival to normalcy is a slow process? First aid & medical attention itself is a delicate operation requiring a great deal of sensitivity in the doctors & paramedical staff. Can they attend to the task of assuaging the shock due to trauma in the first instance? What local arrangements can be made to carry on trauma counselling after the medicos have left, as they must leave at the earliest to attend to other victims of devastation? How can the local bodies & panchayats be geared to coordinate these activities? Can the beneficiaries themselves be organised for self-help to bolster their self-esteem & self-confidence and also to minimize complaints as well as to maximize the benefits?
- e. Major natural disasters like floods & drought are cyclic in their occurrence in the same areas of the country year after year and advance action to prevent or mitigate their impact is possible. In addition, technology is now available which can give advance notice of a week in the case of cyclones and quite a few hours in the case of Tsunami. So the questions arise: What all can you suggest by way of preventive actions? What all warning devices are available to our experts in India for natural disasters of different types? What are the gaps in our existing warning systems? Whether these gaps have been due to technological constraints or our lack of preparedness down the line to act on warning products/services?
- f. The condition of public health in India forebodes a disaster in-waiting. The Surat plague about a decade ago is a grim reminder of what is likely to happen if the

existing state of public health is not addressed seriously. What remedy can you suggest to tide over this state of affairs?

- g. There is a need to inculcate elements of safety concerns in various walks of life as well as in the basic infrastructure of society. Anticipating problems and taking pro-active preventive measures has to be built into the cultural and administrative ethos of the country. How can safety concerns be built-into the extra-curricular activities of our students in schools, colleges, professional institutes & universities? Have you any ideas on this, which may be further developed and implemented?

These are some of the specific questions I had in mind, which, I think, the august assemblage of experts here should address today. On the whole, however, there are certain broad themes that have to be dealt with, for evolving a total and effective response to crises situations. They are:

- *What do you need further to act quicker in times of crisis?*
- *What are the present constraints?*
- *Do you have real time access to information, warning and resources etc?*
- *Whether the gaps lie in (i) access to knowledge inputs/technology, (ii) policy and (iii) institutional arrangements?*
- *Are relief and rehabilitation connected with long-term development?*
- *What could be the most appropriate technological tools in operational environment?*
- *Whether the knowledge products are 'actionable' down the line?*
- *What are the 'gaps' in product delivery vis-a-vis absorption towards twin track strategy?*
- *Is there any specialized capacity building/training need?*

I am confident that with your domain knowledge and expertise, you will find answers and solutions to the questions I have posed and the concerns I have raised. I am sure, with the insights you provide and the valuable suggestions you make, the Commission would be in a position to evolve a total and effective crisis management system.

List of Participants - Round-table held at NIDM, New Delhi on 9.12.2005

Sl.No.	Name	Designation
1.	Shri S.K. Aggarwal	Member (RM), Central Water Commission, New Delhi
2.	Shri Y. Chaudhury	Executive Director, Nehru Yuva Kendra Sangathan, New Delhi
3.	Shri B.K. Bandyopadhyay	Director (NHAC), India Meteorological Department, New Delhi
4.	Shri K.C. Gupta	DG, National Safety Council, Navi Mumbai
5.	Shri R.P. Bhanushali	Advisor (Tech), NSC, Navi Mumbai
6.	Dr. Kishore Kumar	Faculty, CRRI, New Delhi
7.	Shri J.K. Prasad	Executive Director, BMPTC, New Delhi
8.	Dr. P. Nag	NATMO, Kolkata
9.	Dr. G.C. Bhattacharya	National Institute of Oceanography, Goa
10.	Prof. K. Sekar	NIMHANS, Bangalore
11.	Prof. D.K. Paul	Head, Civil Engineering Department, IIT, Roorkee
12.	Dr. R. Viswanathan	Consultant, ARC
13.	Shri P.G. Dhar Chakrabarti	Executive Director, NIDM
14.	Shri Anil Sinha	Consultant, Gurgaon
15.	Ms. Srilekha Majumdar	Consultant
16.	Ms. Shikha Srivastava	Consultant
17.	Shri B.K. Malhotra	Under Secretary (GS-I), Ministry of Defence, New Delhi
18.	Sq. Ldr. Amit Kansal	HQ IDS, Ministry of Defence, New Delhi
19.	Shri Sanjay Srivastava	ISRO, Bangalore
20.	Shri Kamalakar	Youth Officer, NSS, New Delhi

ADMINISTRATIVE REFORMS COMMISSION (ARC) :

Sl.No.	Name	Designation
1.	Shri M. Veerappa Moily	Chairman, Administrative Reforms Commission
2.	Dr. A.P. Mukherjee	Member, Administrative Reforms Commission
3.	Ms. Vineeta Rai	Member Secretary, Administrative Reforms Commission

Comparison of State Disaster Management Laws

Sl.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
1	Name of the Act	The Gujarat State Disaster Management Act, 2003	Uttar Pradesh Disaster Management Act, 2005	The Bihar Disaster Management Act, 2004	Uttaranchal Disaster Mitigation, Management and Prevention Act, 2005
2	Definition of 'disaster'	"an actual or imminent event, whether natural or otherwise occurring in any part of the State which causes, or threatens to cause all or any of the following: (i) widespread loss or damage to property, both immovable and movable; or (ii) widespread loss of human life or injury or illness to human beings; or (iii) damage or degradation of environment; and any of the effects specified in sub-clauses (i) to (iii) is such as to be beyond the capacity of the affected community to cope up with using its own resources and which disrupts the normal functioning of the community". [Sec.2(h)]	Same as Gujarat Act	Disaster means a catastrophe, calamity or mishap, grave occurrence, which causes loss of life, human suffering, damage to and destruction of property, environment and/or which disrupts the normal affairs of societies, Government and/or communities and/or adversely affects individuals and families and it includes any or more of the occurrences mentioned in Schedule. [Sec.2(i)]	Disaster means a catastrophe, calamity or mishap, a grave occurrence being, natural or otherwise, which causes, human sufferings, destruction or annihilation of human/animal and plant life, damage to and destruction of property, degradation of environment which overwhelms the prudent and protective measures and disrupts and paralyzes the normal functioning of Government and society at large, and includes any one or more of the occurrences mentioned in Schedule. [Sec.2(a)]
3	Definition of 'disaster management'	"a continuous and integrated process of planning and implementation of measures with view to: (i) mitigating or reducing the	Same as Gujarat Act	No specific definition	Similar to Gujarat Act [Sec.2(e)]

Comparison of State Disaster Management Laws

Sl.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
		risk of disasters; (ii) mitigating the severity or consequences of disasters; (iii) capacity-building; (iv) emergency preparedness; (v) assessing the effects of disasters; (vi) providing emergency relief and rescue; and (vii) post-disaster rehabilitation and reconstruction" [Sec.2(i)]	Same as Gujarat Act, except for substitution of Uttar Pradesh Disaster Management Authority in place of GSDMA, District Magistrate for Collector and addition of "Any agency, organization or body authorized by the Authority" (Sec.3)	(a) The State Government (b) Standing Technical Committee (STC) (c) State Relief Commissioner (SRC) (d) District Relief Commissioner (DRC) (Sec. 3)	(a) The State Government (b) Uttaranchal State Disaster Management Authority (c) Heads of Government Departments (d) Divisional Commissioners (e) District Magistrates of districts (f) Local authorities (g) Disaster Mitigation and Management Center(DMMC) (Sec. 3)
4	Authorities for disaster management	(a) The State Government, (b) The Gujarat State Disaster Management Authority, (c) Heads of Government Departments, (d) Commissioner, (e) Collector of a district, (f) Local authorities. (Sec.3)	Same as Gujarat Act, except for substitution of Uttar Pradesh Disaster Management Authority in place of GSDMA, District Magistrate for Collector and addition of "Any agency, organization or body authorized by the Authority" (Sec.3)	(a) The State Government (b) Standing Technical Committee (STC) (c) State Relief Commissioner (SRC) (d) District Relief Commissioner (DRC) (Sec. 3)	(a) The State Government (b) Uttaranchal State Disaster Management Authority (c) Heads of Government Departments (d) Divisional Commissioners (e) District Magistrates of districts (f) Local authorities (g) Disaster Mitigation and Management Center(DMMC) (Sec. 3)

Comparison of State Disaster Management Laws

Sl.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
5	Whether any provision for formation of 'Crisis Management Group' or such other entities?	Yes.[Sec.4(2)(b)]	Yes.[Sec.4(2)(b)]	No. It provides for constitution of a Standing Technical Committee for the purpose of facilitating procurements related to disaster management. [Sec.4 (3)]	No specific provision
6	Responsibility for data collection	Departments of the State Government to assist other authorities[Sec.5(1)(a)] GSDMA to take steps to collect or cause to be collected data on all aspects of disasters and disaster management, to analyze such data and to cause and conduct research and study relating to effects of disasters (Sec.13) GSDMA to be repository of all information concerning disasters (Sec.14)	Same as Gujarat Act (same sections also)	No specific provision	Section 16 of the Act envisages the creation of a Disaster Mitigation and Management Center. One of the core functions of this Center is 'Data Collection and Research'. [Sec. 17(1)].
7	Responsibility for capability building and training	Departments of the State Government to assist other authorities[Sec.5(1)(a)] GSDMA to advise and train the community, and stakeholders with a view to increasing their capacity to deal with potential disasters [Sec.16(1)]	Same as Gujarat Act (same sections also)	No specific provision	Disaster Mitigation and Management Center has been assigned the responsibility. [Sec.17(4)].

Crisis Management - From Despair to Hope

Comparison of State Disaster Management Laws

Sl.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
8	Responsibility for awareness generation	GSDMA to promote general education and awareness on disaster management, emergency planning and response [Sec.12(2)(d)] GSDMA to do so by publishing guidelines, facilitating access to its electronic database, coordinating the integration of methodologies for awareness and preparedness with development plans etc. [Sec.16(1)]. Collector to facilitate community training, awareness programmes. [Sec.24(1)(f)].	Same as Gujarat Act (same sections also)	No specific provision	Disaster Mitigation and Management Center has been assigned the responsibility. [Sec. 17(4)].
9	Role of Collector / District Administration	Collector to issue directions to the officers of the departments of the State Government and the local authorities in the affected areas to provide emergency relief in accordance with the disaster management plans.[Sec.23(1) & (2)]	Same as Gujarat Act (same sections also)	To supervise, coordinate and discharge the responsibilities and perform functions as prescribed. To prepare disaster management plan in accordance with the Rules and notify it for information of the general public, and implement it during the time of disasters. (Sections 6&7)	District Magistrate with the assistance of the local authorities shall prepare a disaster management plan for the district by anticipating the types of disaster that may occur and their possible effects and identifying the communities and properties at risk. He shall provide for appropriate prevention and mitigation strategies and promote capacity building. (Sec. 22). At the time of disaster, to conduct search and rescue operations, provide alternate shelters, food and medicines etc. [Sec. 19(2)]. To take action in accordance with prescribed guidelines. (Sec. 20).

Comparison of State Disaster Management Laws

Annexure-II Contd.

Comparison of State Disaster Management Laws

SL.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
10	Role of local bodies	Subject to directions given by GSDMA and under the supervision of the Collector, local authorities shall: (a) carry out relief operations in the affected area subject to the directions of the Commissioner (b) carry out reconstruction and rehabilitation work in accordance with the guidelines framed by GSDMA (c) prepare a disaster management plan suitable for the local area, clearly defining the role and responsibilities of the local authority etc. [Sec.25(1)]	Same as Gujarat Act (same section also)	Each Municipal Local Body and panchayat to prepare a Disaster Management Plan to meet adequately the requirements of the locality concerned in their respective jurisdiction. They shall be responsible for effective implementation of the plan drawn up by them in this behalf. [Sec.8 (1) & (3)].	To assist the district magistrate in preparation of disaster management plan for the district [Sec. 22(1)]. In disaster affected areas, local authorities to assist the USDMA, the State Commissioner for Disaster Management and the District Magistrate. Also to provide training to the staff and ensure that all building in their local area comply with laid down specifications. [Sec. 21 (1)].
11	Role of general public	Citizens to assist the Commissioner and the Collector in prevention, response, warning, emergency operation, evacuation and recovery activities. (Sec.31).	Same as Gujarat Act (same section also)	To assist the State and/or District Relief Commissioner in prevention, mitigation, response, rescue etc. (Sec.11).	No specific provision

Annexure-II Contd.

Comparison of State Disaster Management Laws

SL.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
12	Duties of private bodies	Community groups, youth organizations to assist the Authorities. (Sec.28) Similarly, each Factory as defined under the Factories Act, 1948 shall assist the Commissioner and the Collector and prepare a disaster management plan. Each private and public sector entity shall provide assistance to GSDMA, the Commissioner and the Collector. (Sec.29). All voluntary agencies, including non-governmental organizations, which desire to participate in disaster management activities may provide assistance to the Commissioner and the Collector. (Sec.30).	Same as Gujarat Act (same sections also)	Each Factory as defined under the Factories Act, 1948, and each of the undertakings and enterprises, as may be prescribed shall have a disaster management plan in conformity with the plan of local authorities/ district administration. They shall be responsible for its effective implementation. [Sec.8 (1) & (2)].	No specific provision
13	Whether any provision for issuing direction to a person or authority for purpose of avoiding an imminent damage or for mitigation of effects of a disaster?	Yes.[Sec.4(3)]	Same as Gujarat Act (same section also)	Yes, general powers. [Sec.4(6)].	Yes. [Sec. 4 (3)].

Comparison of State Disaster Management Laws

Sl.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
14	Whether any provision for suspension of any executive order which prevents, hinders or delays necessary action in coping with disaster?	Yes.[Sec.4(4)]	Same as Gujarat Act (same section also)	No specific provision	Yes. [Sec. 4(4)].
15	Relief works	Departments of the State Government to carry out relief operations under the supervision of the Commissioner and the Collector[Sec.5 (1) (b)] GSDMA to assist the State Government in formulation of policy relating to emergency relief notwithstanding that the implementation of the same shall be the responsibility of the Revenue Department and other departments of the State Government. [Sec.12(2)(b)]. Where GSDMA is of the opinion that relief provided by the Commissioner or the Collector is not adequate, it shall recommend modifications in the prescribed norms [Sec.18(2)]	Same as Gujarat Act (same sections also)	Responsibility of State Relief Commissioner and District Commissioner. (Sec.6&7)	USDMA to assist the State Government in formulation of policy relating to emergency relief. Revenue Department and other departments of the State Government to implement emergency relief. [Sec. 11(1)(b)]. State Commissioner for Disaster Management to make arrangement for release and use of resources for providing relief [Sec. 14(2)] and to develop and appropriate relief implementation strategy taking into account unique features of each district. [Sec. 15(1)(b)]. District Magistrate is responsible for relief works in the district. [Sec. 19].

Comparison of State Disaster Management Laws

Sl.No.	Parameter	Gujarat	Uttar Pradesh	Bihar	Uttaranchal
16	Disaster Management Plans	GSDMA to develop or cause to be developed guidelines for the preparation of such plans, local authorities and persons specified by it in preparation of such plans. [Sec.15(1)] Collector to ensure that district disaster management plans are prepared, revised and updated. [Sec.24(1)(d)]. Each department of the State Government in a district shall prepare a disaster management plan for the district and the Collector shall ensure that these are integrated into the plan for the whole district. (Sec.26).	Same as Gujarat Act (same sections also)	State Government may prepare a disaster management policy [Sec. 4 (2)(a)] . DRC may prepare a district management plan, and Local Bodies and other Agencies may prepare a Disaster Management Plan in accordance with the district plan (Sections 6 & 8).	USMDA to act as central planning body [Sec. 11(1)(a)]. State Commissioner for disaster management to prepare, review and update district or divisional level emergency plans. [Sec. 15(1)(c)]. District Magistrate to prepare disaster management plan for the district [Sec. 22(1)].
17	Whether any provisions for offences and penalties?	Yes. (Sec.38)	Yes. (Sec.38)	Yes. (Sections 13 and 14).	Yes. (Sec. 29 to 31).

Salient Features of The Disaster Management Act, 2005

Preamble: An Act to provide for the effective management of disasters and for matters connected therewith or incidental thereto.

1. The Act defines disaster as 'a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area'.⁴³
2. The Act provides for establishment of a National Disaster Management Authority (NDMA) with Prime Minister as the ex-officio Chairperson and other Members, not exceeding nine in number, one of them being Vice Chairperson. The NDMA shall be responsible to⁴⁴
 - a) lay down policies on disaster management;
 - b) approve the National Plan;
 - c) approve plans prepared by the Ministries or Departments of the Government of India in accordance with the National Plan;
 - d) lay down guidelines to be followed by the State Authorities in drawing up the State Plan;
 - e) lay down guidelines to be followed by the different Ministries or Departments of the Government of India for the purpose of integrating the measures for prevention of disaster or the mitigation of its effects in their development plans and projects;
 - f) coordinate the enforcement and implementation of the policy and plan for disaster management;
 - g) recommend provision of funds for the purpose of mitigation;
 - h) provide such support to other countries affected by major disasters as may be determined by the Central Government;
 - i) take such other measures for the prevention of disaster, or the mitigation, or for preparedness and capacity building for dealing with threatening disaster situation or disaster as it may consider necessary;

⁴³Section 2 (d)

⁴⁴Sections 6(1) and (2)

- j. lay down broad policies and guidelines for the functioning of the National Institute of Disaster Management.
3. The Act further provides for the constitution of a National Executive Committee (NEC). The Secretary in charge of the Ministry or Department of the Central Government having administrative control of disaster management shall be ex officio Chairperson of the NEC. Secretaries in the Ministries or Departments having administrative control of agriculture, atomic energy, defence, drinking water supply, environment and forests, finance (expenditure), health, power, rural development, science and technology, space, telecommunications, urban development, water resources and the Chief of the Integrated Defence Staff of the Chiefs of Staff Committee shall be ex officio members of NEC. NEC shall be responsible for the following⁴⁵:
 - a) act as the coordinating and monitoring body for disaster management;
 - b) prepare the National Plan to be approved by the National Authority;
 - c) coordinate and monitor the implementation of the National Policy;
 - d) lay down guidelines for preparing disaster management plans by different Ministries or Departments of the Government of India and the State Authorities;
 - e) provide necessary technical assistance to the State Governments and the State Authorities for preparing their disaster management plans in accordance with the guidelines laid down by the National Authority;
 - f) monitor the implementation of the National Plan and the plans prepared by the Ministries or Departments of the Government of India;
 - g) monitor the implementation of the guidelines laid down by the National Authority for integrating of measures for prevention of disasters and mitigation by the Ministries or Departments in their development plans and projects;
 - h) monitor, coordinate and give directions regarding the mitigation and preparedness measures to be taken by different Ministries or Departments and agencies of the Government;
 - i) evaluate the preparedness at all governmental levels for the purpose of responding to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;
 - j) plan and coordinate specialized training programme for disaster management for different levels of officers, employees and voluntary rescue workers;

⁴⁵Sections 10(1) and (2)

- k) coordinate response in the event of any threatening disaster situation or disaster;
 - l) lay down guidelines for, or give directions to, the concerned Ministries or Departments of the Government of India, the State Governments and the State Authorities regarding measures to be taken by them in response to any threatening disaster situation or disaster;
 - m) require any department or agency of the Government to make available to the National Authority or State Authorities such men or material resources as are available with it for the purpose of emergency response, rescue and relief;
 - n) advise, assist and coordinate the activities of the Ministries or Departments of the Government of India, State Authorities, statutory bodies, other governmental or non-governmental organizations and others engaged in disaster management;
 - o) provide necessary technical assistance or give advice to the State Authorities and District Authorities for carrying out their functions under this Act;
 - p) promote general education and awareness in relation to disaster management; and
 - q) perform such other functions as the National Authority may require it to perform.
4. At the State level a State Disaster Management Authority with the Chief Minister as ex officio Chairperson and other Members (not exceeding nine and inclusive of Chairperson of the State Executive Committee as ex officio Member) shall be responsible for the following⁴⁶:
- a) lay down the State disaster management policy;
 - b) approve the State Plan in accordance with the guidelines laid down by the National Authority;
 - c) approve the disaster management plans prepared by the departments of the Government of the State;
 - d) lay down guidelines to be followed by the departments of the Government of the State for the purposes of integration of measures for prevention of disaster and mitigation in their development plans and projects and provide necessary technical assistance therefor;
 - e) coordinate the implementation of the State Plan;
 - f) recommend provision of funds for mitigation and preparedness measures;

- g) review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated therein;
 - h) review the measures being taken for mitigation, capacity building and preparedness by the departments of the Government of the State and issue such guidelines or directions as may be necessary.
5. A State Executive Committee with Chief Secretary as the ex officio Chairperson and Secretaries of four other departments, as the State Government thinks fit, as ex officio members shall act as the coordinating and monitoring body for disaster management in the state. It shall perform the following functions⁴⁷:
- a) coordinate and monitor the implementation of the National Policy, the National Plan and the State Plan;
 - b) examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation;
 - c) lay down guidelines for preparation of disaster management plans by the Departments of the Government of the State and the District Authorities;
 - d) monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities;
 - e) monitor the implementation of the guidelines laid down by the State Authority for integrating of measure for prevention of disaster and mitigation by the departments in their development plans and projects;
 - f) evaluate preparedness at all governmental or non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;
 - g) coordinate response in the event of any threatening disaster situation or disaster;
 - h) give directions to any Department of the Government of the State or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation or disaster;
 - i) promote general education, awareness and community training in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster;

- j) advise, assist and coordinate the activities of the Departments of the Government of the State, District Authorities, statutory bodies and other governmental and non-governmental organizations engaged in disaster management;
 - k) provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;
 - l) advise the State Government regarding all financial matters in relation to disaster management;
 - m) examine the construction, in any local area in the State and, if it is of the opinion that the standards laid for such construction for the prevention of disaster is not being or has not been followed, may direct the District Authority or the local authority, as the case may be, to take such action as may be necessary to secure compliance of such standards;
 - n) provide information to the National Authority relating to different aspects of disaster management;
 - o) lay down, review and update State level response plans and guidelines and ensure that the district level plans are prepared, reviewed and updated;
 - p) ensure that communication systems are in order and the disaster management drills are carried out periodically; and
 - q) perform such other functions as may be assigned to it by the State Authority or as it may consider necessary.
6. At the district level a District Disaster Management Authority (DDMA), with Collector/District Magistrate/Deputy Commissioner, as the case may be, as ex officio Chairperson, elected representative of the local authority as the ex officio co-Chairperson, and Chief Executive Officer, the Superintendent of Police, Chief Medical Officer, all ex officio and maximum two other district level officers to be appointed by the State Government, as members shall act as the district planning, coordinating and implementing body for disaster management and take all measures for the purposes of disaster management in the district in accordance with the guidelines laid down by the National Authority and State Authority.
7. The Act has defined as many as thirty-nine specific powers and functions of District Authority, as under⁴⁸:
- i. prepare a disaster management plan for the district including a district response plan;

⁴⁸Sections 30(1) and (2).

- ii. coordinate and monitor the implementation of the National Policy, State Policy, National Plan, State Plan and District Plan;
- iii. ensure that the areas in the district vulnerable to disasters are identified and measures for the prevention of disasters and the mitigation of its effects are undertaken by the departments of the Government at the district level as well as by the local authorities;
- iv. ensure that the guidelines for prevention of disasters, mitigation of its effects, preparedness and response measures as laid down by the National Authority and the State Authority are followed by all departments of the Government at the district level and the local authorities in the district;
- v. give directions to different authorities at the district level and local authorities to take such other measures for the prevention or mitigation of disasters as may be necessary;
- vi. lay down guidelines for prevention of disaster management plans by the department of the Government at the districts level and local authorities in the district;
- vii. monitor the implementation of disaster management plans prepared by the Departments of the Governments at the district level;
- viii. lay down guidelines to be followed by the Departments of the Government at the district level for purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefor;
- ix. monitor the implementation of measures referred to in clause (viii);
- x. review the state of capabilities for responding to any disaster or threatening disaster situation in the district and give directions to the relevant departments or authorities at the district level for their upgradation as may be necessary;
- xi. review the preparedness measures and give directions to the concerned departments at the district level or other concerned authorities where necessary for bringing the preparedness measures to the levels required for responding effectively to any disaster or threatening disaster situation;
- xii. organize and coordinate specialized training programmes for different levels of officers, employees and voluntary rescue workers in the district;

- xiii. facilitate community training and awareness programmes for prevention of disaster or mitigation with the support of local authorities, governmental and non-governmental organisations;
- xiv. set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public;
- xv. prepare, review and update district level response plan and guidelines;
- xvi. coordinate response to any threatening disaster situation or disaster;
- xvii. ensure that the Departments of the Government at the district level and the local authorities prepare their response plans in accordance with the district response plan;
- xviii. lay down guidelines for, or give direction to, the concerned Department of the Government at the district level or any other authorities within the local limits of the district to take measures to respond effectively to any threatened disaster situation or disaster;
- xix. advise, assist and coordinate the activities of the Departments of the Government at the district level, statutory bodies and other governmental and non-governmental organisations in the district engaged in the disaster management;
- xx. coordinate with, and give guidelines to, local authorities in the district to ensure that measures for the prevention or mitigation of threatening disaster situation or disaster in the district are carried out promptly and effectively;
- xxi. provide necessary technical assistance or give advise to the local authorities in the district for carrying out their functions;
- xxii. review development plans prepared by the Departments of the Government at the district level, statutory authorities or local authorities with a view to make necessary provisions therein for prevention of disaster or mitigation;
- xxiii. examine the construction in any areas in the district and, if it is of the opinion that the standards for the prevention of disaster or mitigation laid down for such construction is not being or has not been followed, may direct the concerned authority to take such action as may be necessary to secure compliance of such standards;

- xxiv. identify buildings and places which could, in the event of any threatening disaster situation or disaster, be used as relief centers or camps and make arrangements for water supply and sanitation in such buildings or places;
 - xxv. establish stockpiles of relief and rescue materials or ensure preparedness to make such materials available at a short notice;
 - xxvi. provide information to the State Authority relating to different aspects of disaster management;
 - xxvii. encourage the involvement of non-governmental organizations and voluntary social-welfare institutions working at the grassroots level in the district for disaster management;
 - xxviii. ensure communication systems are in order, and disaster management drills are carried out periodically; and
 - xxix. perform such other functions as the State Government or State Authority may assign to it or as it deems necessary for disaster management in the District.
8. The Act provides for the preparation of a hierarchy of Plans at National, State and District levels. All these Plans shall be reviewed and updated annually. The National Disaster Plan shall be prepared by the NEC with regard to the national policy and in consultation with the State Governments and expert bodies and organizations and shall be approved by the NDMA. All Ministries and Departments of Government of India shall draw up their own disaster management plans in accordance with the National Plan. The National Plan shall include⁴⁹:
- a) measures to be taken for the prevention of disasters, or the mitigation of their effects;
 - b) measures to be taken for integration of mitigation measures in the development plans;
 - c) measures to be taken for preparedness and capacity building to effectively respond to any threatening disaster situation or disaster;
 - d) roles and responsibilities of different Ministries or Department of the Government of India in respect of measures specified above.
9. The State Disaster Management Plan shall be prepared by the SDMA in line with the National Plan and after consultation with the local authorities, district authorities and people's representatives as it may deem fit. The State Plan shall include⁵⁰:

⁴⁹Section 11 (3)⁵⁰Section 23 (4)

- a) the vulnerability of different parts of the State to different forms of disasters;
 - b) the measures to be adopted for prevention and mitigation of disasters;
 - c) the manner in which the mitigation measures shall be integrated with the development plans and projects;
 - d) the capacity-building and preparedness measures to be taken;
 - e) the roles and responsibilities of each Department of the Government of the State in relation to the measures specified in clauses (b), (c) and (d) above; and
 - f) the roles and responsibilities of different Departments of the Government of the State in responding to any threatening disaster situation or disaster.
10. The District Disaster Plan shall be prepared by the District Authority in consultation with the local authorities and municipality and in line with the National and State Plan. Every office of the Government of India and the State Government having office at district level shall prepare a disaster management plan in accordance with the district plan and submit a copy of the plan to the District Authority. The District Plan shall include⁵¹:
- a) the areas in the district vulnerable to different forms of disasters;
 - b) the measures to be taken, for prevention and mitigation of disaster, by the Departments of the Government at the district level and local authorities in the district;
 - c) the capacity-building and preparedness measures required to be taken by the Departments of the Government at the district level and the local authorities in the district to respond to any threatening disaster situation or disaster;
 - d) the response plans and procedures, in the event of a disaster, providing for-
 - (i) allocation of responsibilities to the Departments of the Government at the district level and the local authorities in the district;
 - (ii) prompt response to disaster and relief thereof;
 - (iii) procurement of essential resources;
 - (iv) establishment of communication links; and
 - (v) the dissemination of information to the public.
 - e) such other matters as may be required by the State Authority.

11. The Act further provides for the constitution of the National Institute of Disaster Management (NIDM). The Institute shall have a Governing Body which shall exercise such powers and discharge such functions as may be prescribed by regulations. Subject to the provisions of the Act, NIDM shall function within the broad policies and guidelines laid down by the National Authority and be responsible for planning and promoting training and research in the area of disaster management, documentation and development of a national level information base.
12. The Act further provides for the setting up of National Disaster Response Force (NDRF) for the purpose of specialist response to disaster or threatening disaster. The general superintendence, direction and control of the Force shall vest in the NDMA.
13. The Act has also provided for the constitution of National Disaster Response Fund which shall be made available to the NEC and National Disaster Mitigation Fund which shall be applied by the NDMA. Besides, every Ministry and Department of the Government of India shall make provisions in its annual budget, for funds for the purpose of carrying out the activities and programmes set out in its disaster management plans. The States shall constitute similar funds at the State and district levels.
14. The Act provides for punishment where⁵²:
 - i. there is obstruction in the way of any officer in the discharge of functions under the Act
 - ii. there is refusal to comply with any direction given under the Act
 - iii. a false claim for obtaining any relief, assistance etc. has been knowingly made
 - iv. there is misappropriation of funds or materials meant for providing relief
 - v. a false alarm or warning is made or circulated leading to panic
 - vi. any officer who, having been imposed with a duty under the Act, ceases or refuses to perform or withdraws from his duties without express permission
 - vii. there is contravention of section 65 of the Act i.e. written order for requisition of resources or premises or vehicles, as the case may be⁵³.

In case of offence being committed by any Department of the Government, the head of the Department shall be deemed to be guilty, unless it is proved that it was committed without his knowledge or he has exercised all due diligence to prevent it. In case it is proved that

the offence has been committed by or attributable to any officer other than the Head of the Department, he shall be liable to be proceeded against and punished accordingly⁵⁴. In case the offence has been committed by a company or body corporate, *every person*, who at the time of the offence was in charge of, and responsible to, the company for the conduct of its business, as well as the company itself, shall be deemed to be guilty. If it is proved that the offence was committed by or attributable to any director, manager etc. of the company proceedings will be initiated accordingly. However, in case of offences under sections 55 & 56, the previous sanction of the appropriate Government shall have to be taken before instituting prosecution. Further, no court can take cognizance of an offence under the Act unless a complaint is made by the authorities mentioned in section 60(a) of the Act, or by a person who has given notice of not less than 30 days to the authorities mentioned in section 60(b) of the Act.

15. The Act also provides for the following:

- i. The Central Government can issue direction in writing to Ministries or Departments of the Government of India, NEC, State Government etc. to assist in disaster management⁵⁵.
- ii. Any officer or authority of the Union or a State shall have to make available such manpower as requested by NEC, SEC or District Authority in connection with rescue, relief or other disaster related works⁵⁶.
- iii. If it appears to the NEC, SEC or District Authority that provisions of any rule regulation etc. need to be made or amended for purposes of prevention and mitigation of disasters, it may require to do so and the appropriate authority will take action accordingly⁵⁷.
- iv. NEC, SEC or District Authority may requisition any resources, premises or vehicle from any authority or person for rescue operations etc⁵⁸ and in case of requisition of premises, shall pay compensation to the interested party.
- v. The National Authority, the State Authority or a District Authority may recommend to the Government to give direction to any person in control of any media or means of communication to carry out any warnings or advisories regarding disasters.
- vi. The National Authority shall prepare an annual report to the Central Government which shall cause it to be laid before both Houses of Parliament.

The State Authority shall forward its annual report to the State Government which shall place it before the State Legislature.

- vii. A bar on jurisdiction of court (except the Supreme Court or a High Court).
- viii. No suit or prosecution shall in any court against the Central Government or the National Authority or the State Government/Authority etc. for work done in good faith. Officers and employees of these authorities will also be immune from legal processes in regard to any warning in respect of any disaster disseminated by them.
- ix. The Central Government may make rules for carrying out the purposes of the Act. NIDM, with the previous approval of the Central Government may make regulations for the same. These rules and regulations shall be laid before each House of Parliament while in session for thirty days.
- x. The State Government may also make rules in this regard and lay it before its Legislature.
- x. The Central and State Governments may make orders for removal of difficulties arising while giving effect to the provisions of the Act, which should be laid before the Parliament or the State Legislature. But no order shall be made after expiration of two years from the commencement of the Act.

Recommendations of the Working Groups at the Regional Workshops

Regional Workshop on Disaster Management (Earthquakes, Landslides and Avalanches) January 30-31, 2006, Jammu

Group I (Issues related to earthquakes)

Recommendations:

- 1.1 A realistic vulnerability map at the micro level with maximum information should be developed. Volunteers, ex-servicemen, community can be involved for the preparation of the vulnerability map. It was suggested that for this, NIDM may prepare a template of vulnerability maps at village level and sensitization of all concerned may be taken up.
- 1.2 Administrative structures and processes required for dissemination of early warning must be enforced. This will enable better preparedness amongst the likely to be affected people.
- 1.3 Building codes need to be followed strictly. Public and private buildings need to be made earthquake resistant and already existing government buildings should be retrofitted. It was also suggested that safety of critical buildings like schools, hospitals should be given top priority.
- 1.4 Development plans should be integrated with disaster management plans so that development does not become a disaster in itself.
- 1.5 Media plays an important role in dissemination of information therefore, disaster related information must be shared with media. It was also suggested that media needs to be sensitized and made partner in mitigation activities.
- 1.6 Capacity building of community and vulnerable to enhance their capability to cope with the disaster, as they are the first responders.
- 1.7 Simulation/mock exercises should be carried out with participation of all concerned. This enables a high level of preparedness amongst all the stakeholders.
- 1.8 It was suggested that some amount (say, 10%) of MP's or MLA's constituency development fund may be reserved for retrofitting of existing buildings.

- 1.9 Inventory of resources and equipments is needed. This helps the administration in immediate response to disasters.
- 1.10 Civil Defence and other volunteers like NCC, Red Cross, school teachers should be involved in disaster mitigation, preparedness, relief distribution and response activities.
- 1.11 Disasters should be managed with least involvement of Army and it should be called when extremely necessary. An institutional mechanism should also be developed for dovetailing of district disaster management with Defence forces.
- 1.12 Emergency Operations Centres at district levels should be made functional round the clock armed with all required expertise and equipments and with a command or duty officer.

Group II (Issues related to avalanches)

Recommendations:

- 2.1 Identification of villages prone to avalanches should be done by district authorities and Snow & Avalanche Studies Establishment's (SASE) manpower should be strengthened and they may do the vulnerability assessment and zoning of vulnerable districts. Community, which is repository of traditional wisdom, should be involved in vulnerability mapping.
- 2.2 Awareness is another key for preparedness. Slant slope houses are one of the better construction practices. Community may be made aware of this.
- 2.3 Plantation and afforestation are other methods of mitigation. This may be taken up by the district authorities and the community as a method of effective mitigation.
- 2.4 Micro-credit and micro-insurance may be encouraged at village level.
- 2.5 Regular press briefings should be held and a nodal officer should be appointed.
- 2.6 Mock drills, simulation exercises, benchmarking, development of indicators and certification may be used as methods to assess and evaluate level of preparedness. NIDM may develop some such indicators.

- 2.7 Women panchayat members must also be involved in disaster meetings.
- 2.8 Corporate houses may identify and adopt some villages for disaster preparedness and capacity building activities.
- 2.9 Donations from corporate houses may also be utilized for premium payment of the insurance.
- 2.10 There should be one contact point for corporate-government interface.
- 2.11 Sub-divisional and block level disaster management committees may be constituted.
- 2.12 Limited number of visits of VVIPs may be encouraged.
- 2.13 Incident commander should be left free from the VVIP Protocol.
- 2.14 Existing system of synergy between Army and civil administration is well established and needs to be followed in future also.
- 2.15 Inventory of resources and equipments is absolutely necessary.
- 2.16 Capacity building and community empowerment may be taken up to meet the L1 level disasters⁹⁹.
- 2.17 Emphasis may be laid on information dissemination and IEC activities.
- 2.18 The entitlement of victims may be need based and their quality and quantity may be standardized.
- 2.19 Selected members of community should be given training in 'First Aid'. Provision of mobile medical unit will help in speedy and timely medical relief to victims.
- 2.20 District Magistrates/ Collectors may be delegated powers for emergency procurement of materials in a transparent manner.
- 2.21 Laid down procedures for requisition of Army may be followed.
- 2.22 Civil Defence may be re-structured and its mandate may be expanded.
- 2.23 Interagency meetings of DM and NGOs may help in coordination between them during emergency.

⁹⁹L1 level disasters are district level disasters which are within the capacity of the district administration to deal with.

- 2.24 Disaster managers may be connected to the disaster loop alert system.
- 2.25 Local level committees may be strengthened to decide about evacuation, shelter and relief activities.

Group III (Issues related to Landslides)

Recommendations:

- 3.1 Need for Hill Development Authority at national, state and other levels.
- 3.2 Debris disposal policy should be made.
- 3.3 Researches being done in the field of landslides may be shared with implementing agencies.
- 3.4 Geo-technical investigations and clearance may be made mandatory as a policy before construction of the roads and undertaking major developmental activities.
- 3.5 Advice of technical organisations may be made mandatory for all stabilizations measures for active landslides.
- 3.6 Controlled blasting and silent explosive options should be used in Himalayan region.
- 3.7 Vulnerability mapping of all areas may be taken up with priority.
- 3.8 Awareness and skill transfer to the grassroots level with incorporation of traditional skills and involvement of community is needed.
- 3.9 Compulsory insurance may be provided to community in the vulnerable areas with premium paid from CRF.
- 3.10 Training and sensitization of media and also proper liaison of media with district administration is necessary.
- 3.11 Pre-disaster drills keeping in view the periodicity and severity of disaster may be carried out.
- 3.12 NDMA may periodically assess level of preparedness at different levels.
- 3.13 Resource inventory and stocking of resources should be continuously done.

- 3.14 Village Disaster Management Teams (VDMTs) may be trained and equipped.
- 3.15 Security should be tightened in affected areas.
- 3.16 A protocol officer should be nominated for all VVIP visits.
- 3.17 Civil Defence force should be reactivated and reoriented for disaster management.
- 3.18 Essential search and rescue equipments like stretchers, ropes, first aid, etc. and emergency medical facilities should be made available with community
- 3.19 Disaster mitigation fund may be utilized for capacity building of the community and the district.
- 3.20 Liaison officer should be appointed for coordination with NGOs.
- 3.21 Documentation of the past experiences of disasters should be done.

**Regional Workshop on Disaster Management
(Cyclones and Floods)
February 15-16, 2006, Chennai**

Group I (Preparedness, Prevention and Early Warning)

Recommendations:

- 1.1 DMC (Disaster Management Committee) may be formed at the Block, Taluk and Village levels. All line departments, elected representatives, voluntary organisations and NGOs may be made members of DMC.
- 1.2 There may be a single disaster management administrative set up and Disaster Management plan, to avoid confusion among different departments.
- 1.3 A DMM (Disaster Management Manual may be formulated) by the GOI and circulated to the states. The states may prepare state specific DMM based on local needs and vulnerabilities. States may be given autonomy in decision making. Adequate financial powers may be given to Relief Commissioner / District Collector.
- 1.4 Hazard-risk-vulnerability maps may be prepared at the taluk, panchayat and village level by using the available technology.i.e., ISRO, NRSA, satellite data over the year etc.
- 1.5 States may be provided financial support for mapping high vulnerable areas (0-2 kms from sea, river banks, etc.).
- 1.6 The group pointed out a few organizations, which have already such maps: GIS map for Tamil Nadu by The Tamil Nadu Water Supply and Drainage (TWAD) Board, vulnerability map of Hyderabad and Visakhapatnam by Satyam Computers, Hyderabad.
- 1.7 A DEW (Disaster Early Warning) system involving BSNL and other communication media may be set up in each District. The alert may be disseminated through local TV, radio, cell phone, SMS etc.
- 1.8 Development plans need to be incorporated with Disaster Mitigation plan such as "Marriage Hall-cum-Cyclone Shelter", "Community Hall-cum-Cyclone Shelter" etc.

- 1.9 IEC (Information, Education and Communication) material on disaster management may be prepared and distributed for public preparedness.
- 1.10 A special DMF (Disaster Management Fund) may be created in addition to the existing CRF. The fund should be over and above CRF and placed at the disposal of NDMA. The allocation of the funding mechanism may be 60% - NDMA, 30% - SDMA and 10% - DDMA with a strict code for its utilization, in the event of a disaster.

Group II (Disaster Rescue, Relief and Rehabilitation)

Recommendations:

- 2.1 Each state should have its own Disaster Response Force.
- 2.2 Staff and officers of all government departments must be trained on Disaster Management during induction into service.
- 2.3 First Aid training should be given to all students, government employees and staff of every panchayat / urban local body.
- 2.4 Police stations in vulnerable areas should be adequately equipped with vehicles and communication facilities including satellite phones and manpower.
- 2.5 Availability of helicopters at short notice should be ensured. Preferably the state government should have its own choppers at its disposal.
- 2.6 Modern equipment may be identified and procured for search and rescue operations in various calamity situations.
- 2.7 Sniffer dogs may be trained at district level and utilized in earthquake disaster areas to identify the survivors.
- 2.8 Multistoried disaster resistant shelters with all facilities and provision to accommodate men and women need to be constructed in all vulnerable coastal areas.
- 2.9 Safety standards for responders and operations personnel must be laid down clearly and the same may be communicated.
- 2.10 The ICS (Incident Command System) suggested by Ministry of Home Affairs, Government of India, must be introduced in all districts of the state.

- 2.11 PRIs (Panchayati Raj Institutions) must be trained and strengthened as part of the Disaster Management policy.
- 2.12 Emergency Operation Centre must be set up in all districts with adequate life saving drugs, including anti venom and anti rabies vaccines.
- 2.13 A package of remuneration must be formalized and publicized for government personnel, private doctors, paramedics, volunteers etc., for disaster management activities.
- 2.14 Financial delegation to district administration for procurement and undertaking relief operations must be clearly laid down as part of the DM policy.
- 2.15 Blood group directory of all prospective donors in vulnerable areas should be put on the web and donors should be issued ID cards.
- 2.16 Past history of calamities in specific areas may be developed by the district administration in consultation with the local people.
- 2.17 A detailed evacuation plan shall be formalized and put in place in all districts.
- 2.18 Relief camps should be identified in safe zones and safe buildings must be identified scientifically in advance with assistance from experts.
- 2.19 Special toilets and wheel chairs are to be provided in relief camps for the physically challenged.
- 2.20 Special nutrition needs to be provided in relief camps for children, lactating mothers etc.
- 2.21 Psychiatric and trauma counseling should be part of relief camp services.
- 2.22 Separate rooms for kitchen, storage of cooking provisions and other items should be provided in the relief camp. Similarly, garbage disposal system should be in place in each relief camp.
- 2.23 District Authority shall prepare and forward the requirement of relief materials to government and donor agencies in writing and also through print and electronic media.
- 2.24 A standard suggestive set of packages can be evolved by for each kind and level of disasters to enable district admin to quickly extend relief.

- 2.25 The "Procurement Unit" as mentioned in the Incident Command System (ICS) should invite tenders every 6 -12 months and fix rate contracts and place orders with a clear direction to supply the materials in a given time frame.
- 2.26 Quality check of the materials has to be done by the "Procurement Unit" itself.
- 2.27 Reconstruction should be executed through Public-Private partnership.
- 2.28 The designs of the houses should be finalized in consultation with the victims or their representatives as well as experts.
- 2.29 Social audit framework and documentation of standards of rescue, relief and rehabilitation should be evolved and mandated.

Group III (Role of Armed Forces/ NGOs/ Civil Defence/ NCC/ Home Guards and Territorial Army in Disaster Management)

Recommendations:

- 3.1 A comprehensive ex-servicemen database may be prepared based on their individual skill sets at the state and district levels.
- 3.2 The services of defence forces may be utilized sparingly, only as an exception, when state administration feels the situation really warrants it.
- 3.3 Use of civil defence setup is still relevant in disaster management. They may be provided with appropriate training before involving them in disaster management activities.
- 3.4 Compulsory training in civil defence and disaster management may be given to ex-servicemen.
- 3.5 Fire services should be modernized as multi-hazard response force.
- 3.6 Database on corporate capabilities may be prepared at district Head Quarters/ state Head Quarters and specific requisition may be made from them at the time of disasters.
- 3.7 NGO coordination cell may be established in districts and the areas of work be demarcated for each NGO.
- 3.8 Panchayat president and Block Development Officer (BDO) may discuss with NGO's and utilize them effectively.

Group IV (Capacity Building of Government and Local Bodies)

Recommendations:

- 4.1 Disaster management chapter may be included in the Panchayati Raj Acts, reflecting the role of local bodies.
- 4.2 A Disaster Mitigation Fund may be established with specific procedures for utilization of funds. Separate allocation of funds for disaster management activities may be made to panchayats (10%).
- 4.3 List of experts at the state /district level may be prepared.
- 4.4 Training may be made mandatory for induction / promotion. Mock drills may be included in refresher courses.
- 4.5 Sensitization of politicians on disaster management is important.
- 4.6 Database on local bodies may be prepared using GIS technology.
- 4.7 Disaster management teams such as early warning, rescue, relief, and medical aid, damage assessment etc may be set up.
- 4.8 Local community particularly SHGs may be involved in preparation of disaster management plans, identification of victims for compensation and documentation of episodes, preparing risk maps, vulnerability assessment, cost benefit analysis, preparing preparedness and rehabilitation plans and formation of Special Teams for identifying safe shelters, stock piling of relief materials etc.
- 4.9 Training Need Assessment (TNA) and Training of Trainers (TOT) programmes may be conducted for local communities.
- 4.10 Local community may be encouraged to establish their own Disaster Management Fund.
- 4.11 Relief schemes, calendar of activities including training and mock drills, list of beneficiary etc. may be published for general information.
- 4.12 Enforcement mechanism may be strengthened by conducting random checks and imposing punishments.
- 4.13 Service of the EDUSAT (which is widely used for educational purposes in Kerala) may be utilized for disseminating information on Disaster Management.
- 4.14 Disaster management curriculum may be included in school and college syllabi.
- 4.15 Insurance schemes may be introduced in disaster prone areas.
- 4.16 Self-employment schemes may be introduced for victims.

**Regional Workshop on Disaster Management
(Floods and Industrial Accidents)
February 22-23, 2006, Mumbai**

Group I (Issues regarding Earthquakes)

Recommendations:

- 1.1 Seismic and vulnerability map at the micro-level must be prepared, which will help the state to be better prepared for all the disasters.
- 1.2 Incident command system should become a standard procedure in search and rescue (SAR) and some incentive schemes may be considered for SAR teams.
- 1.3 Identification and optimum utilization of locally available resources (human resources, equipments and machinery) would reduce demand for resources from the state level.
- 1.4 Mock drills, strict implementation of building codes, inventory of resources and equipments, professional accountability for certification of building safety with the architect and safety of critical buildings like school, hospitals are needed at all levels to ensure preparedness and readiness.
- 1.5 Administrative structures and processes required for dissemination of information and success stories and best practices from earlier disasters at field levels may be ensured.
- 1.6 Integration of development plans with disaster management plans is must.

Group II (Issues regarding Floods)

Recommendations:

- 2.1 There is a need for revamping of organisations like India Meteorological Department (IMD) and Central Water Commission (CWC), their communication network and density of early warning equipments, to ensure flow of clear warning up to the local level.
- 2.2 It is necessary to identify flood shelters and flood prone areas at the micro-levels. Conduct of pre-monsoon meetings with the participation of all stakeholders, clearance of storm water and natural drainage, plantation and afforestation should be taken up.

- 2.3 Awareness, micro-credit and micro-insurance may be encouraged at village level. This will help strengthening of first responders.
- 2.4 Regular press briefings and mechanism of a nodal officer, for media interaction may be used for media management.
- 2.5 Mock drills and simulation exercises, may be used as methods to assess and evaluate level of preparedness.
- 2.6 Development of an institutionalized interface of administration with Armed Forces will enable the emergency officers to use army and other central forces for effective disaster management.
- 2.7 Mitigation measures like rainwater harvesting, solid waste management, flood plain mapping, water bodies management and study on climate change impact are necessary and may be used effectively.
- 2.8 A national flood mitigation and insurance programme may be launched.

Group III (Issues Regarding Industrial Disasters)

Recommendations:

- 3.1 Standard operating procedures for industrial disaster managers and all the stakeholders must be based on need analysis.
- 3.2 Proper land use planning may be done to enable better management of an industrial disaster.
- 3.3 Awareness for existing rules and also simple ways to avert a disaster may be widely disseminated. Departmental manuals should be developed and made available to all the stakeholders.
- 3.4 A good system of medical assistance like training of paramedics, trauma counselling, decontamination may be developed.
- 3.5 All octroi posts and fire departments may be networked and strengthened. This will enable proper management of any hazardous material transportation through the residential area.
- 3.6 Coordination and sharing of knowledge and information amongst all stakeholders is necessary.
- 3.7 Instant speed recorder on the tanker carrying hazardous material is necessary to avert a disaster.

- 3.8 Documentation of the past experiences and best practices in handling an Industrial disaster may be done for better preparedness to manage future disasters.
- 3.9 Higher priority must be given to the development and implementation of national guidelines on
- Risk assessment
 - Development and review of on-site emergency plans
 - Development and review of off-site emergency plans
 - Testing of the plans covering different stages
 - Protocols for each stage of testing
 - Training of all stakeholders
- 3.10 Regular or project based funding of the faculty, research and documentation activities with the centres for disaster management or organisations imparting such training is necessary.
- 3.11 There is a need for development of a mechanism for speedy payment of compensation for accident victims.
- 3.12 There is a need to harmonise existing rules for industrial safety with the Disaster Management Act, 2005.

Regional Workshop on Disaster Management

(Drought)

May 22-23, 2006, Jaipur

Group I (Drought Preparedness & Mitigation Issues)

Recommendations :

- A. Existing Structural Arrangements
1. Permanent wing of disaster management cell at district level, block level as well as village level.
 2. Need to provide technical support at state level.
- B. Water and Land Resource Management
1. Regulate flow irrigation ('Diggi' with sprinkler in command areas).
 2. Increased use of sprinkler and drip irrigation in rainfed areas.
 3. Institutionalisation of alternate crop planning with minimum support price.
 4. Identify unexecuted, appropriate conservation activities such as catchment area treatment (plantation and forestry), ground water recharge and watershed development and undertake them on priority.
 5. Interphasing of R&D outputs for efficient management of resources.
 6. Urban planning - provision of water harvesting.
 7. Incorporate provisions for incurring expenditure on material component in CRF and NCCF.
- C. Food, Nutrition and Fodder Security
1. Strengthening PDS system / millets-bajra etc.
 2. Support for low water consuming crops like millets and bajra and pulses, horticulture products.
 3. Implementation of National Rural Employment Guarantee Act.
 4. Expanding pension and food supply schemes for the physically challenged and elderly persons.
 5. Strengthen nutrition through expanding ICDS and Mid-day Meal Programme.

6. Fodder farm expansion with minimum support price mechanism in command area.
 7. Organise livestock and feed support appropriately.
 8. Establishment of fodder banks in command areas.
 9. Cultivating degraded land for fodder.
- D. Role of Science and Technology in Long Term Mitigation of Drought
1. Vulnerability mapping and risk assessment at smallest possible administrative level.
 2. Early warning impact assessment at appropriate administrative scale.
 3. Climate change impact assessment in respect of drought mitigation, agriculture and planning.
 4. Establishing application and extension services through Krishi Vigyan Kendra.
 5. Knowledge integration of multi-sectoral Science and Technology inputs and integration of line departments in decision making process and development of action plans (crop monitoring, cropping pattern, alternate crop planning, low water conservation crops).
 6. Identify and organize appropriate mitigation (water and conservation works and farm level option like tanks) through rejuvenating traditional water storage options.
 7. Integrate activities of drought mitigation appropriately with the National Rainfed Area Development Authority of Ministry of Agriculture.
- E. Short Term Crop Diversification
1. Knowledge empowerment
 2. Availability of seeds
 3. Crop insurance
 4. Exposure visits
 5. Adoption of best practices – progressive farmers.
- F. Alternative Livelihoods
1. Agro forestry

2. Bio-diesel
3. Horticulture
4. Market linkages and infrastructure
5. Non-farming revenue earning options through skill development options and nurturing of local skills.

Group II (Drought Relief & Rehabilitation)

- 2.1 The state component of CRF should be a mandatory budgetary provision for all states.
 - 2.2 If more than 50% of CRF in a particular year is utilized, then the state should be eligible for further NCCF funding without any adjustments.
 - 2.3 CRF and NCCF should be kept in interest bearing public accounts.
 - 2.4 Food grain assistance should become a dedicated component of CRF.
 - 2.5 A National Food Trust should be set up to cater to the special needs of food deficit areas.
 - 2.6 Financial contributions from the community should be encouraged through the establishment of a Community Drought Fund at each Gram Panchayat. Community contributions should be matched by government funds, and the fund should allow each Gram Panchayat to meet localized drought needs.
 - 2.7 In order to strengthen public-private partnership, a matching District Relief Fund should be set up. Area specific preferences of the donors should be accommodated.
 - 2.8 Land and off-land interventions that have drought-proofing capabilities should be recognized as long term loans by financial institutions.
- A. Long Term Measures for Rehabilitation/Linking Relief and Development
1. National Rural Employment Guarantee Scheme (NREGS) combines objectives of development with employment generation and is therefore an ideal drought management instrument. Eventually when all districts are covered under NREGS, then the objective of harmonizing development and mitigation would have been realized.

2. Till such time, all-out efforts should be made to dovetail all line departments' programmes to ensure that relief works create long term assets.
 3. Taking up individual beneficiary works as part of relief operations should be allowed.
 4. NGO coordination committee should be activated and the involvement of NGOs in drought management should be institutionalized.
 5. The institutionalization of CRF in state budgets should be reinforced by making drought an explicit mandate of all line departments to ensure that all development schemes make an integrated impact on drought.
 6. Gram Panchayat Drought Perspective Plans should be prepared as a long term drought planning and response tool and as a platform for government-community interaction.
 7. Wireless telemetric rain gauges should be installed in each village to provide additional scientific data to streamline crop insurance claims and settlements. This rainfall data should be subsumed with IMD data.
 8. All states should be encouraged to implement the scheme of CRF in letter and spirit.
- B. Manuals and Codes**
1. Every state should have area-specific drought manual. A provision for regular revisions and updating should be made to allow area plans to be dynamic.
 2. Drought codes should be drawn up for specific areas for immediate implementation as action plans.
 3. Village Drought Committees should be established, and representatives of these VDCs should be apexed into a Gram Panchayat Sub-Committee for Drought. The Gram Panchayat Drought Perspective Plan and Action Plan as well as the Community Drought Fund should be brought under the purview of this sub-committee.
 4. Community institutions (SHGs, CBOs) and civil society should be recognized as implementing agencies for drought management.
 5. Dovetailing of community and civil society schemes should be recognized for CRF supplementation to meet drought objectives.

Group III (Role in Management of NGOs, Community Groups, Local Bodies and Capacity Building for Drought Management)

- 3.1 Community should be at the forefront for identifying the risk, need and prioritization initiatives.
- 3.2 Government should facilitate by providing Knowledge Resource Centre (KRC) for a group of Panchayats as per the local need (risk areas). KRC will be comprised of a group of technical experts. Certain percentage of CRF should be allocated for running KRC. KRC will do the task of capacity building of the community, CBOs, NGOs, PRI and ground level government functionaries.
- 3.3 Community should decide the need and the nature of work and the government guidelines should support that.
- 3.4 Community, through Gram Sabha, will identify the gaps, list of livelihood seekers and help in ensuring entitlement.
- 3.5 Community through local resources and government support would build sustainable system for cattle and water conservation.
- 3.6 IEC campaigns for generating awareness must be undertaken.
- 3.7 Government should provide support to proactive community risk reduction measures/projects by earmarking CRF.
- 3.8 Panchayat should take help of community in the management of the infrastructure created for risk reduction.
- 3.9 Panchayat / local bodies should be strengthened for risk reduction.
- 3.10 NGOs/CBOs, private sectors may be supported to bring the community initiatives in the forefront.
- 3.11 New financial concepts/tools for risk transfer, insurance and management be promoted with the help of NGOs, government, insurance companies and financial institutions.
- 3.12 Local issues to be addressed by local government and the larger community issues to be addressed by the district and state government.
- 3.13 Capacity development programme for the local, district and state level officials of the government should be undertaken.
- 3.14 Transparency at all levels must be ensured.
- 3.15 Social audit at local levels should be made mandatory.

Early Warning Systems

1. Early Warning of Cyclone

1.1 The cyclone warning system comprises of 557 surface observatories, 38 Radiosonde stations and 65 Pilot Balloon stations. 10 cyclone detection S-band radars along the entire coastline of India including 3 Doppler S-Band radars in the east coast have also been installed. A satellite based Cyclone Warning Dissemination System (CWDS) has been operational since 1985. Under the system, 250 receiver antennas with audio warning receiver sets are placed in the coastal offices of the State Governments and other disaster management officials. The Area Cyclone Warning Centres of IMD have facility to uplink direct to the INSAT/Satellites. Cyclone warnings and messages in the regional language and English are broadcast by selectively activating the receivers in the field without losing any time.

1.2 After the Orissa Super Cyclone, advanced Doppler radars have been installed at three locations on the eastern coast which has made the tracking of cyclones more accurate, but such systems are not available in the west coast which makes weather prediction fairly primitive as was demonstrated during the unprecedented rainfall in Mumbai last year. There is need to improve the design of tide-gauge to capture storm surges and augmentation of their network along east and west coasts of India. Cyclone modeling should be done for all coastal areas prone to cyclone so that accurate and focused forecasts can be made about the level and extent of tide surge and inundation on the basis of which effective steps can be taken for evacuating people likely to be affected. Sometimes, generalized forecasts create unnecessary panic among the community and the administration ends up evacuating people from large tracts, which remain unaffected. Moreover, there is need to improve the system for rapid and prompt dissemination of early warning, to the community.

2. Early Warning of Floods

2.1 The Central Water Commission has established Flood Forecasting Centres (FFCs) in all major river catchments of India. A good network of stream flow measurement stations and rain gauges, supported by wireless network have been established. At present, the flood forecasting and warning network of CWC covers 62 major inter-state river basins with 132 water level forecasting stations and 25 inflow forecasting stations. Hydrological and hydro-meteorological data from nearly 700 stations in these river catchments are being collected and analyzed, and flood forecasting and warning messages are issued, generally 24 to 48 hours in advance. In case of large flood events, advisory forecasts are issued 72 hours in advance or more with details on extent and areas of impact. The FFCs are supported by the

Flood Meteorological Offices (FMOs) operated by India Meteorological Department. Quantitative precipitation forecasts based on the latest meteorological situation are provided by the FMOs to the FFCs. With the availability of satellite data, monitoring of major floods have been taken up by the National Remote Sensing Agency, Hyderabad. The flood inundation maps are provided to CWC and concerned State Government agencies.

2.2 The flood warning system in the country is reasonably accurate in normal times, but such warnings have been found to falter badly during times of heavy rainfall largely due to the absence of adequate number and proper maintenance of rain gauge stations and lack of timely transmission of data from the existing stations. Often, there is lack of coordination among departments in transmitting such information. For example, hydel power stations do not issue timely warnings to the irrigation and flood control departments regarding releases from dams and irrigation departments, which in turn, do not warn transport and railway authorities, as was demonstrated by the tragic submergence of a train in Andhra Pradesh, leading to a large number of casualties.

3. Early Warning of Drought

3.1 The prediction and early warning of drought is mainly based on three kinds of rainfall predictions.

- a) *Long range rainfall prediction:* Longs range forecasts for the country as a whole are being provided by India Meteorological Department since the year 1875. Use of parametric and power regression models and dynamic stochastic transfer models since 1989 has made these forecasts fairly accurate. The seasonal total rainfall for the entire country is predicted in the forecast.
- b) *Medium range rainfall prediction:* National Centre for Medium Range Weather Forecasting provides in advance weather forecast at every 1 deg. x 1 deg. grid. At present, the centre issues weekly forecast to 76 agro-meteorological advisory service units (AAS). Out of these, 42 units are given 3-day forecast.
- c) *Short range rainfall predictions:* India Meteorological Department, based on Indian National Satellite (INSAT) data supported with weather and Agromet observations, issues Farmer's Weather Bulletins twice a day. These forecasts are valid for 24 to 72 hours.

3.2 Forecasting of drought and its impact on agriculture needs to be further streamlined. Efforts being made in various institutions in the country should be integrated to devise models for drought prediction based on the experience of occurrence of drought conditions in the past few decades. Rigorous monitoring of drought conditions may be carried out at village level using a network of automatic weather stations and satellite data.

4. Seismic Monitoring

4.1 The India Meteorological Department (IMD) maintains round-the-clock watch of seismic activity in the country. The operational task of the department is to determine the earthquake parameters immediately after the occurrence of an earthquake anywhere in the country and disseminate the information to all concerned agencies. On the basis of trigger information received on line from the field observatories, the Central Receiving Station ascertains the occurrence of an earthquake in and around the country and collects the waveform and phase data from the field stations. After computer processing of the data received, a Preliminary Earthquake Report (PER) is generated giving details of the time of origin, location (latitude and longitude) and magnitude of the event. The PER is disseminated immediately, within 20-30 minutes depending upon the location and magnitude, to all the concerned state and central government agencies responsible for carrying out relief and rehabilitation measures. The information is also transmitted to other concerned agencies including public information channels, press, media etc.

The existing regional seismological network is broadly capable of locating earthquakes of various magnitudes, as per details given below:

- i) M: 3.5 and above in Peninsular region.
- ii) M:4.0 and above in the extra-Peninsular region and
- iii) M:5.0 and above in the border regions

To achieve the objective of locating earthquakes of magnitude 3.0 and above uniformly over the entire country, an optimum network design has been worked out, which consists of a total of 177 seismological observatories throughout the country. IMD is now believed to be in the process of upgrading its seismological network in a phased manner to meet these objectives. The ongoing upgradation plans include a 20-station telemetry system for Northeast India and a 40-station regional seismological network as part of an optimum

network plan for the country as a whole. The upgradation plan needs to be taken up and implemented on priority basis.

5. Tsunami Early Warning

5.1 In the aftermath of the Great Sumatra earthquake of 26th December, 2004, Government of India has initiated actions for setting up an Early Warning System for Tsunamis and Storm Surges in the Indian Ocean. The system is expected to be functional by September, 2007 and will help in providing advance warnings of Tsunamis and Storm Surges in the region. The Department of Ocean Development (DOD), Department of Science & Technology (DST), India Meteorological Department (IMD), Department of Space (DOS), and CSIR laboratories are the major agencies involved in this endeavor. An operational centre has been established by the DOD at Indian National Centre for Ocean Information Services (INCOIS), at Hyderabad on a 24X7 basis.

5.2 As part of the Tsunami Early Warning System, a 17 station Real Time Seismic Monitoring Network (RTSMN) is being set up by the Department of Science & Technology (DST). The seismological network is expected to be operational by July/August, 2006. Data from the Broadband seismic field stations will be transmitted in real time through V-SAT communication facilities to the Central Receiving Station (CRS) of IMD at New Delhi for processing and interpretation.

6. Early Warning of Landslides

6.1 At present, no early warning system for landslides is available in the country although landslides are monitored along important highways. There is need to step up R&D activities on prediction and forecasting of landslides, especially for early warning against reactivation of old landslides, repetitive landslides, those occurring in the areas known to be hazardous and areas close to dense human settlements.

Questionnaire for Disaster Management (For State/UT Governments)

1. PREPARATION

Preparation to face crises is the most important aspect. This preparation has to be by the Government agencies, the community *and the civil society at large inclusive of* volunteers, specialized functionaries like doctors etc.

- a. Does the existing set up for disaster management at the state and the district level require further strengthening? What are the suggestions?
- b. Is there a need to reorient the Civil Defence and the Home Guards set up towards disaster management also?
- c. What were the lessons learnt in respect of functioning of government machinery & structure during any recent disaster?
- d. How are the NGOs and the community made partners for disaster management in the formal set up?
- e. Has a vulnerability mapping of each district been done?
- f. Are disaster management plans prepared for districts and also sub-district levels like the municipalities and the blocks? How are all these plans integrated/ updated?
- g. Is the district management plan disseminated to the public? What is the mechanism?
- h. Should the police and some civilian officers be trained in disaster management? Similarly, should volunteers in disaster prone areas also be trained?
- i. How are the development plans and the long term disaster management plans being integrated?
- j. What steps have been taken for better enforcement of existing laws for prevention of disasters such as industrial accidents, epidemics etc.
- k. Have the building byelaws been modified in order to ensure that only disaster resistant building/structures come up in future?
- l. In case of earthquake-prone areas, is there a plan to retrofit the existing public buildings?

- m. What is the funds flow mechanism at the time of disasters?
- n. What steps have been taken to streamline procurement of relief materials at the time of crisis such that the process is transparent on the one hand and is quick on the other?
- o. Women, children, aged and the physically challenged are the most vulnerable groups in case of disasters. How to empower them to face disasters?
- p. Any suggestions to improve civil military synergies.
- q. Is there a disaster management set-up at the sub-district level?
- r. How often are the disaster management plans updated? Is there any periodical mock rehearsal, especially in the disaster prone areas?
- s. Is there a mechanism to assess the district's preparedness for disaster management/ any suggestions?

2. EARLY WARNING

Major natural disasters like floods & drought are cyclic in their re-occurrence in the same areas of the country year after year. Advance action to prevent or mitigate their impact is possible. To be forewarned is to be forearmed. Technology is now available which can give adequate advance notice in the case of cyclones and quite a few hours in case of Tsunami.

- a. What are the gaps in our existing warning systems?
- b. Are these gaps due to technological constraints? If no, what may be / are the reasons?
- c. How can the common citizen / the public be given the early warnings? What are the best practices, which can be followed / replicated?
- d. What, in your opinion, can be done to bring closer the knowledge institutions, disaster management agencies and community-based organizations?
- e. What technologies can you suggest to provide assistance in managing disasters? Kindly state whether there is access to the availability of those technologies. Kindly also state about the usefulness of these technologies.

3. QUICK RESPONSE

The governmental system in India comprises the Union Government in New Delhi & the State Governments, in the state capitals. The district administration represents the

governmental system closest to people and the community followed by the block development agencies. The first responder in any disaster situation is the community, which has traditionally risen invariably to provide relief and help to the needy at the earliest.

- a. What measures would you suggest to ensure that the response is timely and quick?
- b. How can the panchayati raj system and the local municipalities be empowered to come to the aid of the community in a disaster situation?
- c. Is it possible to have a group of volunteers trained to provide hands-on-relief at say, every district headquarters to enable quick response whenever needed? If so, what should be its size? Can home guards fulfil this role?
- d. Shouldn't the civil police be trained for emergency relief work? Can this help in changing their public image?
- e. What are the different types of interventions to strengthen indigeneous coping mechanisms, promote collective wisdom and social networking?
- f. How would you like the lessons learnt after each disaster to be kept alive / retained and institutionlised for suitable preventive action in future?
- g. What is the existing system of fund flow at the time of disasters? Is there adequate delegation of financial powers to the districts? How to improve the fund flow mechanism at the time of disasters?

4. MANAGING RELIEF

The electronic media has reduced the response time to a major disaster, of the whole world - in any place in the world, as also anywhere in the world. As a result, relief material & expertise begin to pour in at the nearest airports and railway stations for being taken/ carried to wherever it is required. Even the district headquarters of the affected districts get flooded with relief material and gets over-crowded with volunteers & experts of all types, who along with the district administration in the recipient district are sometimes unprepared in dealing with this inflow of men & materials. At times, some of these materials may not be of much use as they are not really necessary.

- a. After disaster, relief in various forms pours in. How should this be streamlined and coordinated? What should be the mechanism of informing the requirements of aid to various agencies?

- b. A large number of NGOs move in immediately after a disaster takes place. What should be the coordination mechanism for them?
- c. After the initial rush of aid and relief material, help generally reduces. How to ensure that the relief and rehabilitation measures are sustained during the time of need?

5. RESTORATION & REHABILITATION

- a. Should there be a policy defining the rehabilitation package?
- b. Interventions of different agencies in the restoration and rehabilitation effort may create disparities in the package. How to bring about uniformity in the rehabilitation efforts?
- c. Every disaster traumatizes the affected population, specially the women & children. How can this phenomenon be addressed, considering that revival to normalcy is a slow process?

6. PROMOTING A CULTURE OF SAFETY

- a. How can safety concerns be built into the extra/co- curricular activities of our students in schools, colleges, professional institutes & universities and the community at large?

Questionnaire for Disaster Management (For NGOs)

1. PREPARATION

Preparation to face crises is the most important aspect. This preparation has to be by the government agencies, the community *and the civil society at large inclusive of* volunteers, specialized functionaries like doctors etc.

- a. Is the present governmental set up set up adequate for handling disasters? Keeping in focus that different types of crises would demand different requirements, what, according to you/your organisation should be the organisational set up for disaster management at the state and the district levels?
- b. How should the community be prepared to face crisis? What should the community be taught to prepare it to face any crisis?
- c. In what way should the community be involved in preparing the disaster management plan for a district/area?
- d. How should the disaster management plan be disseminated to the community?
- e. What roles could be played by the NGOs in the preparatory phase?
- f. What should be the role of the corporate sector? How can they be best utilised as they have financial resources, equipments and a trained workforce?
- g. There are disasters like industrial accidents, epidemics etc, which can be prevented by proper enforcement of existing regulations. What are the reason(s) *for not enforcing these regulations?* What measures would you suggest for proper enforcement of such regulations?
- h. How to integrate the development plans with long term disaster mitigation plans?
- i. How to address the public health issues such that disasters due to epidemics are prevented?
- j. Women, children, aged and the physically challenged are the most vulnerable groups in case of disasters. How to empower them to face disasters?

2. EARLY WARNING

Major natural disasters like floods & drought are cyclic in their re-occurrence in the same areas of the country year after year. Advance action to prevent or mitigate their impact is possible. To be forewarned is to be forearmed. Technology is now available which can give adequate advance notice in the case of cyclones and quite a few hours in case of Tsunami.

- a. What are the gaps in our existing warning systems?
- b. Are these gaps due to technological constraints? If no, what may be / are the reasons?
- c. How can the common citizen / the public be given the early warnings? What are the best practices, which can be followed / replicated?
- d. What, in your opinion can be done to bring closer the knowledge institutions, disaster management agencies and community-based organizations?
- e. What technologies can you suggest to provide assistance in managing disasters? Kindly state whether there is access to the availability of those technologies. Kindly also state about the usefulness of these technologies.
- f. The heroic elements in society come forward in such tragic situations. How best can they be mobilized to provide relief?
- g. A disaster also provides opportunities to the basest elements in society. Kindly suggest ways to hold them in check?

3. QUICK RESPONSE

The governmental system in India comprises the Union Government in New Delhi & the State Governments, in the state capitals. The district administration represents the governmental system closest to people and the community followed by the block development agencies. The first responder in any disaster situation is the community, which has traditionally risen invariably to provide relief and help to the needy at the earliest.

- a. What measures would you suggest to ensure that the response is timely and quick?
- b. How can the panchayati raj system and the local municipalities be empowered to come to the aid of the community in a disaster situation?

- c. Is it possible to have a group of volunteers trained to provide hands-on-relief at say, every district headquarters to enable quick response whenever needed? If so, what should be its size? Can home guards fulfil this role?
- d. Shouldn't the civil police be trained for emergency relief work? Can this help in changing their public image?
- e. What are the different types of interventions to strengthen indigeneous coping mechanisms, promote collective wisdom and social networking?
- f. How would you like the lessons learnt after each disaster, to be kept alive / retained and institutionlised for suitable preventive action in future?

4. MANAGING RELIEF

The electronic media has reduced the response time to a major disaster, of the whole world - in any place in the world, as also anywhere in the world. As a result, relief material & expertise begin to pour in at the nearest airports and railway stations for being taken/ carried to wherever it is required. Even the district headquarters of the affected districts get flooded with relief material and gets over-crowded with volunteers & experts of all types, who along with the district administration in the recipient district are sometimes unprepared in dealing with this inflow of men & materials. At times, some of these materials may not be of much use as they are not really necessary.

- a. After disaster, relief in various forms pours in. How should this be streamlined and coordinated? What should be the mechanism of informing the requirements of aid to various agencies?
- b. A large number of NGOs move in immediately after a disaster takes place. what should be the coordination mechanism for them?
- c. After the initial rush of aid and relief material, help generally reduces. How to ensure that the relief and rehabilitation measures are sustained during the time of need?

5. RESTORATION & REHABILITATION

- a. Should there be a policy defining the rehabilitation package?
- b. Interventions of different agencies in the restoration and rehabilitation effort may create disparities in the package? How to bring about uniformity in the rehabilitation efforts?

- c. Every disaster traumatizes the affected population specially the women & children. How can this phenomenon be addressed, considering that revival to normalcy is a slow process?

6. PROMOTING A CULTURE OF SAFETY

- a. How can safety concerns be built into the extra/co-curricular activities of our students in schools, colleges, professional institutes & universities and the community at large?

Questionnaire for Disaster Management (For Collectors of Districts)

1. PREPARATION

Preparation to face crises is the most important aspect. This preparation has to be by the government agencies, the community *and the civil society at large inclusive of* volunteers, specialized functionaries like doctors etc.

- a. Does the existing set up for disaster management at the state and the district level require further strengthening? What are the suggestions?
- b. Is there a need to reorient the Civil Defence and the home guards set up towards disaster management also?
- c. What were the lessons learnt in respect of functioning of government machinery & structure in any recent disaster?
- d. How are the NGOs and the community made partners for disaster management in the formal set up?
- e. Has a vulnerability mapping of each district been done?
- f. Are disaster management plans prepared for districts and also sub-district levels like the municipalities and the blocks? How are all these plans integrated/ updated?
- g. Is the district management plan disseminated to the public? What is the mechanism?
- h. Should the police and some civilian officers be trained in disaster management? Similarly, should volunteers in disaster prone areas also be trained?
- i. How are the development plans and the long term disaster management plans being integrated?
- j. What steps have been taken for better enforcement of existing laws for prevention of disasters such as industrial accidents, epidemics etc.
- k. Have the building byelaws been modified in order to ensure that only disaster resistant building/structures come up in future?
- l. In case of earthquake-prone areas, is there a plan to retrofit the existing public buildings?

- m. What is the funds flow mechanism at the time of disasters?
- n. What steps have been taken to streamline procurement of relief materials at the time of crisis such that the process is transparent on the one hand and is quick on the other?
- o. Women, children, aged and the physically challenged are the most vulnerable groups in case of disasters. How to empower them to face disasters?
- p. Any suggestions to improve civil military synergies?
- q. Is there a disaster management set up at the sub-district level?
- r. How often are the disaster management plans updated? Is there any periodical mock rehearsal, especially in the disaster prone areas?
- s. Is there a mechanism to assess the district's preparedness for disaster management/ any suggestions?

2. EARLY WARNING

Major natural disasters like floods & drought are cyclic in their re-occurrence in the same areas of the country year after year. Advance action to prevent or mitigate their impact is possible. To be forewarned is to be forearmed. Technology is now available which can give adequate advance notice in the case of cyclones and quite a few hours in case of Tsunami.

- a. What are the gaps in our existing warning systems?
- b. Are these gaps due to technological constraints? If no, what may be / are the reasons?
- c. How can the common citizen / the public be given the early warnings? What are the best practices, which can be followed / replicated?
- d. What, in your opinion can be done to bring closer the knowledge institutions, disaster management agencies and community-based organizations?
- e. What technologies can you suggest to provide assistance in managing disasters? Kindly state whether there is access to the availability of those technologies. Kindly also state about the usefulness of these technologies.

3. QUICK RESPONSE

The governmental system in India comprises the Union Government in New Delhi & the State Governments, in the state capitals. The district administration represents the governmental system closest to people and the community followed by the block development agencies. The first responder in any disaster situation is the community, which has traditionally risen invariably to provide relief and help to the needy at the earliest.

- a. What measures would you suggest to ensure that the response is timely and quick?
- b. How can the panchayati raj system and the local municipalities be empowered to come to the aid of the community in a disaster situation?
- c. Is it possible to have a group of volunteers trained to provide hands-on-relief at say, every district headquarters to enable quick response whenever needed? If so, what should be its size? Can home guards fulfil this role?
- d. Shouldn't the civil police be trained for emergency relief work? Can this help in changing their public image?
- e. What are the different types of interventions to strengthen indigeneous coping mechanisms, promote collective wisdom and social networking?
- f. How would you like the lessons learnt after each disaster to be kept alive / retained and institutionlised for suitable preventive action in future?

4. MANAGING RELIEF

The electronic media has reduced the response time to a major disaster, of the whole world - in any place in the world, as also anywhere in the world. As a result, relief material & expertise begin to pour in at the nearest airports and railway stations for being taken / carried to wherever it is required. Even the district headquarters of the affected districts get flooded with relief material and gets over-crowded with volunteers & experts of all types, who along with the district administration in the recipient district are sometimes unprepared in dealing with this inflow of men & materials. At times, some of these materials may not be of much use as they are not really necessary.

- a. After disaster, relief in various forms pours in. How should this be streamlined and coordinated? What should be the mechanism of informing the requirements of aid to various agencies?

- b. A large number of NGOs move in immediately after a disaster takes place. What should be the coordination mechanism for them?
- c. After the initial rush of aid and relief material, help generally reduces. How to ensure that the relief and rehabilitation measures are sustained during the time of need?
- d. What is the existing system of fund flow at the time of disasters? Is there adequate delegation of financial powers to the districts? How to improve the fund flow mechanism at the time of disasters?

5. RESTORATION & REHABILITATION

- a. Should there be a policy defining the rehabilitation package?
- b. Interventions of different agencies in the restoration and rehabilitation effort may create disparities in the package. How to bring about uniformity in the rehabilitation efforts?
- c. Every disaster traumatizes the affected population, specially the women & children. How can this phenomenon be addressed, considering that revival to normalcy is a slow process?

6. PROMOTING A CULTURE OF SAFETY

- a. How can safety concerns be built into the extra/co- curricular activities of our students in schools, colleges, professional institutes & universities and the community at large?

Designed & produced by Ashok Creatives, India Tourism Development Corporation and printed at M/s. Shree Om Enterprises Pvt. Ltd.,
New Delhi - 110 020.