THE REPORT

of

HIGH POWERED COMMITTEE

ON

DISASTER MANAGEMENT

NATIONAL CENTRE FOR DISASTER MANAGEMENT

INDIAN INSTITUTE OF PUBLIC ADMINISTRATION

HIGH POWERED COMMITTEE

on

DISASTER MANAGEMENT

REPORT



DEPARTMENT OF AGRICULTURE AND COOPERATION

MINISTRY OF AGRICULTURE

GOVERNMENT OF INDIA

October, 2001

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A number of Sub Groups and Sub Committees were set up and Research Studies commissioned by the HPC, and material from these has been heavily drawn upon towards preparation of the final HPC Report. All views expressed in these reports do not necessarily represent the considered opinion of the HPC.

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Vision

Disaster Free India

विकास ऐसा हो जो आफत से बचाए ।
विकास ऐसा हो जो आफत न बन जाए ।।

An ounce of practice is far better than tons of precepts

SOLEMN PLEDGE*

We, the members of the nationwide network - VASUDEVA, take this solemn pledge, that in times of disaster in any part of our dear motherland, and in normal times, as a preparatory measure, practice and promote, one or all of the following obligations.

1. Donation - दान
2. Grant- अनुदान
3. Offering co-operation - योगदान
4. Skill application - प्रतिभादान and
5. Offering services - समयदान।

* Adopted in the NGO Consultation at Vivekananda Kendra, Kanyakumari on September 7-9, 2000

जगदीश चन्द्र पन्त
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D.O. no.1-21/2001-NCDM(HPC)

Dated: October 8th-2001

Dear Shri Ajit Singh,

I have great pleasure in submitting the Report of the High Powered Committee (HPC) on Disaster Management, set up with the approval of the Prime Minister, in August, 1999 by the Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India along with the National Disaster Response Plan.

As you are aware, the mandate and scope of the Committee was enlarged in April, 2000 to cover man-made disasters as well including chemical, industrial and nuclear disasters. The large number of disasters i.e. 30 odd, which were identified by the Committee, and the complexity of various issued involved in the nature of disasters and the system of planning relating to each one of these required much greater thought and examination than was perhaps originally envisaged. In this process the Committee interacted with diverse cross section of the governmental system as well as society in general throughout India in order to address its task comprehensively.

The Committee was also required to submit state and district model plans for management of disasters. While several steps were initiated by the Committee to accomplish this task, it was felt that it will be best for the states and districts to do it themselves in a participatory manner so that state specific an district specific plans could be formulated which adequately reflect the fervour and the hazard peculiarities of the state and the district concerned. Apart from finalising a Source Book on disaster management Plans, which was wisely circulated in

the country, we have also tried to include Guiding Principles for formulation of state plans and Framework for preparation of district plan in the Report. Now, with the finalization of the Report of the Committee with several recommendations of far reaching consequences, it is hoped that the formulation of the district and state plans will be facilitated.

Considering the importance of community preparedness, the HPC also initiated some concrete steps for involvement of Panchayati Raj institutions and Urban local bodies for preparation of community, family as well as individual preparedness plans.

This indeed is the first step towards a long journey which we have to take in our country towards disaster preparedness. Our hope in submitting this Report is that it will contribute to the deepening of understanding of many complex issues which are involved in this task. The implementation of the recommendations should make it feasible to usher in a new culture of disaster management so that country is not only prepared to prevent disasters we already know of but also of those that may become possibilities in times to come.

Yours sincerely,



(J.C. Pant)

Shri Ajit Singh,
Union Agriculture Minister,
Govt. of India,
Krishi Bhavan,
New Delhi.

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The policy and arrangements for meeting relief expenditure are, by and large based on the recommendations of successive Finance Commissions. Earlier, margin money was allocated to each State for meeting immediate needs of expenditure on relief measures. The quantum of margin money was calculated by averaging non-plan expenditure (excluding advance plan assistance and expenditure of a plan nature) on relief measures.

- While a seperate Fund should be created as provided earlier, there should also be

- The Ministry of Agriculture is also required to monitor whether the

reasons, it is not possible to keep the Fund in a nationalized bank or invest in a manner approved by the Ministry of Finance, it may be kept in the Public

---

Chap-10-Corrcation

1. General
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have been found. Malaria is endemic in most parts of the country. RMRC, Port Blair plays a leading role in the field of leptosporosis by undertaking studies in different fields like epidemiology, diagnostics, disease

- aid co-ordination with the Central Relief Management Agency.

- Water and climate related disaster

MAPPING

learning from one another's experience carries the potential seldom appreciated. Department

PREFACE

1. As we wind-up the two-year exercise of the High Powered Committee (HPC) in a few days time, the world has witnessed the worst kind of human tragedy that struck the World Trade Centre and other establishments in USA This human tragedy is a stark reminder of the fact that in today's world, we not only have to prepare ourselves for the prevention of hazards we already know of but also of those that we may have to imagine as possibilities.

2. In the extensive journey of the HPC which has lasted for a little over two years, what initially appeared to be a task of making disaster management plans gradually got enlarged into a gigantic national exercise involving practically all sections of society throughout the country. While the Committee's deliberations started with an analysis of the vulnerability of India to natural hazards only, it was soon realized that in terms of planning and "consequence management", keeping a distinction between natural and manmade disasters would amount to taking too technical a view of human sufferings caused by disasters. It was felt that from the point of view of the role of various stakeholders, it would be prudent to enlarge the scope of the Committee's work to include non-natural disasters also. The terms of reference of the Committee were accordingly modified. It transpires that this has been the first ever such exercise in India where in an attempt has been made to take a look at all kinds of disasters in a holistic manner.

3. The Committee followed a highly process-oriented and participatory approach at the national, state and district levels involving all concerned governments, ministries, departments, scientific, technical, research & development organizations, social science institutions and covering more than a hundred non-governmental organizations. Care was also taken to consult a representative cross-section of urban local bodies as well as Panchayati Raj institutions. As the deliberations of the Committee intensified into a nation-wide consultation at all levels, the country continued to face several disasters including Orissa Super-cyclone of October, 1999, drought in various parts of the country and the worst ever earthquake in Gujarat in January, 2001. It is said that disasters offer a unique opportunity to learn, and the Committee indeed tried to learn lessons from various disasters which took place in the country and outside, and to incorporate their lessons in its thinking in terms of improving the proposed strategy to cope with disasters. The set-up that the committee is proposing would provide for such a process of continuous learning at all levels.

4. As the deliberations further unfolded, it was realized that the focus of planning must shift to taking a look at the whole cycle of disasters rather than only the post disaster relief and rehabilitation aspects. The loss of life and property which took place in Gujarat on 26th January this year should really be "unacceptable" to a modern-day society and equally to our country. The HPC, therefore, attempts to provide a new conceptual framework to reduce the impact of these disasters by focusing on preparedness for their prevention and reduction, as well as on their mitigation. Hazard mitigation involves recognizing and adapting to natural forces, rather than on countering them, and this approach is further elaborated as a process of sustained action which is to be taken over a long timeframe to reduce or even eliminate the long-term and short-term risks to human life and property. The national strategy, therefore, should aim at bringing about a fundamental change in the mindset of all the role players and the community about hazard risks, preparedness for their prevention and mitigation, and the fact timely prevention is often far more cost effective than post disaster relief and rehabilitation.

5. Suffering due to disaster permeate and touch all aspects of our lives national, social as wall as individual, and people sitting in their homes can see live, through the media and information technology, as to how we respond to and manage disasters Expectations of people have appropriately risen high and therefore, disaster management today defined the agenda of good governance. The Committee presents to the nation a strong case for ushering in a new culture of disaster management which will stand on the four pillar of:

   - Culture of Preparedness;
   - Culture of Quick Response;
   - Culture of Strategic Thinking; and
   - Culture of Prevention

   The new culture rests on the premise that in today's society while hazards- natural as well as manmade are inevitable, the disasters that follow need not be that inevitable, and the society can be prepared to cope with them effectively whenever they occur.

6. We hope that with the setting-up of an all-party National Committee on Disaster Management under the chairmanship of the Prime minister, the implementation of the HPC's recommendations and the follow-up action thereon would get the necessary attention at the highest and other levels. It will also hopefully generate an informed debate in the country so as to create the necessary national will, consensus and support to its quick implementation at the national level and down to the village and community levels. We are happy that the High Powered Committee already stands converted into a Working Group under the overall guidance of Shri Sharad Pawar, Member of Parliament and Vice-Chairman

of the National Committee. We believe that his process would facilitate that implementation of the recommendations of the HPC and ensure that they see the light of the day in right earnest.

7. The preparation of the Report would not been possible without the tremendous support and valuable contribution from a large number of individuals, experts and organizations which we received from all parts of the country as well as from abroad. The Report sincerely tries to reflect their ideas, views and experiences, and an attempt has been made to capture as must as possible and transform these ideas into real actions by ways of concrete and specific recommendations.

8. I am thankful to the Ministry of Agriculture in general and the Department of Agriculture and Cooperation (DAC) in particular, who provided all the necessary support throughout the tenure of the Committee. I am also grateful to all the ministries/departments of Govt. of India, state governments, NGO's and others who have made valuable contributions and made this exercise possible. In particular, I would like to thank the Indian Institute of Public Administration (I.I.P.A.) and Shri M. C. Gupta, it Director for having provided all the infrastructure and other support throughout the term of the Committee. The tireless effort put in by Shri Anil Sinha, Member –Secretary, initially along with his onerous duties of Joint Secretary, NDM division (DAC), and subsequently as Head, N.C.D.M. and his indefatigable concern for the Committee's formidable task has been a matter of great satisfaction to all the members and me personally. The National Centre for Disaster Management (N.C.D.M.) and its team of dedicated, enthusiastic and sincere staff deserve the highest appreciation for bringing the report of the committee into its present shape.



(K. Pant)
Chairman,
High Powered Committee on Disaster Management

Dated: 29.9.2001

ACKNOWLEDGEMENTS

Due to the increasing frequency of natural disasters and theur severe impact on the individuals, society, economy and environment, Government of India constituted, in August 1999, a High Powered Committee (HPC) on Disaster Management under the Chairmanship of Shri J. C. Pant to suggest measures to bring about institutional reforms in the field and planning of disaster management. The Committee was also required to prepare comprehensive plans for National, State and district levels. Soon after its formation, the scope of the Committee was enlarged to include man-made disasters like chemical, industrial, nuclear and others.

As it turns out, this happens to be the first such organised effort at the highest level to take a holistic look at the management of disasters in India. The final report of the Committee spread over several volumes is an outcome of extensive nation-wide deliberations and consultations held with various stake holders like professionals, practitioners, experts, institutions, organisations and governments at different levels including urban local bodies and panchayati raj institutions. Large number of people made their valuable contribution to this historic national exercise to make it successful. It has genuinely been a challenge to assimilate and capture the total wisdom of this exercise. Various constraints of infrastructure and other factors notwithstanding, I alongwith my team, have tried our sincere best to do justice to this task of far reaching consequences.

It is not only difficult but also impossible to thank all those who gave their valuable time and made immense contribution in this important national endeavour.

First and foremost, I would like to thank the Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India for entrusting this onerous responsibility to us in the National Centre for Disaster Management and then full support throughout the term of the Committee.

My sincere gratitude to Shri Sompalji, Member, Planning Commission and former Union Minister of State for Agriculture whose vision led to the setting up of the Committee; also to Shri Nitish Kumar, Union Railway Minister and former Agriculture Minister for his personal interest and valuable guidance which we received from time to time, and to Shri Ajit Singh, Union Agriculure Minister for his support and guidance in accomplishing this task. Also my thanks to Shri Sripad Nayak, Minister of State for Agriculture for his encouragement from time to time. We are beholden to Shri Sharad Pawar, Member of Parliament and Vice-Chairman, National Committee on Disaster Management for his encouragement and guidance in completing this task.

In the Chairmanship of Shri Pant we had a visionary and a down to earth practitioner who transformed the work of the Committee into a mass movement with a strong participatory and process-oriented approach involving various cross sections of the society. I genuinely fail to find appropriate words to thank him, however, I would like to pay my gratitude and thanks for his continuous guidance and support at every step.

I am grateful to all concerned Ministries, Departments and other organisations for their cooperation and participation in various activities. Thanks are due to all international agencies, United Nations Organisations, World Bank, various Academic and Technical Institutions for their many sided help.

Grateful acknowledgements are due to Shri J. N. L. Srivastava, Secretary, Department of Agriculture and Cooperation, Ministry of Agriculture whose able confident guidance and support has helped in finalising this Report. My sincere thanks to Shri Bhaskar Barua, former Agriculture Secretary during whose tenure this work was initiated for his encouragement.

I would also like to thank Shri Ashok Pradhan, Central Relief Commissioner and Special Secretary, Ministry of Agriculture, Shri Naved Masood, Joint Secretary, Shri P. Michael V. Siromony, Shri S. K. Swami, Shri V. P. Pasrija and other officials of NDM Division for their full support. My sincere thanks are due to Shri Bhagat Singh, former Addl. Secretary and Central Relief Commissioner, who has been a continuous source of inspiration. I am grateful to Shri S. K. Purkayastha, former Central Relief Commissioner for providing valuable suggestions from time to time.

I am immensely grateful to each HPC member individually for their active interest, valuable academic support, dedication and sincere efforts in preparing the final report. My thanks to Shri M. C. Gupta, Director, IIPA, who is also a member of the Committee for not only providing space for the HPC secretariat in the NCDM but also for his valuable guidance and encouragement at every stage. Shri R. R. Shah, former Secretary RM&M in the Cabinet Secretariat provided a lot of inputs to the HPC and we gratefully acknowledge his very thoughtful suggestions and recommendations.

I am also grateful to all Chairman and all members of HPC Sub-Groups, MSP Sub-Groups and Sub-Committees and experts whose contributions have been invaluable. I am grateful to various institutions of scientific and technical research, social science research and NGOs i.e. DMI, Ahmedabad; DMI, Bhopal; Shantikunj, Hardwar; Vivekananda Kendra, Kanyakumari; Ramakrishna Mission Ashram, Narendrapur; Himalayan Jan Kalyan evam Bal Vikas Samiti, Rudraprayag; Gyan Vigyan Samiti, Assam, Guwahati; Council of Boards of School Education; and 600 NGOs whose co-operation was forthcoming in facilitating HPC-NGO deliberations at different places and in conceptualising the NGO network and Knowledge Based Network in the country.

I am extremely grateful to Lal Bahadur Shastri National Academy of Administration, Mussoorie, who facilitataed several sensitisation workshops for relief commissioners and ATI faculties on disaster management and a special word of grateful thanks to Prof. L. C. Singhi who helped in the drafting and finalisation of the National Calamity Management Act.

I would like to thank my colleague Dr Vinod K Sharma, Professor, Disaster Management, NCDM, IIPA, who was of great strength to me right from the beginning and sparing his valuable time in finalising this report.

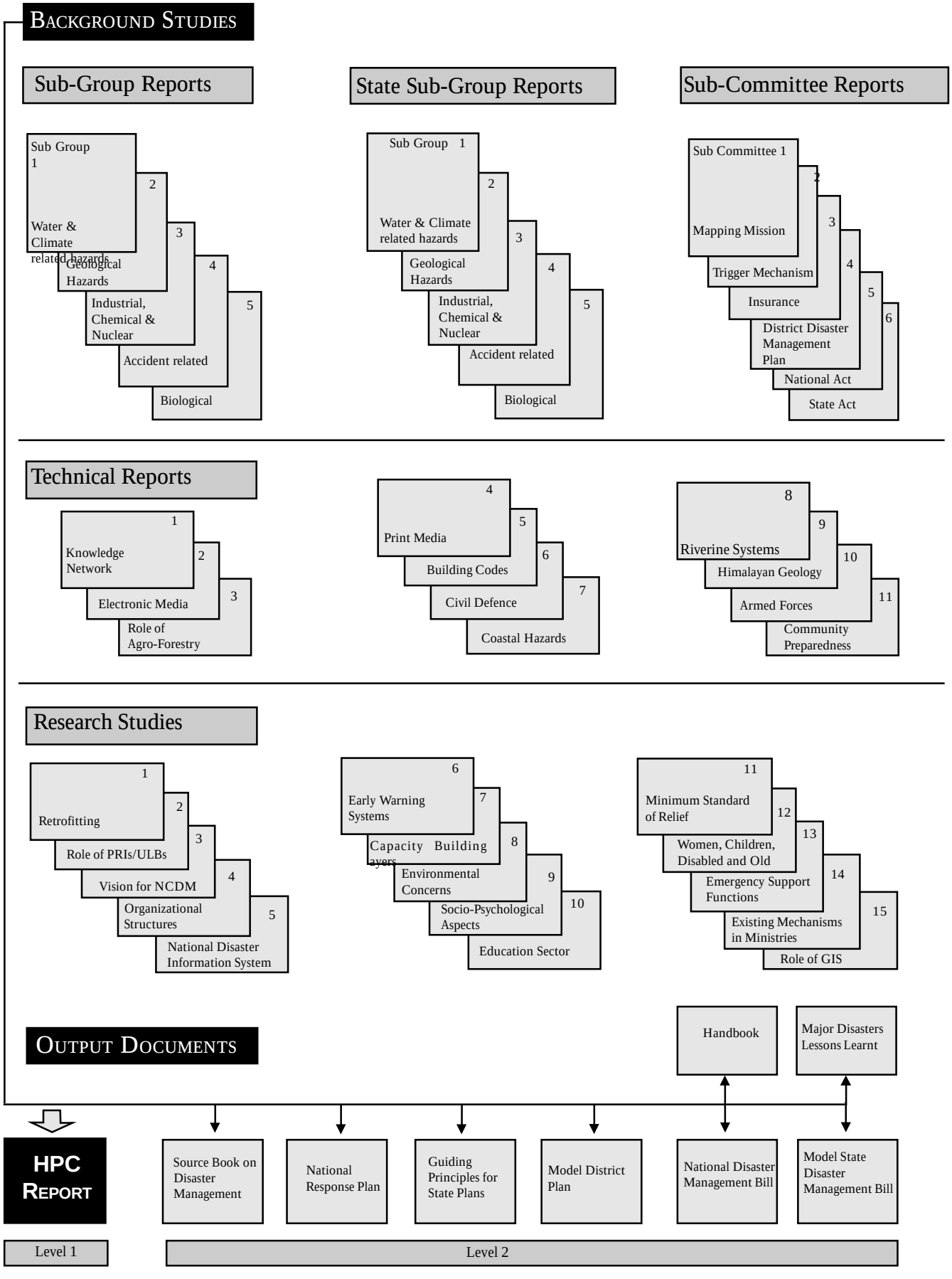
I am thankful to Shri Anshu Sharma and Shri Manu Gupta from SEEDS, New Delhi, Ms Shveta Mathur and Ms Sucharita Mookherjee from CSDMS, NOIDA, Col. Kohli and Ms Parul Choudhary for working endless hours with me and for their valuable contribution in conceptualising, editing and giving final shape to this report.

The academic and secretarial support from NCDM staff, particularly Ms Chandrani Bandopadhyay, Mr Harsh V Kalra, Mr Shekher Chaturvedi, Mr Ahmed Kamal, Mr Sandeep Patil and Ms Megha for their enthusiastic and sincere efforts in organising HPC meetings, writing minutes and assisting in all other academic work of the HPC. Last but not the least, I am also thankful to my personal staff viz. Mrs Krishna Kumari and Mr Pearey Lal for their dedicated services in accomplishing this task.



(Anil Sinha)

Head, NCDM &
Member Secretary, HPC
Dated : 29.09.2001


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HPC REPORT

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- Health and Medical Response System – Response Team Description Manual (USA)
- Norwegian Mobile Hospitals and Disaster Units

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- Knowledge Network – Centre for Disaster Mitigation and Management, Anna University Chennai

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ABBREVIATIONS USED IN FINAL REPORT OF HPC

ATI	Administrative Training Institute
BSG	Bharat Scouts and Guides
BUCFAC	Building Code Formulators and Administrators Conference of India
CABE	Central Advisory Board on Education
CAP	Contingency Action Plan
CARE	Cooperation for Assistance and Relief Everywhere
CASA	Church's Auxiliary for Social Action
CBO	Community Based Organization
CCDM	Cabinet Committee on Disaster Management
CD	Civil Defence
CDPC	Central Disaster Preventive Council
CISF	Central Industrial Security Force
CMG	Crisis Management Group
CRC	Central Relief Commissioner
CRF	Calamity Relief Fund
CRRI	Central Road Research Institute
CRRID	Center for Research in Rural and Industrial Development
CSIR	Centre for Scientific and Industrial Research
CWC	Central Water Commission
DAC	Department of Agriculture and Cooperation
DFID	Department For International Development
DG	Director General
DGCD	Director General Civil Defence
DGMS	Directorate General of Mines Safety
DIET	District Institute of Education and Training
DMAT	Disaster Medical Assistance Team
DMB	Disaster Management Bureau
DMI	Disaster Management Institute
DMP	Disaster Management Plan
DRDA	District Rural Development Agency
DSL	Digital Subscriber Line

EAP	Emergency Action Plan
EGS	Employment Guarantees Scheme
EIC	Emergency Information Centre
EMP	Emergency Management Plan
EOC	Emergency Operations Centre
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
FFW	Food For Work
FSI	Forest Survey of India
GDIN	Global Disaster Information Network
GESI	Global Earthquake Safety Initiative
GIS	Geographical Information System
GPS	Global Positioning System
GSDMA	Gujarat State Disaster Mitigation Authority
HAM	Ham Radio
HAZUS	Hazard US
HF	High Frequency
HLCR	High Level Committee on Relief
HPC	High Powered Committee
IAEA	International Atomic Energy Agency
IAS	Indian Administrative Service
ICDS	Integrated Child Development Scheme
ICMP	Integrated Crisis Management Plan
ICMR	Indian Council for Medical Research
ICS	Incident Command System
IDNDR	International Decade for Natural Disaster Reduction
IIPA	Indian Institute of Public Administration
IIRS	Indian Institute of Remote Sensing
IMD	Indian Meteorological Department
IMDMCC	Inter-Ministerial Disaster Management Coordination Committee
INSARAG	International Search and Rescue Assistance group
IPS	Indian Police Service
IRS	Indian Remote Sensing

ITBP	Indo Tibetan Border Police
JE	Junior Engineer
JRY	Jawahar Rozgar Yojana
KMVN	Kumaon Mandal Vikas Nigam
LAN	Local Area Network
LBSNAA	Lal Bahadur Shastri National Academy of Administration
MAT	Medical Assistance Team
MDMR	Ministry of Disaster Management and Relief
MFR	Medical First Responders
MIC	Methyl Isocyanides
MoAH	Ministry of Animal Husbandry
MoC	Ministry of Communications
MoCA	Ministry of Civil Aviation
MoCAPD	Ministry of Consumer Affairs and Public Distribution
MoCI	Ministry of Commerce and Industry
MoD	Ministry of Defence
MoEA	Ministry of External Affairs
MoF	Ministry of Finance
MoHFW	Ministry of Health and Family Welfare
MoHI	Ministry of Heavy Industries
MoIB	Ministry of Information and Broadcasting
MoIT	Ministry of Information Technology
MoL	Ministry of Labour
MoNCR	Ministry of Non Conventional Energy Resources
MoP	Ministry of Power
MoPNG	Ministry of Petroleum and Natural Gas
MoRD	Ministry of Rural Development
MoSCT	Ministry of Science and Technology
MoSJE	Ministry of Social Justice and Empowerment
MoST	Ministry of Surface Transport
MoU	Memorandum of Understanding
MoWR	Ministry of Water Resources
NBC	Nuclear, Biological, Chemical

NCC	National Cadet Corps
NCCF	National Calamity Contingency Fund
NCCM	National Centre for Calamity Management
NCDM	National Centre for Disaster Management
NCMC	National Crisis Management Committee
NCRC	National Calamity Relief Fund Committee
NDDR	National Day for Disaster Reduction
NDM	Natural Disaster Management
NDMAC	National Disaster Management Advisory Committee
NDMC	National Disaster Management Council
NDRP	National Disaster Response Plan
NFCR	National Fund for Calamity Relief
NGOs	Non Governmental Organizations
NIAR	National Institute of Amateur Radio
NIRD	National Institute of Rural Development
NSS	National Service Scheme
NSSCD	National Surveillance Program for Communicable Diseases
NYK	Nehru Yuvak Kendra
OCHA	Office for Coordination of Humanitarian Assistance
OFDA	Office for Disaster Assistance
OPCW	Organization for Prevention of Chemical Warfare
OSDMA	Orissa State Disaster Mitigation Authority
OSOCC	On Site Operations Coordination Center
PAHO	Pan American Health Organization
PDPC	Prefectural Disaster Prevention Council
PM	Prime Minister
PRIs	Panchayati Raj Institutions
PSUs	Public Sector Undertakings
PWD	Public Works Department
RADIUS	Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters
R&D	Research and Development
SAARC	South Asia Association for Regional Cooperation
SCDO	State Counter Disaster Organisation

SEEDS	Sustainable Environment and Ecological Development Society
SIRDs	State Institutes of Rural Development
SOP	Standard Operations Procedure
SRC	State Relief Commissioner
S&T	Science and Technology
SUMA	Supplies Management
TAD	Transboundry Animal Diseases
TFC	Tenth Finance Commission
TTI	Teachers Training Institute
TV	Television
UCC	Union Carbide Chemical
UN	United Nations
UNDP	United Nations Development Program
UNDAC	UN Disaster Assessment and Coordination
UNEP	United Nations Environment Program
UP	Uttar Pradesh
USA	United States of America
USAID	United States Agency for International Development
UNDRO	United Nations Disaster Relief Office
USAT	Ultra Small Aperture terminals
UHF	Ultra High Frequency
USSR	Union of Soviet Socialist Republics
ULBs	Urban Local Bodies
VA	Voluntary Agency
VASUDEVA	Voluntary Agencies for Sustainable Universal Development and Emergency Voluntary Action
VHF	Very High Frequency
VCO	Voluntary Community Organization
VSAT	Very Small Aperture Terminal
WAN	Wide Area Network
WHO	World Health Organization
WMO	World Meteorological Organization

Executive Summary

Introduction

A Disaster is an event triggered by natural or man-made causes that lead to sudden disruption of normalcy within society, causing widespread damage to life and property. Disruptions in India caused by frequent disasters due to earthquakes, landslides, droughts, floods and cyclones, and occasional man-made tragedies like the gas leak at Bhopal have stirred the nation's imagination leading to, inter alia, establishment of the High Powered Committee on Disaster Management.

Overview of Disasters

In the 70s and 80s, droughts and famines were the biggest killers in India. The situation stands somewhat altered today, wherein it is probably a combination of factors like increased irrigation development, improved reservoir management and food security measures that have greatly reduced deaths caused by droughts and famines. Floods, cyclones, and earthquakes dominate (98%) the reported injuries, with ever increasing frequency in the last ten years. The period from 1973 to 1997 has been associated with a large number of earthquakes in Asia, that have a relatively high injury-to-death ratio. Floods, droughts, cyclones, earthquakes, landslides, and avalanches are some of the major natural disasters that repeatedly and increasingly affect India. The fast pace of growth and expansion without comprehensive understanding or preparedness has brought forth a range of issues that seek urgent attention at all levels. In the absence of such measures, the growing numbers in our population are at a risk of prospective hazards such as air accidents, rail accidents, road accidents, boat capsizing, building collapse, electric fires, festival related disasters, forest fires, mine flooding, oil spills, serial bomb blasts, and fires. The safeguards within existing systems are limited and the risks involved high.

Vulnerability Profile of India

Vulnerability is defined as "the extent to which a community, structure, service, or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account of their nature, construction and proximity to hazardous terrain or a disaster prone area". The concept of vulnerability

therefore leads to calculation of risk. Risk management would therefore mean the level of social and economic ability to cope with the resulting event in order to resist major disruption or loss. This susceptibility and vulnerability to each type of threat will depend on its respective differing characteristics. With such an understanding, vulnerability was examined by the HPC on physical as well as socio-economic parameters.

Emergence of a Holistic Approach: Setting the Context

Himalayan Regions

The Himalayan region of India, characterized by a wide variation in topography, geology, soil, climate, flora and fauna, and various ethnic groups with varied socio-cultural traditions, is a unique geographical entity of our country. Human activities in this region are the prime cause of environmental degradation within this region. The effects of human activities on environment may be direct or indirect, small or big, slow or fast, predictable or unpredictable depending on the nature, intensity and frequency of the disturbance to natural ecosystem.

Riverine Regions

Communities living in the great plains of India that spread across northern, western and central parts of the country, including the inland parts of the larger coastal states, are vulnerable to a host of disasters. These communities are settled in river basins and predominantly depend on agriculture. They are subjected to extremes of rainfall - either very high or very low . These facts make them most vulnerable to river flooding on one hand and also to food scarcity during droughts on the other. Such regions therefore suffer from two major problems of floods and food insecurity.

Coastal Regions

Natural disasters, primarily cyclones, accompanying storm surges and coastal erosion, affect coastal communities regularly, bringing widespread miseries with them. However, the damages incurred due to these disasters have grown in recent past. One of the main reasons for this is the growing population pressure in the coastal regions. The continuing trend of settlements in hazardous zones, and predicted climatic changes in the coming decades is expected to result in rising sea level, that indicates a possibility of increasing occurrence of disasters in these communities.

Constitutional and Legal Context

The subject of disaster management does not find mention in any of the three lists in the 7th Schedule of the Indian Constitution. The basic responsibility for undertaking rescue, relief and rehabilitation measures in the event of natural disasters, as practiced, is that of the concerned State Governments. Role of the Central Government is supportive, in terms of supplementation of physical and financial resources and complementary measures in sectors like warning, transport and inter-state movement of food grains, etc. On the legal front, neither the Union nor a State Government have any enactment to deal with the management of disasters.

Multi-Hazard Approach by Governments and Concerned Agencies

In the recent past, government response to natural disasters has progressively improved in terms of its effectiveness. This is chiefly due to the emergence of well organized administrative machinery, presence of Relief Manuals at district level, predetermined allocation of duties and recognized public private partnerships. However, the absence of an integrated policy at national level has led to overlooking of some of the vital aspects of disaster management. Presence of such a policy helps clearly define government's

approaches on a continuing basis. It also provides for an appropriate legislation and associated regulations in this regard besides an overall national competence and self-reliance vis-à-vis international initiatives.

HPC on Disaster Management

Mandate, Terms of Reference and Key Considerations

The HPC was constituted in August 1999 under the Chairmanship of Shri J.C. Pant. HPC members were drawn from the Ministries, States, NGOs and experts from relevant fields. It was the first attempt in India towards evolving a systematic, comprehensive and holistic approach towards all disasters. The original mandate of the HPC was confined to the preparation of management plans for natural disasters only. However, it was expanded to include man-made disasters as well in order to develop an effective plan of action that would encompass disasters of all origins and shades. The Terms of Reference of the HPC were subsequently enlarged to include non-natural or man-made disasters also with the approval of the Prime Minister vide order dated April 17, 2000. Representation from concerned Ministries dealing with industrial, nuclear, biological, chemical disasters was ensured by way of inclusion of experts from these Ministries.

The HPC constituted five sub-groups to go into details of five major classifications as decided by the HPC. In an effort to ensure comprehensive coverage to the vast subject of disaster management, it also commissioned a number of research studies and set up special committees to look into certain important aspects of disaster management in appropriate detail. A list of the support documents produced by these sub-instruments of the HPC is annexed. The HPC has drawn heavily on these documents wherever acceptable, as HPC did not always conform to its authors view.

Select Global Practices

In 1989, the General Assembly of the United Nations proclaimed the decade 1990-2000 as the International Decade for Natural Disaster Reduction (IDNDR). At the World Conference on Natural Disaster Reduction in the city of Yokohama, Japan in 1994, deep concern was expressed at the continuing human suffering and disruption of development due to natural disasters and a Yokohama Strategy and Plan of Action for a Safer World was developed.

HPC studied systems of disaster mitigation and management worldwide. The UN and USA systems of disaster management were studied by the HPC in detail, alongside systems in countries like Bangladesh, Japan and Australia. Note was taken of the fact that a nation like Bangladesh that is recurrently affected by disasters has set up a separate ministry for disaster management. Special mechanisms such as the SUMA (WHO-PAHO) system for supply management and FEMA's Incident Command System were also studied. Projects including HAZUS, RADIUS and GESI that have become international models for disaster management action were studied for their applicability to India. Lessons were drawn from the study of above practices and appropriate adaptation was attempted for the national plan preparation exercise.

Disaster Mitigation and Preparedness

The World Conference on Natural Disasters at Yokohama in May 1994 was a definitive step in Disaster Mitigation and Preparedness Planning. It emphasised that natural hazards were beyond the control of human beings. However vulnerability towards disasters usually stems from human interventions and activities.

Principles of Mitigation and Preparedness were discussed in detail and strategies

formulated thereupon. Risk assessment was recognized as a critical need.

Ushering in a New Culture of Disaster Management

Culture of Preparedness

It is not possible to do away with the devastation due to natural hazards completely. However, experience has shown that destruction from natural hazards can be minimized by the presence of well-functioning warning systems, combined with preparedness on the part of the vulnerable community. Warning systems and preparedness measures reduce and modify the scale of disasters. A community that is prepared to face disasters, receives and understands warnings of impending hazards and resorts to precautionary and mitigatory measures, and is able to cope better and resume normal life sooner.

Culture of Quick Response

Following cataclysmic events such as the Orissa Super cyclone (October,1999) and the Gujarat Earthquake (January, 2001), the HPC has highlighted the need for the Central Government to respond promptly and in the most appropriate manner. An appropriate organisational set up at the State level to cope with incoming relief and rescue measures is an urgent necessity, so that in disaster situations of colossal magnitudes no time is lost in directing incoming relief and rescue measures to the exact locations where they are required. The principle of quick response has been underscored in the plans for National, State and District level. The proposed design and layout of documents provide for easy and quick reading on appropriate action to be followed.

Culture of Strategic Thinking

HPC has emphasized the crucial importance of strategic thinking to combat disasters, and the need for networking of institutions engaged in the pursuit of knowledge. Based on the deliberations of the committee, a National Disaster Knowledge Network has been proposed. It was also felt that National Centres of Excellence be established. The process of recording data during any disaster situation must be properly structured for different types of disasters, for which networking of knowledge would be essential. Such an exercise would also be useful in forecasting disaster situations.

Culture of Prevention

The communities actively involved in working on prevention of natural disasters before they strike belong to all groups of society: international and regional organizations, national governments or private firms, local administrations and specialized associations. It is important to instill a culture of prevention in disaster managers and all communities. Action must be taken at all levels so as to save lives before the disaster strikes. Early warnings and conscious developmental planning are key elements to preventive planning.

Operational Framework

Part I: Frameworks

Constitutional Framework

The subject of disaster management does not find mention in any of the three lists in the 7th Schedule of the Constitution. However, the State Governments are provided financial assistance for meeting expenditure on six identified natural calamities on the basis of the recommendations of Finance Commissions to ensure that the assistance is used only for calamity relief. A Calamity Relief Fund has been constituted by each State, where annual assistance is credited and utilized on the basis of guidelines issued by the Union Ministry of Finance.

Legal Framework

In the absence of an enactment, the HPC has prepared a "National Calamity Management Act", which has been circulated to all States as well as all the concerned ministries of Government of India for their comments. The Act aims at ensuring efficiency and effective management of natural and other calamities, for achieving greater coordination and responsiveness with respect to prevention and mitigation of disasters as also to provide better relief and rehabilitation of victims of disasters. The proposed 'National Calamity Management Act' envisages the formation of a 'National Centre for Calamity Management' for the purpose of effective management of disasters arising out of calamities. A Committee to prepare a Model State Disaster Management Act was constituted by the HPC. The Committee finalised the Act, which has also been circulated to all the States.

Organisational Structure

Disaster management needs a dedicated political commitment at all levels of national and local government. A structure with clearly defined authority and appropriate budget to maintain an effective disaster plan is needed. Preparedness plans should be comprehensive in scale and operational, ideally through a nominated national body.

Central Level

The HPC deliberated at length on the need for a comprehensive and efficient national level disaster management system, and recommended that a separate Ministry of Disaster Management may be created in a phased manner armed with appropriate instrumentalities. Strengthening of Authorities and Centres such as the NCCM and other Disaster Management Institutes and opening of new centres, if and when necessary, to revamp support functions seem essential. With the kind of direction we seem to be moving in, that is a multi-hazard and comprehensive management strategy, the national approach has to look at the whole cycle of disaster management activities, and therefore, after weighing all options, the HPC arrived at the recommendation of a separate ministry. The HPC further recommends a Cabinet Committee on Disaster Management; an all party National Council on Disaster Management, assisted by a Working Group which would be a body of experts, comprising of a Scientific and Technical Advisory Committee as its subset. The National Institute of Disaster Management and the National Centre for Calamity Management will be bodies that will assist in the operationalization of plans and procedures of these higher-level bodies.

State Level

In keeping with the federal structure of the country, the responsibility to cope with natural disasters is essentially that of the State Government. The role of the Central Government is supportive in terms of supplementation of physical and financial resources.

District Level

The district administration is the focal point for implementation of all government plans and activities. Considerable powers have been vested in the District Collector to carry out relief operations in the shortest possible time. In the event of shortage of funds, he is also empowered to draw money from the district treasury under the emergency powers vested in him.

The district administration is also required to prepare an advance Contingency Plan based upon the type of disaster likely to affect the district. The actual day-to-day function of administering relief is the responsibility of the Collector/District Magistrate/Deputy Commissioner who exercises co-ordination and supervisory powers over all departments at the district level.

Part II: Instruments

Governance

Disaster management should be seen as a part of good governance. The 73rd and 74th constitutional amendments have been a turning point for Panchayati Raj Institutions and Urban Local Body System. These institutions can be effective instruments in tackling disasters through public education, preparedness and early warning. These institutions are in a better position to undertake relevant tasks than the State and Central government, and can be relied upon at the time of relief distribution, in providing shelter to victims, medical assistance, etc., due to their proximity to the communities.

Health and Medical Care

Health and medical care is one of the most critical and immediate response components in any disaster situation. Adequate planning needs to be carried out for Medical First Responders (MFR), Medical Assistant Teams (MAT), Mobile Hospitals, Hospital Preparedness for Mass Casualties, Epidemic Prevention, and Trauma Counselling.

Use of Technology

The use of state-of-the-art technology is required for effectively implementing preparatory as well as response actions, including search and rescue. The key areas to be addressed under use of technology are: communications, remote sensing and GIS.

Capacity Building

Capacity building is a complex, long-term phenomenon that requires the development of human resources, the establishment of well functioning organisations within a suitable work environment and a supportive socio-political environment, for improving the performance of institutions and personnel for planning and implementation Capacity Building is critical at all levels. Appropriate level of training and knowledge availability is required otherwise such plans would tend to be incomplete and short sighted.

Education and Youth Movement

The HPC considered education as one of the most important thrust areas in order to achieve its defined paradigm shift from a culture of response to culture of preparedness. It is strongly felt that prevention, mitigation and preparedness are possible only through large-scale awareness, knowledge generation and dissemination, for which the education sector needs to play a critical role. The role of basic education system, college and technical education system as well as youth movement was dealt with in detail.

Mapping

In order to assess mapping needs of the vulnerable areas for disaster preparedness, a sub committee on Mapping Mission was constituted by the HPC. The sub-committee in its report has recommended taking up a pre-disaster proactive approach consisting of prevention, reduction and mitigation with hazard maps prepared for this purpose. The Committee was of the view that easy availability of maps for each disaster focusing on the vulnerable areas would go a long way in managing future disasters. Eventually the country should produce large scale multi-hazard maps.

Insurance

Despite efforts at mitigation, economic losses from natural disasters continue to grow exponentially. In such a situation, insurance has played a very important role in disaster mitigation. However, much more needs to be done to institutionalize and popularize this instrument.

International and Regional Cooperation

The HPC recommends that collaboration among SAARC and other countries,

especially neighbouring countries with respect to seismic data exchange, flood management, cyclone, monsoon forecasting systems, technology transfer, training and knowledge network would go a long way in managing disasters holistically especially in terms of pooling of resources and expertise.

Part III: Roleplayers

The Communities, NGOs and Media were recognised as emerging roleplayers in the arena of disaster mitigation and management and a need was felt for strengthening their operational frameworks. The roles of knowledge based institutions, including Disaster Mitigation and Management Institutes, Fire Services, Police and Para-Military Forces, Civil Defence and Home-Guards, Armed Forces, Ex-Servicemen, PSUs and Private Sector are also examined and recommended upon.

Planning Process

Vulnerability based planning was taken as the basic approach towards plan preparation.

Disasters are graded at three levels:

L1: A District Level disaster, within the capabilities of the District Administration to deal with

L2: A State Level disaster, within the capabilities of the State Government to deal with

L3: A National Level disaster, requiring major direct intervention of the Central Government

In addition to the disaster situations, the following 'peace-time' situation has also been identified:

L0: A 'no-disaster' situation. This is the level at which surveillance, preparedness, prevention and mitigation activities must be focused on.

Trigger Mechanism

The concept of Trigger Mechanism has been incorporated by the HPC as an emergency quick response mechanism, which would spontaneously set the vehicle of management into motion on the road to disaster response process.

National Disaster Response Plan

The National Disaster Response Plan primarily explains processes and mechanisms that are brought into action after the Declaration of L3 in case of any disaster. It also defines the approach of the HPC towards management of disasters and the role of the National Government. The Plan outlines a step-wise progress of activities in the following phases of disaster: Pre-disaster Warning, Disasters where warnings can be given, Disasters where effective warning cannot be given, De-warning, Central Relief Commissioner's meeting with Crisis Management Group, Quick response, Deactivation etc.

State Plan Guiding Principles

The HPC constituted five theme-specific sub-groups of Model State Plans for five different groups of disasters. These committees were given the mandate to prepare model state disaster management plans for the group of disasters that have been assigned to each committee. Based on the initial findings of the report prepared by the sub groups and subsequent deliberations, the Committee realized that it was not possible to develop a model plan to be complied with by all States, given the variation in the contextual attributes of different States in the country. The HPC Secretariat has hence prepared a set of Guiding Principles for a Model State Plan. An exercise would have to be taken up with each State, in order to develop State specific plans, in accordance with individual State attributes.

District Disaster Management Plans

HPC constituted a special committee to prepare a model District Disaster Management Plan. During the course of plan preparation, the Committee organised a number of sensitization workshops for District Collectors of identified vulnerable districts of the country.

It is proposed that while preparing the District Disaster Management Plan, the structure of the Plan should permit easy and quick retrieval of relevant information on which the authority/individual may to have to act upon.

Financial Arrangements

Calamity Relief Fund (CRF)

The policy and arrangements for meeting relief expenditure are, by and large, based on the recommendations of successive Finance Commissions. Earlier however margin money was allocated to each State for meeting immediate expenses on relief measures. The quantum of margin money was calculated by averaging non-plan expenditure (excluding advance plan assistance and expenditure of a plan nature) on relief measures. One of the concerns the HPC raised in the context of financial arrangements is the fact that the CRF and NCCF may cover only six natural disasters as per the recommendations of the Finance Commission. The HPC also recommends evolving appropriate instruments for coverage of financial support to other types of disasters as well, apart from the six that have been suggested.

District Level Funds

In view of the Eleventh Finance Commission not recommending the creation of district level CRF or contribution thereto from State CRF, it was felt that the fund could be created entirely out of public contribution and donations. To take account of disaster mitigation and management components in the development process, concept of ten percent allocation from plan funds at all levels to be earmarked is recommended. This also emerged from the workshop of the SIRDs at NIRD, Hyderabad and was resolved therein. It is hoped that this will bring in a culture of mainstreaming disaster management in the development process.

Financial Discipline

There is a long felt need for financial discipline within disaster management financial arrangements. Once the Finance Commission has made certain recommendations, which are accepted by Government of India, there should be no room for tampering with them. Public money is a trust, to be fully utilised when needed and be dealt with scrupulously.

Recommendations

General

Framework

Considering the mammoth work done by the High Powered Committee in terms of the scope of its terms of reference and also the large number of disasters as diverse as natural to manmade to biological to evolving a framework for writing the recommendations of its work is a challenge in itself. Various formats and frameworks for recommendations were considered such as following the sequence of the terms of reference and key considerations, making recommendations with relation to national, state, district and local community or disaster-wise including an indication of the nodal organisation responsible for its implementation. Timeframe in which recommendations can be implemented is another aspect, which needs to be indicated including such recommendations implementation of which will be a continuous process spread over a number of years. After considering various options, it was thought that it would be best to put the recommendations in the sequence of a disaster cycle and in a manner that captures the essence of the work of the HPC, i.e., building cultures of preparedness, quick response, strategic thinking and prevention. Therefore, in keeping with this approach, the recommendations have been put in the following framework:

1. General
2. Organizational Structures/ Institutional Mechanisms
3. Culture of Preparedness
4. Culture of Quick Response
5. Culture of Strategic Thinking
6. Culture of Prevention
7. Implementation of the Recommendations
8. Legal Framework

Vision

To create a disaster free India, through the confluence of cultures of Preparedness, Quick Response, Strategic Thinking and Prevention.

Mission Statement

To raise through sustained collective wisdom and effort, and by every possible means, the level of concern for the environment, the synergy of national capacities and the intensity of people's participation to such commanding heights that disasters are averted, and ensuing losses are minimal, and infrequent.

Constitutional and Legal Framework

There is no mention of disaster management as a subject/item in any of the lists (Central, State or concurrent) under Schedule 7 of the Constitution. Keeping in view the importance that the field of disaster management has come to acquire in recent times with enhanced level of public awareness about the obligation of the government; the Committee recommends that this issue needs to be debated in appropriate forum so that a conscious view is taken about appropriate mention of disaster management in one of the lists. (A subject not specifically mentioned in any of the three lists would ordinarily have to be dealt with by the Union government under entry 97 of the Union list. By this interpretation as of now the subject would deem to be an entry under the Union List and therefore Union Government would be entitled to pass a suitable legislation. However, by practice and convention the primary responsibility for the management of any disaster is borne by the State Government. In view of the above dichotomy and the importance that is being currently attached to disaster management nationally as well as internationally, it is felt that a conscious view needs to be taken to make an appropriate mention of the subject in one of the lists.

Disaster Management Act

In addition to the constitutional framework, a need was felt to have a suitable legislation to provide appropriate legal framework at the national and/or state level. Keeping this in view the committee recommended in its interim report I and II the drafts of a National Act for Calamity Management and a model State Disaster Management Act as these drafts would facilitate and help generate informed discussion on the subject. After the issue relating to the constitutional amendment has been settled, necessary action would be required for the enactment of Central and/or State Act.

Regulations

Subject to the enactment of suitable legislation, it will be necessary to evolve detailed regulations to help in the enforcement of law. Certain regulations/ codes/laws relating to various aspects of disaster management exist e.g. coastal regulations, building codes, chemical accidents, fire safety. However the implementation and enforcement of these remain weak in the country. Making the laws stringent in order to act as a deterrent, it is felt that these codes/regulations/laws need to be reviewed wherever necessary and suitable mechanisms evolved for stringent enforcement.

Organizational Structures/ Institutional Mechanisms

Organizational

Cataclysmic events sometimes assume the nature of a national crisis involving the mobilization of practically the entire government at the highest level. The committee feels that an institutional mechanism needs to be created at the highest level by setting up a Cabinet Committee On Disaster Management that would help continued and sustained focus in this area at the highest level of the government. (It may be recalled that a High Powered Task force under Defence Minister was constituted after the Orissa Super Cyclone and an Empowered Group under the Home

Minister was constituted in the wake of the Gujarat Earthquake.)

The All-Party National Committee under the Chairmanship of the Prime Minister and the Working Group set up under the guidance of the Vice Chairman need to be institutionalised 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 of the Cabinet Committee on Disaster Management (CCDM) as well as the National Committee. It would have the advantage of political, governmental and NGO representation apart from expert input. It is also suggested that the All-Party National Committee be re-christened as National Council on Disaster Management.

Taking note of the global trend that progressively countries world wide and international agencies are "shifting focus from managing natural calamities to all hazard management", i.e., the same institutional structure deals with natural catastrophes as well as "Complex" man-made emergencies, since in the aftermath, the humanitarian dimension is the same. It is felt that a separate institutional mechanism needs to be evolved at the national level. It is recommended that a separate Ministry of Disaster Management be set up for a sustained and focused effort in the area of disaster preparedness, mitigation and management. This Ministry will deal with natural as well as manmade disasters. However its role would essentially be concerned with networking and co-ordination of national resources while the concerned ministries will continue to discharge their responsibilities and finances in accordance with the respective disaster management plans and also work in close cooperation with the nodal ministry.

The primary responsibility of managing a disaster lies with the state government. It is therefore necessary to strengthen the institutional mechanism at the State level which presently are very weak focused only on relief. In the wake of recent disasters new structures and mechanisms have been evolved in the States of Orissa (Orissa State Disaster Management Authority), Gujarat (Gujarat State Disaster Management Authority) and Uttaranchal where a separate Department of Disaster Management has been established which is presently combined with the Department of Health and Medical Care. Weighing various options the committee feels on the lines of the pattern at the national level a separate Department of Disaster Management and Mitigation be established. However, it is also felt that the different States may deliberate on this issue in the context of their own situation and may take steps to strengthen the institutional mechanisms so as to be able to deal with all hazards to which they are vulnerable and include all aspects of disaster management.

Many State Governments have Disaster Mitigation and Management Centres such as the Centre for Disaster Mitigation and Management in Chennai and Disaster Management Institute in Bhopal. Many State Governments may be well on their way to establishing Disaster Mitigation and Management Centres, as is being done by the Uttaranchal Government. The HPC is strongly of the view that creation and strengthening of networks of such Centres will reinforce the disaster management apparatus of the country, and be encouraged. The Disaster Mitigation and Management Centres should endeavour to take all such investigations, studies and tasks as identified according to the felt needs and national and state priorities. Both Central and State Governments should turn their first attention to strengthen the existing institutions and centres by way of capacity building, modernization, staffing and funding. Before

the new centres are opened, it should be ensured that they will be adequately funded so that they pro-actively perform rather than passively respond, as is commonly seen in our resource starved situation.

Taking note of the fact that across the globe in most of the countries the national investment strategies are shifting emphasis to regular yearly investment in disaster preparedness and mitigation so that the communities invest in risk reduction on a continuing basis, it is felt that a change in the nomenclature of the concerned organisations/department/functionaries will help bring about the necessary change in approach and focus. It is therefore recommended that nomenclature such as Relief Commissioner may change to Commissioner/Secretary In-Charge of Disaster Management and like wise wherever necessary and appropriate.

In order to facilitate liase and co-ordinate with various agencies and organisations at national and international levels, the resident commissioner of each state posted in Delhi be also designated as Ex-officio Special Commissioner for Disaster Management.

In view of the fact that action really takes place at the district level, which is the cutting edge of administration, it is necessary to strengthen the set up and support system for the District Magistrate who provides the overall leadership. Therefore it is suggested that the district relief committees presently existing be reconstituted as District Disaster Management Committee.

Institutional

National Centre for Calamity Management (NCCM), as suggested by the Eleventh Finance Commission and its structure as evolved by HPC needs to be set up at the earliest.

Disasters, especially natural disasters permeate every aspect of our lives. Building community leadership and a chain of trained community cadres through participatory approach can help harness the resilience and resourcefulness of the community to cope. Human resource development in this context assumes national importance. A network of training institutions led by a national level disaster management institute with symbiotic linkages with other National and State level institutions like National Civil Defence College, National Fire Services College, ATIs, Disaster Management Institutes, National Institute of Rural Development, State Institutes of Rural Development, Indian Institute of Technology, Indian Institutes of Management etc. will need to be forged and developed. Strengthening of infrastructure and capacity building of these institutions in the area of disaster mitigation will help synergise national efforts.

A National Institute for Disaster Management to be established as a centre of excellence in the area of creation of knowledge and its dissemination including training and capacity building. The institute will have a full-fledged campus with infrastructure and resources to fulfill its role as a centre of excellence. A full-fledged Emergency Operation Centre will also be established at the institute which would serve as an alternate/backup of the National EOC during times of disasters and act as an instrument for hands on training during normal times.

The State level ATIs and/or SIRDs should have a full-fledged department of disaster management and also be responsible for establishing the alternate State EOC. Full-fledged EOC with clear conceptualised roles and all necessary infrastructure and support would exist at the district level. To address the need for capacity building at the district level, institutional mechanisms for training should be established. This facility can be

created in one or more of the several institutions in existence at the district level such as District Institute of Education and Training (DIET) and Teachers Training Institutes (TTI), Polytechnics etc.

Funding and Infrastructure Support

Reconstitute the Calamity Relief Fund (CRF) provided by Tenth Finance Commission – Rs 11,007.59 crores for years 2000-2005 as funds earmarked for state level capacity building for disaster management and to act as a buffer for handling district level (L1) and state level (L2) emergencies without support from Central Government. State Disaster Management Ministry at the Centre will have full say over decisions pertaining to this fund and its application. Expenditure on restoration of infrastructure and other capital assets except those that are intrinsically connected with relief operations and connectivity with the affected area and population should be met from the plan funds on priority. The CRF should be kept out of Public Account of the State and should be invested in a manner approved by the Ministry of Finance. A committee of Experts should be constituted to review the list of items approved for incurring expenditure from the CRF, and make recommendations for adoption by the Central Government. State specific and District specific norms may also be developed in consultation with appropriate authorities.

Constitute two new funds at national level for handling L3 level disasters:

- A National Disaster Response (Rescue/ Relief/ Rehabilitation and Reconstruction) Fund, i.e., Fund 'A'. This will function as a repository of all receipts from international funding, private/ corporate donations, and all cess on income taxes levied to finance post disaster response to all mega-disasters or National Level Emergencies and capacity building including human resource developed for effective response preparedness.
- A National Disaster Prevention, Mitigation and Preparedness Fund i.e. Fund B. Essentially will function as a subset of Fund 'A' in as much as 20% of all inflows into Fund 'A' will automatically flow into Fund 'B'. Fund 'B' will finance disaster prevention, mitigation and preparedness related activities relating to national, State or First Responder level capacity building including human resource development.

  To begin with this fund may be constituted with an initial corpus of 500 crores.

An important resolution of the committee is that at least 10% of the plan funds at the national, state and district levels must be earmarked and apportioned for schemes that specifically address prevention, reduction, preparedness and mitigation of disasters.

A district level CRF raised out of people's contribution locally by the District Magistrate and other people need to be institutionalised. In this regard all places of worship in the country could have a donation box separately for Calamity Relief. All such funds collected are to be passed on to the district CRF from time to time. In order to address district level needs and priorities, it is necessary that the District Disaster Management Committees evolve the norms for expenditure from district level funds.

Code of Conduct

The humanitarian imperative must come first and foremost. All other considerations whether political, religious or other must remain outside the domain of disaster management. There should be full co-operation between various governments, voluntary agencies, and relief workers with a commitment to perform to the best of their abilities and they should refrain from public criticism of each other.

Culture of Preparedness

Mapping Mission

The HPC constituted an expert group that went into various issues related to mapping requirements for disaster management. Digitisation of maps in the scale of 1:50,000 is permitted to be done only by a select few agencies and for restricted areas prior permission is needed from Ministry of Defence. Survey of India could be the nodal agency. Based on their report the following recommendations are made which are to be implemented in a planned manner, in a time bound, phased, manner:

Precision GIS/Digital Maps of all states/ districts and all urban centres with Spatial and Non-Spatial data be made available, at appropriate scales.

Drawing of a blueprint of action, showing identified activities, agencies, resources and funds for carrying out the necessary exercise.

Survey of India maps to be suitably supplemented for information relating to specific and individual disasters as well as for planning of developmental programmes.

For disaster management the existing maps of 1: 50,000 and 1:25,000 to be used until is supplemented by detailed large-scale maps of 1:10,000 scale.

Production of topographic maps, especially for hazardous locations on a priority basis to serve as an essential input to production of hazard maps.

Seismic Micro-zonation of all major cities and urban centres, with priority assigned to the seven metros with detailed assessment of buildings and infrastructure for all cities in Zone IV and V.

Hazard Specific Zonation Maps for all identified hazards e.g. earthquakes, floods, cyclones and landslide based maps, eventually leading to production of large scale multi-hazard maps.

Remote Sensing

In general remote sensing, GIS and GPS provide database which can be interpreted to aid production of hazard maps, that have immense value in any kind of activity related to disasters. For a quantitative base of disaster related operations, the following activities should be built into our management system:

- Organise integrated spatial and non-spatial databases using GIS tools in a systematic manner. Integration or synthesis of spatial and non-spatial information within the framework of a coherent data model and linkages between different data sets would have to be done. This would involve diverse information from variety of sources, requires effective matching of similar entities, and demands information consistency across the data sets.
- Generation of spatial outputs, supported by tables/charts to help in developmental planning and decision-making.
- Conventional forecasting to be integrated with state of the art technologies namely remote sensing, Data Collection Platforms and Geographical Information System.
- Development activities proposed should use maximum possible information from remote sensing. Frequent monitoring and evaluation should also be carried out.
- Operational use of high technology (satellite/aerospace data) for real time data acquisition and monitoring for predicting disaster damage scenarios is needed.

Information Database

A robust and sound information database is the backbone of any system and it facilitates strategic planning. It is therefore felt that access to such information is primary and

the following efforts should be made, as a part of the Disaster Knowledge Network initiative to be spread all over the country.

A database of all area/region giving the land use, demographic, socio-economic data, infrastructure (like road, rail network, hospital, etc.), geography, etc, maintained at national, state and local levels.

Resource inventories of governmental and non-governmental systems, personnel and equipment should be made and networked.

There is a need in disaster management to have access to current information on climate, weather and man-made structures as a source of data to aid in the planning, warning and assessment of disasters. So far such information has been compiled by many organisations and stored in multiple formats and media making it difficult to bring the data together on one platform so as to support disaster management operations.

Historical documentation of previous disasters should include location of disasters, history, causes, mitigation, details, financial etc. available and accessible for future planning.

Planning

The most important component of preparedness is planning for all contingencies. The plans have to be linked with different support departments; linking district plans to state plans and state plans to national plan i.e. horizontal and vertical integration. Recognising this, the committee recommends the following measures to be taken:

It is felt that each Ministry, Department and organisation at national level should formulate comprehensive disaster management plans that should link to the national plan. These must be kept ready, practiced and updated periodically, preferably once a year.

Each State to develop integrated "all hazard" disaster management plans on priority, which too must be practiced and updated periodically.

Even at the district level District Disaster Management Plans should be prepared linked to the state and national plans, practiced and updated from time to time.

Community, family and individual level plans to be prepared for disaster management developing individual kits for survival that can be kept handy.

In order to integrate disaster management on the same platform, common concepts and norms have to be followed consistently in disaster planning at National, State, District Level. The following concepts are envisioned as primary by the HPC:

L0 activities to become the backbone of all planning processes.

The system of such planning is to be based on a thorough analysis of the parameters defined for various stages (L0, L1, L2, and L3) for different disasters.

Trigger Mechanism should be used as a primary means of activation of disaster response.

Standard Operating Procedures have to be developed and tied up at all functional levels.

An Incident Command System to be the basis of field operations management. The Emergency Support Functions (ESF's) need to be deliberated for holistic response at all levels and their team formulations to be accordingly focussed taking contingencies into account.

An "All Hazards" approach keeping in view the entire cycle of disaster management for all natural and man-made disasters needs to be considered.

Vulnerability Assessment to be the basic component for developing a method for integrating risk reduction into local

development planning process. The committee is of the view that Risk identification should be the basis of action planning to integrate risk reduction measures with sustainable development.

Equity interests of all stakeholder groups should be taken into account with consideration of special needs of the more vulnerable groups.

Infrastructure, maintenance, and safety review should be built into the disaster management plans.

Implementation and monitoring at all stages to be worked out and integrated with the planning process.

Forecasting, Warning and Alert Systems

The technology context of the day helps us to forewarn the possibility of a range of disasters much before they actually strike that can initiate preparatory response and trigger the decision making process. The HPC therefore strongly feels the need to strengthen such a structure; and thus give fillip to the forecasting and early warning.

Specific agencies, where not existing, to be nominated/designated for forecasting and monitoring of specific types of disasters identified by HPC to improve the quality and accuracy of the forecasts and increase the warning time of the forecast to make it available for optimum reservoirs operation to moderate flood peaks.

There is a need to improve communication links, forecasting, control rooms, by modernising the existing facilities.

It is essential to modernise the computerised weather forecasting system of IMD by introducing very fine resolution numerical models for tropical cyclone predictions. This may require ocean-atmosphere coupled models with suitable parameterisation schemes to comprehend intense precipitation, strong winds and storm surges well in advance. This would essentially need upgrading of the computing facility in IMD.

The rain-gauge network is too coarse to provide variations of rainfall within districts. An adequate network of rain gauges shall cover the entire country, especially the known hazardous areas and locations. Rainfall analysis based forcasting is simple and less expensive and therefore needs to be encouraged. Space borne measurements have to be integrated with computed aridity anomaly based on field measurements.

R&D on prediction and forecasting of landslides should be encouraged, specially for early warning against reactivation of old landslides, repetitive landslides, and those occurring in the areas known to be hazardous.

Forecasting of drought and its impact on agriculture needs to be reviewed. Efforts being made in various institutions in the country may 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 network of automatic weather stations and satellite data.

There is a need to augment the observing systems including Doppler Radar not only over the cyclone prone coastal areas but also over highly populated areas.

There is a need for deployment of ocean observing systems for detection and monitoring of tropical cyclone formation and movement.

Deployment and networking of adequate number of Doppler Radars (replacing conventional 10 and a need for additional 10) would facilitate improvement in analysis and prediction of cyclones.

There is a need to improve design of tide-gauge to capture storm surges and augmentation of their network along east and west coasts of India.

Forecasting and warning works for rivers within states should be assessed on an individual basis.

There is a definite need to strengthen the network of micro-seismic monitoring. Round the clock earthquake monitoring through strong motion seismographs and V-Sat based digital telemetry systems be encouraged to generate, and disseminate, earthquake related information in real time.

At the same time a need to strengthen surface observational network including high wind speed recording instruments.

A network of automatic weather stations should be established.

Microwave imagers especially the high frequency sensors have been found particularly useful. There is a need to fly such sensors on board Indian polar orbiting satellites and their data should be analysed on real-time basis.

Structural Measures

Certain area of activities need concrete initiatives in planning for disasters. They have been identified as structural measures by the HPC for imperative inclusion towards prevention:

Provision of temporary shelters for human dwellings and animals in the event of a disaster has to be made in terms of appropriate design, material and cost effective construction technology.

Storage facilities at a suitable scale need to be undertaken for food, fodder and other essential relief materials.

The building of cyclone shelters should be carried out in terms of the need in number, appropriate design and sound principles of construction.

Existing road, aviation and other communication linkages have to be reviewed in terms of capacities and reach for prompt mobilization of men and material.

Flood Fighting through building temporary dykes along the river and dowel bunds on the banks need to be considered at all local and regional levels.

Retrofitting of buildings, building foundations and structures as a component of disaster management should be adopted as a policy of the Government of India as well as the State Governments. A small expert group may be constituted to recommend an action plan for taking up retrofitting work in a prioritised manner in high-risk areas. Guidelines are also necessary for establishing need for retrofitting.

Human Resource Development

Human Resource Development is an important aspect of capacity building recognised by the HPC whereby the various role players in disaster management are included. The training institutes must focus on the following:

(i) Systems, measures and initiatives that need to be taken for ensuring intensive training and retraining for building up of human resources especially to improve disaster awareness, safety and capabilities.

(ii) Capacity must be built to handle specific disaster event and training programs are essential for each of the concerned agencies of the specific disaster. Training of trainers at all levels must receive special attention.

(iii) There is a need for trained professionals in the field of development and mitigation, be it training of technicians, masons and artisans in disaster resistant construction or the post disaster component of medical first response and search and rescue.

Updating, Rehearsals, Mock drills, Simulations

"An ounce of Practice is far better than tons of precepts and a forest of instructions." It is recommended by the HPC that an annual updating is carried out in the last week of April and rehearsal of the plans during first week of May. Drills should be a primary training ground for emergency management. This is with reference to Mock drills that are to be carried out involving all agencies in order to maintain the efficacy of contingency exercise in times of actual requirement. A 'Continuing Scenario Building' initiative needs to be taken up, wherein at the level of each district, an exercise to build a worst scenario is taken up before the annual updating of the disaster management plan, so as to keep the plans realistically equipped to address all possible contingencies.

Police and Para Military Force

Trained manpower available with the country has to be further strengthened to help channelize them better for disaster management. Police is primary to response in case of emergencies and therefore there is a need to identify them better for the purpose of disaster management.

(i) The police organisations should have trained and equipped disaster rescue teams as part of the local plans.

(ii) A coordinating agency amongst the para military forces be nominated for disaster management.

(iii) Certain Paramilitary forces having resources like medical, air transport, temporary shelters etc earmarked in designated areas of their presence in partnership with other governmental or non-governmental organisations.

(iv) Separate budgetary provision to be made for disaster management related training, equipping and storing for these services.

Fire Service

When it comes to the First Response on the site of emergencies, the Fire Services of the country play a vital role. For the Services it is recommended that:

A National Fire Service Commission be appointed to suggest the reorganisation of Fire Services to cope with the challenges posed by technological advancements during peacetime and war situations.

Formulation of a National Policy on Fire Preparedness in rural and urban areas.

The provision of a comprehensive legislative backup to the fire services to enforce fire regulations.

The risk mapping of cities and industrial towns and the norms for fire protection levels in such areas.

Review of training standards and equipment requirements.

Planning of Fire Safety programmes for the public.

Planning or fire prevention and protection in slums and shanty towns.

To review provisions of the model Fire Service Bill.

Civil Defence and Home Guards

The Central Government, under section 3(1)(z), may make rules regarding utilisation of Civil Defence Corps in disaster response such that they remain in a state of continuous preparedness. A comprehensive role for these services should be formalised in a harmonised structure for disaster management. Each of these services should be integrated into the state disaster management plan and work under the concerned state department for disaster management. The State Disaster Management Act being enacted should include Civil Defence as one of the agencies for relief and rehabilitation. The Department of Science and Technology, Ministry of

Family Welfare and Ministry of Environment and Forests are the nodal Ministries for management of nuclear, biological and chemical accidents respectively. These Ministries are already creating and upgrading the capabilities of the States in respect of these disasters, and these organisations can be specially trained for response to these disasters.

State Governments may be permitted to accept donations for Civil defence from corporate sector. The Chief Wardens of Civil Defence in every town should be accorded appropriate status in civil administration hierarchy especially with regard to their role and importance in disaster management. Their services when utilised should be properly recognised. To have a multi disciplinary unit, which will come into action for activating and following up various functions and responsibilities entrusted to DGCD under the Union War Book during war, and to manage disasters. Separate budgetary provision to be made for disaster management related training, equipping and storing for these services. Civil Defence, Home Guards and Fire Services should be placed under the administrative and operational control of the State level Management Agency. Provision for following components should be made:

Control Room be set up

Develop Management Information System to network with concerned Central, ministries/departments, state government and NGOs.

Operational component of 'Trained and Equipped First Responders' for rescue of disaster victims be created.

Creation of Immediate and Temporary Shelter Service.

Armed Forces

The armed forces have invariably played an important role in every major disaster in the country. The following could be implemented:

(i) The Armed Forces should have a dedicated component of personnel and equipment at the battalion level for disaster management.

(ii) The five army commands may have fully equipped centres in the five command regions at appropriate locations that may have heavy equipment necessary to carry out relief and rescue activities in the region at short notice.

(iii) Use of Territorial Army to be incorporated in disaster management plans. In highly disaster prone states, it could be considered raising specialised Disaster Management Battalions similar to Ecological Battalions.

(iv) Border Roads Organisation, where available, be suitably incorporated in disaster management plans.

(v) A Military Coordinating Officer should be part of the disaster management team at the national and state level.

(vi) The potential of ex-servicemen available throughout the country be tapped for disaster management. They should be employed for creating disaster task force at the local level.

(vii) Armed Forces should be resorted to in an appropriate manner. The deployment of Armed Forces should be limited for short duration, about 15 days, with a provision for extending the period with the approval of Ministry of Defence.

Youth Movement

NCC, Boy Scouts and the Girls Guides, National Service Scheme and such organised youth bodies should include Disaster Management as one of their main activities. They could be incorporated into the local level relief and awareness programmes.

NYKs, Youth Clubs and Mahila Mandals at the grass-root level to be organised for creating mass movement for disaster preparedness.

Culture of Quick Response

Response mechanism are to be worked out in detail for every type of situation. Some of the relevant issues are:

(i) Inter-agency Disaster Response for Government of India based on prepared inter-agency drills for each of the different kinds of disasters. This would give rapid assessment report, periodic review of the disaster and recommend national level intervention.

(ii) The qualitative requirements for the assessment teams and assistance teams to be defined for each type of response visualised.

(iii) The HPC felt that collaboration between SAARC and other countries especially neighbouring countries with respect to flood management, cyclone and monsoon forecasting would go a long way in managing disasters holistically, especially in terms of pooling of resources and expertise. Vegetation in general, is crucial to the entire process of conservation of rainwater. A common SAARC approach through their forest policies therefore is essential.

(iv) Drought response requirements (e.g., programs) may be extensive and prolonged, thus involving major commitment and expenditure of resources.

(v) Biologically related Disasters: Surveillance and rapid response activities by the State Health Authorities. Develop infrastructure for BSL3 and BSL4 laboratory support within the country. Develop and evaluate new diagnostic tools.

(vi) Revision of existing system of response mechanism in the wake of natural and man made disasters at all levels of government and introduction of steps to minimise the response time through effective communication and measures to ensure adequacy of relief operations.

The concept of Trigger Mechanism has been incorporated by the HPC as an emergency quick response mechanism which would spontaneously set the vehicle of management into motion on the road to disaster mitigation process. The Trigger Mechanism has been envisaged as a preparedness plan whereby the receipt of a signal of an impending disaster would simultaneously energise and activate the mechanism for response and mitigation without loss of crucial time. L1, L2, L3 levels of each type of disaster have to be predetermined, to layout procedures to trigger basic response without formal orders from anywhere. There is a need for defining calamity of rare severity or laying down broader criteria, adherence to which could be insisted upon for ensuring equity as well as transparency. The categorisation of L1-L3 as proposed by the HPC is a move in this direction.

Early Warning

(i) Early warning systems for different disasters should be in place so that the concerned administrative machinery and communities can initiate appropriate actions to minimise loss of life and property.

(ii) These should be based on the parameters developed for trigger mechanism and should give an indication of the level or magnitude of mobilisation required by the responders.

Networking/Coordination

(i) There is need for more timely and reliable assessment of the location, area and extent of damage (damage scenarios) to aid in response and recovery activities. An integrated system adequately equipped with necessary infrastructure and expertise to constantly monitor the risk profile on all possible disasters and maintaining a database will become relevant. Proper coordination mechanisms should be incorporated for the following:

- ♦ Different levels of government
- ♦ Different departments
- ♦ Government, private sector and NGOs
- ♦ International agencies
- ♦ Regional countries

International Mobile Satellite Organisation is an internationally renowned co-operative, which provides world wide mobile satellite communication for maritime aeronautical and land mobile users. Currently IMD is using this system for issuing Global Maritime Distress Safety System. We recommend that the State Governments should install International Mobile Satellite Receiving Terminals at select locations in coastal areas.

SOPs, Formats, Check List, Manuals

(i) Prescribe SOPs, formats and Field Manuals for Disaster Management officials, U&R Teams, DMAT teams, NBC teams, EOCs, etc.

(ii) During a disaster of rare severity, selected senior experienced officers could be deputed in limited geographic area for overall control. Incident Command System be utilised at the site of the disaster.

(iii) A "Sourcebook on District Disaster Management" has been finalised by Lal Bahadur Shastri National Academy of Administration, Mussoorie in consultation with could be used as a basis for developing the manuals.

(iv) Guidelines be developed for relief from donors and international agencies.

State of the Art Control Rooms/EOC

(i) Set up a network of EOCs in National and State capitals and headquarters of disaster prone or vulnerable districts. The EOCs will function as nerve centres of an integrated command and control structure which will give primacy to the Incident Commander. They will be the convergence points for all inter-agency coordination and will be equipped with state of the art communications network – VHF/ UHF network at taluka village level and VSAT links; DSL – lines; broadband access to streaming audio-video network for video-conferencing, and complete computer support at district, state and national level.

(ii) State Government shall immediately set up a control room at the State Capital manned round-the-clock by competent experienced officials. State Government should issue a manual clearly laying down duties and responsibilities of each official designation-wise for each type of accident.

(iii) Each EOC should have an alternate EOC that should be appropriately located.

(iv) The Emergency Operations Centre provides a secure location to coordinate actions and make critical decisions at the time of emergency and disaster situations. It would include the following components:

a. EOC Operations room - this is the main room where all disaster management operations are planned, managed and executed and would have components such as LAN networked computers, servers, digitised maps, emergency response plans, etc.

b. EOC Analysis room-this is meant for analysing the information received from the EOC operations room by GIS experts, statisticians and data analysts so as to come up with a revised disaster management plan that could ensure speedy relief and recovery of the affected areas.

c. Emergency Information Centre (EIC) is meant for collection and dissemination of disaster related information to the media and general public. It would be equipped with strong telephone network and computers.

d. EOC Communications would have radio communication on UHF, VHF, Low Band, HF, and Amateur radio frequencies.

e. EOC reference Library will contain research material to support staff and personnel at the EOC particularly in the analysis room.

f. Functional area work cells - The WAN (Wide Area Network) connected room will be in contact with various centres of distribution for relief material such as back up transport systems, food and other materials, shelters in the area under the EOC, medical aid centres and list of hospitals and doctors through its special cells that deal with those functions.

(v) Armed forces should also be included in any knowledge network in order to make use of their experience in handling disasters as well as their command, control and communication facilities.

(vi) District control room/Shadow control rooms, State Control room/Shadow Control room need to be set up.

ESFs

(i) ESFs form integral part of the Emergency operation centres and each ESF should coordinate its activities from the allocated EOC.

(ii) Extension teams and workers of each ESF will be required to coordinate the response procedures at the affected site. Primary agencies when directed by NCCM will take actions to identify requirements and mobilise and deploy resources.

(iii) The identified ESF's should have a plan for mobilization, management and monitoring of their designated activities.

Communication

(i) Plans at national, state and district level should incorporate use of all communication means such as web, telephone, radio (UHF, VHF, HF), fax etc.

(ii) State-of-the-Art communication equipment is to be provided at the National and State EOCs.

(iii) Ham Radios to be used as a back up emergency communication system in the eventuality of a disaster and integrated with the district/ community response plan.

(iv) Communication links: VHF at each Tehsil/taluka; V-Sat at each District Headquarters; HAM (Help all Mankind) radio promotion programme need to be taken up.

(v) Promotion of amateur radio clubs in schools and colleges to extend Ham radios in remote areas needs to be taken up seriously.

(vi) Communication at the EOCs to be duplicated. Alternatives through messengers on foot and vehicles should be maintained.

(vii) Community level communication should be given due emphasise so that people can be in touch with relatives.

(viii) It has been observed that during disasters conventional telecommunication links get disrupted. The Department of Telecommunication and State Governments should take necessary action to ensure satellite telephonic facilities.

Teams

(i) Every State should develop an inter-disciplinary cadre under the Relief Commissioner comprising of 200 to 300 persons who could be deployed for relief works on the occurrence of a natural calamity within the State or in any other part of the country.

(ii) Search and Rescue Teams, Disaster Medical Assistance Teams, Disaster Mortuary Assistance Team, Specialized Emergency Operations Teams and Medical Assistance Teams to be instituted at the State and District levels.

(iii) Setting up 20-30 quick-response US&R Teams by strengthening and reorienting the Fire Services and Civil Defence Structures in all Metros, State Capitals and very vulnerable and populous urban centres.

(iv) Setting up of 5-6 DMATs or Disaster Medical Assistance Teams and an equal number of fully equipped Mobile Hospital Units with operation theatres, pathological labs, intensive care units, X-ray equipment and standard FEMA prescribed or equivalent equipment cache.

(v) Setting Specialised Emergency Operations teams for NBC disasters, viz. Nuclear Emergency Teams, Biological Emergency Teams and Chemical Emergency Teams.

(vi) The police authorities shall arrange for medical examination and post-mortem teams.

(vii) Development of Rapid Damage Assessment Methodology and Constitution of Trained Teams for the purpose.

Incident Command System

Is a very effective method whereby the most experienced and knowledgeable person at a disaster site is designated as "Incident Commander" and charged with the responsibility of on scene inter-agency co-ordination and management of the incident. This is a very effective device to overcome constraints imposed by inter-se seniority and it obliterates departmental hierarchies and selects the best man intellectually equipped to ensure high quality of decision process.

Equipment Cache

US&R Teams and DMATs can each be equipped with a standard cache. This has to be specifically developed for each type of disaster and geographical region. Proper storage and maintenance of equipment needs to be ensured. Some important stocks could be maintained on a regional basis for quick relief.

Delivery of Relief

An appropriate organisational set up at the

state level to cope with incoming relief and rescue measures is an urgent necessity so that in disaster situations of colossal magnitudes no time is lost in directing the incoming relief and rescue measures to exact locations where they are required. Such a set up could be formulated on the lines of the one presented by the SUMA model launched as a collective effort of Latin American countries in order to improve the administration of supplies in the aftermath of a disaster situation. It provides a solution to problems associated with the arrival of unsolicited supplies thus enabling speedier distribution of relief material and assistance as the situation warrants. Equity in relief should be ensured through appropriate community level involvement.

Quality and Minimum Standards of Relief

Minimum standard of relief not only addresses the food requirements of the victimised but also provides for the health and immediate first aid facilities, looks at water and sanitation needs, shelter requirements, and providing food that should be developed on the guidelines of SPHERE etc. When addressing relief requirements of disaster victims, focus should be placed on special needs of the vulnerable population that is: children, women, aged and the disabled. The State and District authorities of vulnerable States should prepare socio-cultural needs in relief supplies.

Health and Medical

Disaster Management Plans at all levels should have medical assistant teams, mobile hospitals, epidemic prevention measures, trauma counselling etc. Nurses & paramedics should be specially incorporated in the medical plans. Disaster specific medical plan would incorporate special needs within the population effected.

Help Lines

Establish information centres at pre-designated locations for giving details of the disaster and answering public queries etc. Telephone numbers of all such information centres should be given wide publicity in electronic media. Tracing mechanism should be a part of the response plan.

Human Rights

The rights of the victim in access to appropriate relief and dignified treatment also needs to be considered by the relief agencies. It is generally noticed that Human Rights of people directly affected by disasters are a worse sufferer. Therefore due consideration should be given to protection of Human Rights. It is recommended that codes be developed for this purpose and incorporated into the response plans. Relief Organisations should not act as charity distribution but should encourage the affected population to be self sufficient at the earliest rather than converting the poorest of the poor into beggars of relief.

Culture of Strategic Thinking

Linking Development to Disaster Reduction

Integration of development plans with disaster-mitigation is the key for successful disaster management. The construction of roads, railway lines, bridges etc should be tuned to the analysis of hazard, vulnerability and risk in a given situation. All development projects (Engineering and non-engineering) including irrigation and industrial projects should address disaster-mitigation. Environmental protection, afforestation programme, pollution control, construction of earthquake-resistant structures etc should have high priority within the plans.

Disaster Knowledge Network

A National Disaster Knowledge Network be established to cover natural, manmade and biological disasters in all their varied dimensions. The proposed Disaster Knowledge Network should be a network of networks, tuned to the felt needs of a multitude of users such as disaster managers, decision makers, affected communities and media. It should also serve as an interactive platform and be in fact a huge black board in cyberspace for all players, major and minor. In this respect:

(i) High Powered Committee has identified Centre for Disaster Mitigation and Management, Anna University to coordinate the activity. Central Road Research Institute, New Delhi; Indian Institute of Chemical Technology, Hyderabad and Indian Council for Medical Research were identified as nodal agencies, respectively, for natural, manmade and biological disasters. The task can be achieved in a phased manner.

(ii) The Disaster Knowledge Network should exhibit a deep concern for users and the information should be so packaged that it becomes available in the right form to the right people at the right place, in right time. There ought to be an intimate connection between Disaster Knowledge Network and the Great Learning Exercise. This would require constant interaction between the managers of Knowledge Network and Knowledge based institutions. Indian Disaster Knowledge Network should eventually be linked with other International Networks like, for example, the Commonwealth Knowledge Network and the Global Disaster Information Network.

(iii) The enormous Science and Technology potential within our country needs to be tapped by forging partnerships between R&D institutions, universities, the Industry and other government and non-government players where by the best practices could be spotlighted and publicised, policy papers could be written, action planning manuals may be published and training modules could be prepared.

(iv) Initiative be taken for National and International networking of knowledge on all spheres of disasters and their mitigation and management to create a network of networks in which it is ensured that knowledge information is adequately filtered and authenticated and gets immediately connected to relief, rescue and to the great learning exercise.

(v) It is advisable to direct research and educational institutions to develop a compendium on their achievements, breakthroughs for mitigation and prevention for wider circulation and benefit of the concerned organisations. R&D and educational institutions may be directed to conduct studies addressing the problems faced by the industry in a time bound manner.

(vi) To keep pace with the rapidity of change, there is a need for new technology and innovations in our ideas for which clarity of purpose, funds, commitment in pursuit of research and development is needed. A significant improvement in R&D, infrastructure activities and in addition manpower in training at research institutions in the various areas of disaster mitigation and management are required. The networking concept has to be one of

building partnerships. To complement each other's efforts for achieving an efficient overall disaster management system. The basic premise is that all role players are important, and can contribute to the cause.

(vii) India has a tradition of wisdom in coping mechanisms for disaster prevention and mitigation. There is a need to study these and develop a compendium of such knowledge which is found dispersed from Kashmir to Kanyakumari and from North East to the West.

Global Information Network

Efficient disaster mitigation and management demand global thinking and local action. Exchange of information, experience and expertise in the area of participatory approaches, risk assessment and reduction should be through a global network established where lessons learnt, preventive models and innovative ideas for involvement of various agencies should have a common platform for building a local base. Integrated mechanisms evolved through long and varied experience gained while coordinating effectively between the stakeholders, delivery systems, socio-political decision making models in different countries should be introduced. Scientific, social and economic research and technological applications through programmes of joint R&D, training, human resource development for risk management and effective reduction of vulnerabilities would be a part of this effort.

International Co-operation

International cooperation in Science and Technology of Disasters is being pursued by Departments of Science and Technology of the Government of India. International cooperation encouraging voluntary contributions in terms of human resource sharing and financial support from governments, international organisations, UN agencies, and other sources deserves added care. Bilateral or multilateral assistance programmes in the framework of mutually agreed protocols for cooperation in tackling disasters should be accorded high priority both in pre-disaster and post-disaster situations. Activities of cooperation between international organisations, programmes of United Nations, inter-governmental organisations, non-governmental organisations and the private sector for efficient use of existing resources should be enhanced. There is a need to define responsibilities for assisting and receiving organisations in the areas of humanitarian response and relief operations, enhancing awareness, establishing and strengthening sustainable institutional mechanisms. International disaster assistance programmes should not be limited to the geographic area of the calamity but also have a component towards building nation wide resilience. The following should take place as soon as possible:

(i) Prepare a Protocol and Detailed Operation Procedures for timely receipt of International Humanitarian Response & Relief Assistance.

(ii) Prepare an Inventory of International Response Resources that could be deployed in the event of a disaster in India.

(iii) A booklet detailing the protocols, the resources available and the principles to be followed in the sourcing of international assistance.

(iv) National and international delegates be identified and invited to attend a National ways & means symposium where the booklet will be formally re leased and a program for its distribution will be determined, along with a program for supporting activities.

(v) Mobilise national and international resources for implementing Pilot Programs based on identified needs.

(vi) Task a small multi-disciplinary team to monitor the above process and report on its progress after 12 months.

Committee for Coordination of International Cooperation is recommended to be set up with the following considerations:

(i) A clear corpus of resources be identified by key international players which could be used for meeting the overall needs (including R&D needs) in disaster situations, on a continuous basis.

(ii) An inventory of resources, material and expertise has to be maintained for defining the functions of role players of various agencies to give a quick specific response in disaster situations.

(iii) The Trigger Mechanism is vital at the international level for an immediate and coordinated response to disasters with concerned agencies to move into action for rescue, recovery and reconstruction is required. The global early warning systems need to be tapped.

(iv) Nodal points for the Government of India, State Governments and International agencies with all their details have to established and updated regularly to contact them on the first news of such disasters.

(v) An inter-agency group led by the NCCM/NIDM/NCDM has to be put in place to ensure the cooperation and coordination of all the key national disaster mitigation and management centers and international players for not only an effective post disaster response but also in the efforts aimed at mitigation, prevention and preparedness for disasters.

National Disaster Mitigation Strategy to include

(i) Creating policy supports at national, State and local levels.

(ii) Improving public awareness and human resource development.

(iii) Strengthening institutional infrastructure as the first priority. Adding new centers, institutions and instruments as per needs.

(iv) Developing and facilitating improvements in engineering interventions and improving regulatory mechanisms for effective response.

(v) Strengthening of R&D and technology transfer. Creating specific infrastructure for Nuclear, Chemical and Biological threats.

(vi) National level and nation wide learning from disaster experience of other states in the country.

(vii) Creating financial supports for disaster prevention and mitigation.

(viii) Formulating better environmental methods and introducing instruments for stricter implementation of pollution laws.

(ix) An India Earthquake Safety Initiative needs to be taken up on the lines of the GESI (Global Earthquake Safety Initiative), studied as a part of select global practices. The initiative should scientifically assess the earthquake risk to all cities in India falling under high seismic risk zone. Similar initiatives should be encouraged for other types of disasters.

(x) Preparation of inundation maps under a postulated failure can be made a statutory requirement.

(xi) Comprehensive greening programs at district levels to prevent drought and

to cope with it when ever it occurs. Can States adopt schemes like the Employment guarantees Scheme (EGS) of Maharashtra, where on the first signal of distress the district collector is able to intervene to check the situation well in time?

(xii) The dam safety program should consist of evaluation of hydrologic, subsurface, hydraulic, and stability conditions. It is important that dam safety be periodically checked and resultant rectification be done.

(xiii) Safe evacuation before floods, cyclones and impending dam bursts needs to be devised.

(xiv) Safety of important installations like bridges, dams, nuclear powerplants etc. needs to be ensured.

(xv) Provision for period technical audit to check deviations from the planned activities such as in case of mines etc.

(xvi) Integrating preventive measures in all planning and developmental activities.

(xvii) Creating a mitigation fund for meeting the expenditure at all concerned organisational levels.

(xviii) Evolving a scheme of reward and punishment for prevention, safeguarding and mitigation activities.

Information technology –Disaster Information Systems would require measures and programs to harness state-of-the-art information technology for effective communication network. Networking mechanism by Government/NGOs would also improve advance-warning systems against disasters. Details to be placed on a dedicated web-site with provisions for continuous updating.

Creation of intelligent, integrated and comprehensive data base as a subset of the Disaster Knowledge Network that would include:

(i) Creating a National Register of resource persons and institutions for disaster management.

(ii) Generating standardized formats for assessment, relief and compensations.

(iii) Generating location specific data, which can provide a reliable decision support to emergency managers.

(iv) The Source Book on District Disaster Management Plan be updated by NCDM and then widely circulated and discussed.

(v) A comprehensive compendium on details of the existing ground situation in mines, forests and other relevant departments be prepared to assess for future strategy.

(vi) A composite vulnerability/ risk index for mega cities and highly disaster prone states to be developed.

Mass movement, a community based approach

Creating awareness among the community through disaster education and training, and information dissemination about disasters and empowering them to cope with hazards are all mitigation strategies. In the present circumstances adhering to building bye-laws and standards could be crucial and therefore peoples' consciousness towards the same needs to be evolved. However each mass movement requires different site specific strategy. Involvement of Mahila Manadals, Aanganwadi workers, CBOs, Panchayats and other grass root organisations could play a significant role. Local cultural groups need to be mobilised in order to educate people on how to cope with disasters.

Media

An appropriate publicity management plan/ media publicity Plan for disaster management will be very useful in imparting timely and correct information to the public. The role of this growing sector needs to be tapped for disseminating preparedness aspects of disaster management among all sections of the society and making special provisions for more vulnerable sections of the community viz. women and children. Media should play a responsible role not only in terms of awareness but also in terms of accurate and informed reporting of events. The media could establish dedicated channels during the aftermath of a calamity to provide specific information about the local people and conditions.

Culture of Prevention

Proactive Measures

(i) Pro-active measures for disaster preparedness and mitigation should be – administrative, financial, legislative and techno-legal.

(ii) Capacity Building in Disaster Management has to be at Policy, Institutional and Individual level.

(iii) Raising and recruitment of professionals to build up expertise for mitigation and management.

(iv) Enforcement of Protection and Preventive measures.

(v) Generate a proper understanding of risk among different stakeholders, training and confidence building among professionals and masons with appropriate development planning strategies.

(vi) Rehabilitation to be viewed as a long term phased activity. Mid-term rehabilitation vision is focused on reconstruction of infrastructure and livelihoods, while long term programs are geared towards addressing the issues of prevention, mitigation and preparedness.

(vii) Demonstration and discussion of selective practices with target groups like ameliorative agro-forestry techniques even properties of pesticides, methods of weed control etc.

(viii) Licensing of engineers and architects and circulation of brochures on micro-zone specific engineering prescriptions for new construction

(ix) Retrofitting of existing structures, buildings and related infrastructures and lifelines against all vullnerabilities.

Educational Sector

(i) The school and college curricula to include Disaster education and awareness. Schools should take up such programs through slogan writing, art competitions and essay writing competitions.

(ii) Disaster management and disaster resistant development practices need to be incorporated as an integral part of higher level education at the college level and particularly at institutions and centers of engineering, architecture, development planning and disaster mitigation and management.

(iii) All technical colleges, medical colleges, paramedic and nursing training institutions should have a module on disaster management. A committee of experts may be constituted to identify the syllabus for the same.

(iv) Specific course related to disaster management could be introduced at the post graduate and research level.

(v) There is a need to build up the young to understand their community and its problems to involve them in problem-solving through community participation. To develop among them a sense of social and civic responsibility and build capacity to meet emergencies.

(vi) It was recognised that the NCDM has been organising periodic disaster management education camps in colleges and universities across the country, but the need was felt to strengthen the system and institutionalise it by carrying an in-depth appraisal and creating nation wide networking of disaster training institutes.

Strengthening Existing Infrastructure

(i) Communication links like telephone/ wireless/road/rail/boat for improving flood management in the country

(ii) Potable drinking water and sanitary arrangements for improving flood management in the country

(iii) Biologically related disasters: Availability of safe drinking water.

(iv) Stockpile antimicrobial agents and biologicals.

Public Participation and Awareness

(i) National Decade for Disaster Reduction (NDDR) be utilised for community awareness, preparedness and mitigation efforts.

(ii) The HPC recommends that 3rd December every year be observed as National Prayer Day during which all religious groups in the country would pray at their respective places of worship for "Alleviation of Human Misery."

(iii) Capacity Building needs to include development of appropriate tools that can be used to convey as well as elicit useful information pertaining to disasters from the citizens at large and vulnerable sections in particular.

(iv) Preparation and circulation of area specific or city specific fact sheets with emergency preparedness check lists, family disaster plans, family disaster supply kits etc.

(v) Do's and don'ts for the public need to be developed using various methods and mediums of video, TV, radio or print on different types of disasters, how to prevent, how to combat one and finally what not to do should be made in local language and telecast on local television

(vi) The Village Task Force to be trained in emergency evacuation and relief within the village. The people of the village would elect the Task Force themselves and during disasters it serves as the nodal body at village level which has to mobilise resources for the community and disseminate necessary information passed on by the outside agencies.

(vii) Building community leadership and a chain of trained community cadres through a participatory approach can help harness the resilience and resourcefulness of the community to cope together with disasters and mitigate their effects.

NGOs

Five elements to sustain VASUDEVA are donation, grant, co-operation, skill, application and offering services. Resources will have to be located in advance, for focussed application during a crisis, to avoid delay in relief activities. The tasks performed by and the role of non-government

organisations is extremely beneficial for down scaling the impact of disasters. However there is a need to define roles, NGOs are better equipped to handle accident relief and post – disaster rehabilitation work rather than actual real time rescue. There is a need to generate a co-ordination model between the NGOs and the government towards a comprehensive approach to disaster management. The concept of VASUDEVA as given by the HPC could be popularised and expanded. It is recommended that NGOs and governments bring forth their strengths and areas of expertise in order to benefit the affected population more effectively.

NGOs should be involved in Civil Defence and other organisations for disaster management by supplementing and not supplanting these services. They can be utilised for Ambulance service, medical including nursing/para-medics and provision of medicines, rehabilitation activities like arrangement of food, shelter and clothing; Communication; and Awareness of people. Efforts be made by Voluntary Agencies to evolve a district level federation of NGO's to work for building voluntary community organisations (VCO) to promote self reliance, and building peoples capacity to cope with disasters. NGOs can assist to evolve model Panchayat-level sustainable development and disaster management plans.

PRIs/ ULBs

These are to be involved in the formulation and implementation of disaster management plans and subsequently look into the short term, medium term and long term development plans. For effective implementation of disaster mitigation strategies, awareness training needs to be provided to the members of local bodies as well as the gram panchayats, thereby setting up a trained task force that would be immediately activated should a disaster strike. They should be provided with training to handle modern communication equipment such as fax, wireless sets etc.

Corporate Sector

There is a need to identify the infrastructure, equipment, expertise and other resources of large private and public sector units and their incorporation into the local, state and national disaster management plans. There should be draft contracts prepared for supply of equipment and relief material which could be activated on occurrence of calamities. Corporate sector should take up components of disaster management activities as part of their social marketing. A silent disaster is the phenomena of massive rural-urban migration. The corporate sector can play a vital role in this context. They can help create markets for the produce of our cottage and village industries to generate gainful rural employment by extending this facility through their own marketing networks.

Insurance

Insurance brings quality consciousness in the infrastructure and a culture of safety by insisting to follow building codes, norms, guidelines, quality materials in construction etc. It would enforce safety standards by bringing accountability. Hazardous areas are to be announced, notified and publicly displayed so that people would be motivated not to settle in those areas and insurance be made mandatory in disaster prone areas. Premiums can be charged on the basis of higher the risk high the premium; lesser the risk lesser the premium. Since many areas are multi hazard, there should be multi hazard insurance provisions. Insurance

against all natural disasters to be made available including thunder and lightning etc. Gramin, Cattle and Crop insurance are limited, ad-hoc and scattered in scale which needs to be corrected. Incentives are to be provided to insurers who have followed building codes and other prescribed guidelines prevailing in the area. Insurance companies should have their own experts and supervisors for great efficievery. Insurance companies are limited in the rural areas hence other existing institutions and their services such as Panchayats, local bodies, cooperative banks, post offices could be used by insurance agencies. To bring the culture of safety and insurance a year may be declared as Year of Insurance and Government may provide suitable incentives to cover the people in areas not yet covered by insurance and the District Administration and other developmental agencies take it up on a mission mode. Migrant labourers can be caught in the disasters and being far from other States they are not given any compensation, Such a difficulty should be addresed. Government may also make provisions to incorporate identity cards, insurance policy number etc to create awareness and also facilitate insurance oriented information. The landless, shelterless, assetless and under privileged people have to be insured by the Government on a tapering basis. It should be ensured that there are Policies for personal, property as well as disaster oriented schemes. Comprehensive Insurance Policy for covering all types of man made accidents must be brought into place. In due course as a policy, the provision of compensation should be taken over by insurance.

Training

(i) The LBSNAA, state ATI's and the NCDM are emerging as parts of a nation wide structure for Disaster Management, that would need further strengthening. All training for civil services, police, armed forces, professional bodies and others should have a disaster management component. The training facilities at various training institutes in the country are to be upgraded for modernization, capacity building, staffing, and tuning and shaping of their disaster management plans and programmes.

(ii) District Magistrate in districts is the controller of Civil Defence Corps in categorised Civil Defence Towns. Police is invariably included in the first responders to disasters. It is necessary that during training, IAS and IPS officers under go a short capsule course in National Civil Defence College, Nagpur so that they are aware of the role, function and importance of Civil Defence. Each State should have a combined Home Guards and Civil Defence training institute.

(iii) Workshops should be organised at a suitable location to discuss and evolve the necessary actions and planning for various types of disasters. Experts in the workshop should be made to interact with officials of the relevant departments and listen to their views and versions inorder to arrive at the suggestions for future actions.

(iv) A network of training institutions led by a national level disaster management institute with symbiotic linkages with other National and State level institutions will need to be forged and developed. National level training institutions – NCDC, NFSC, NIRD, ICSSR, CSIR, CDMM, and in Universities need to be brought into such networks.

(v) R&D and educational institutions may be directed to conduct studies addressing the problems faced by the hazardous industry and specific department.

R&D, Science and Technology

(i) Systematic monitoring of El Nino and global warming should be continued.

(ii) As a permanent member of World Meteorological Organisation (WMO), India should continue to pursue efforts to facilitate a most effective tropical cyclone warning system for the region.

(iii) South Asia Association for Regional Cooperation (SAARC) Meteorological Research Institute may strive to achieve its stated objectives of joint research on various aspects on monsoon meteorology.

(iv) R&D should be promoted and encouraged for all frontier areas related to disasters such as biological, space applications, information technology, and nuclear radiation.

(v) Specific disaster management training at various levels – managerial, state responder, community based etc. should be taken up.

(vi) Disaster management personnel should be trained in the use of emergency communication and disaster warning systems so as to act efficiently in managing mitigation exercises.

(vii) Skills of professionals should be upgraded by providing state of the art training and establishing public health laboratory training programme. State Government shall ensure that adequate training is imparted to all such officials for correctly carrying out their designated duties.

(viii) The US&R Teams are to be trained, equipped and given periodic/surprise exercises to ensure adherence to the minimum prescribed response time.

IMPLEMENTATION OF THE RECOMMENDATIONS

Monitoring by Working Group of the All Party National Committee

The HPC has arrived at the recommendations after wide consultation with experts and implementers and a consensus already appears to be building up, hence these would be readily accepted. However, the allocation of resources, technical expertise and support has to be put together by each of the agencies involved who would make a detailed implementation plan. These would be implemented by the different ministries, departments, agencies and organisations at the National level along with their respective disaster management plans. Similarly, actions would be undertaken at the State, district and panchayat level. These recommendations of the HPC, as accepted by the Government, needs to be followed up and implemented in a structured and time bound manner by the concerned Ministries, departments, agencies, corporations and organisations. The HPC views the setting up of the All Party National Committee on Disaster Management under the Prime Minister as a very positive development as it would help in bringing about a political consensus for the implementation of the recommendations especially the one related to constitutional provisions, and legal framework.

The All Party National Committee on Disaster Management has an important role in building up a political will and consensus for disaster management and mitigation effort in the country so that all sections of the society and the Government act in unison towards the vision of a disaster free India. Hence, the National Committee should be a standing body with all aspects of disaster management in the country under its preview. The HPC stands converted into the Working Group of the National Committee to assist in co-ordination and implementation of the follow up actions. The

Working Group under the National Committee may be entrusted with steering, monitoring and supervising follow up actions and implementation of the recommendtions at the National level along with those at various States, districts and panchayats.

Time frame for implementation

The Working Group would be required to submit quarterly status reports on the progress of implementation to the National Committee. A checklist giving the time frame and nodal agencies has been given separately.

Funding mechanism

It is recommended that a certain percentage of the funds for disaster management are earmarked by all ministries and organisations for implementation of these recommendations.

1

Introduction

Disaster Risk in India is apparent in the physical and socio-economic vulnerability profile of the country. The devastating Orissa Super Cyclone, the Gujarat Earthquake, and the Bhopal Gas Tragedy are still fresh in our memories. Hazardous encounters and fatalities also mar our daily lives. A holistic approach to Disaster Management would therefore include-growing environmental concerns and risk assessments towards a safer India.

A Disaster is an event of nature or man-made causes that leads to sudden disruption of normalcy within society, causing damage to life and property, to such an extent that normal social and economic mechanisms available are inadequate to restore normalcy.

Disasters cause widespread damage and disruption in India with a high frequency of natural causes such as droughts, floods, cyclones and earthquakes and occasional man-made tragedies like the Gas Leak at Bhopal.

The High Powered Committee (HPC) constituted for suggestion of institutional reforms and preparation of Disaster Management Plans at the National, State and District levels was set up at the behest of the Prime Minister by the Ministry of Agriculture, under the chairmanship of Shri J.C. Pant, former Secretary to the Government of India, vide an order dated August 20, 1999.

The need for an effective disaster management strategy to lessen disaster impact was increasingly being felt in many quarters. The State Governments, as the

major responders in disaster situations, are responsible for preparedness and mitigation measures, in addition to organising an effective disaster response mechanism. In this context, uniformity in response mech nism, including scale of assistance in various parts of the country is imperative. In view of the increasing trend and intensity of natural disasters in recent past, the need for strengthening of organisational structure of disaster management at various levels and revising/regular updating of Codes/Manuals/ Disaster Plans of the States was also being felt.

While the area liable to floods is 40 million hectares, the average area affected by floods annually is about 8 million hectares.

In view of the enhanced Terms of Reference, manmade disasters were also included to develop a more comprehensive disaster management system. The HPC took an overview of all recent disasters (natural as well as manmade) in the country and identified common response and preparedness mechanisms.

An important activity carried out by the HPC was a series of consultations with a number of government, non-government, national and international agencies and media organisations who submitted their own findings on the disaster management scenario in their respective areas. Their observations and recommendations became the basis for developing the planning process for prevention, preparedness and response at national, state, district and local levels.

Overview of Disasters

Natural Disasters

In the 1970s and the 80s, droughts and famines were the biggest killers in India, the situation stands altered today. It is probably a combination of factors like better reservoir management and food security measures that has greatly reduced the deaths caused by droughts and famines. *Floods, high winds and earthquakes dominate (98%) the reported injuries, with ever increasing numbers in the last ten years*. The period from 1973 to 1997 has been associated with a large number of earthquakes in Asia, that have a relatively high injury- to death ratio. Floods, droughts, cyclones, earthquakes, landslides and avalanches are some of the major natural disasters that repeatedly and increasingly affect India. (World Disasters Report- 1999, International Federation of Red Cross and Red Crescent Societies)

Floods

Seventy five per cent of rainfall is concentrated over four months of monsoon (June - September) and as a result almost all the rivers carry heavy discharge during this period. The problem of sediment deposition, drainage congestion and synchronization of river floods compound the flood hazard with sea tides in the coastal plains. Brahmaputra and the Gangetic Basin are the most flood prone areas. The other flood prone areas are the north-west region of west flowing rivers such as the Narmada and Tapti, Central India and the Deccan region with major east flowing rivers like Mahanadi, Krishna and Cavery. While the area liable to floods is 40 million hectares, the average area affected by floods annually is about 8 million hectares.

Droughts

We have a largely monsoon dependant irrigation network. An erratic pattern, both low (less than 750 mm) and medium (750 - 1125 mm) makes 68 per cent of the total area vulnerable to periodic droughts. A 100 year analysis reveals that the frequency of occurrence of below normal rainfall in arid, semi-arid and sub-humid areas is 54-57%, *Severe and rare droughts occur in arid and semi-arid zones every 8-9 years.* Semi-arid and arid climatic zones are subject to about 50 per cent of severe droughts that cover generally 76 percent of the area. In this region, rare droughts of most severe intensity occurred on an average once in 32 years and almost every third year used to be a drought year.

Cyclones

India has a long coastline of approximately 8,000 kms. There are two distinct cyclone seasons: pre-monsoon (May-June) and post-monsoon (October-November). The impact of these cyclones is confined to the coastal districts, the maximum destruction being within 100 Km from the centre of the cyclones and on either side of the storm track. Most casualties are caused due to coastal inundation by tidal waves, storm surges and torrential rains.

Earthquakes

The Himalayan mountain ranges are considered to be the world's youngest fold mountain ranges. The subterranean Himalayas are geologically very active. In a span of 53 years four earthquakes exceeding magnitude 8 have occurred in this region. The peninsular part of India comprises stable continental crust. Although these regions were considered seismically least active, an earthquake that occurred in Latur in Maharashtra on September 30, 1993 of magnitude 6.4 on the Richter scale caused substantial loss of live and damage to infrastructure.

Table 1.1: Annual Damage due to Natural Disaster (for the year –1985-1997)

Year	Number of people killed or missing	Number of people affected (in millions)	Number of houses & buildings partially or totally damaged.	Amount of property damages (Rs. billion)
1985	1,804	59.56	2,449,878	4.06
1986	1,200	55.00	2,049,277	3.74
1987	1,835	48.34	2,919,380	2.57
1988	4,533	10.15	242,533	4.63
1989	1,718	3.01	782,340	2.41
1990	1,855	3.17	1,019,930	1.71
1991	1,860	34.27	1,190,109	1.90
1992	1,367	19.09	570,969	2.05
1993	9,936	26.24	1,529,916	5.80
1994	2,344	23.53	1,051,223	1.83
1995	2,508	54.35	2,088,355	4.73
1996	3,789	54.99	2,376,693	5.43
1997	1,881	44.38	1,103,549	n.a.

Source: IDNDR Review, NCDM, 2000

Landslides and Avalanches

The Himalayas, the Northeast hill ranges and the Western Ghats experience considerable landslide activity of varying intensities. River erosions, seismic movements and heavy rainfalls cause considerable activity. Heavy monsoon rainfall often in association with cyclonic disturbances result in considerable landslide activity on the slopes of the Western Ghats.

Avalanches constitute a major hazard in higher reaches of the Himalayas. Parts of the Himalayas receive snowfall round the year and adventure sports are in abundance in such locations. Severe snow avalanches occur in Jammu & Kashmir, Himachal Pradesh and the Hills of Western Uttar Pradesh. The population of about 20,000 in Nubra and Shyok valleys and mountaineers and trekkers face avalanche hazard on account of a steep fall.

Manmade Disasters

The fast pace of growth and expansion without comprehensive understanding or preparedness has brought forth a range of issues that seek urgent attention at all levels. In the absence of such measures growing numbers in our population are at a risk of prospective hazards such as air accidents, boat capsizing, building collapse, electric fires, festival related disasters, forest fires, mine flooding, oil spills, rail accidents, road accidents, serial bomb blasts, and fires. The safeguards within existing systems are limited and the risks involved high.

The concept of vulnerability therefore implies a measure of risk combined with the level of social and economic ability to cope with the resulting event in order to resist major disruption or loss.

Nuclear, Chemical and Biological threats are apparent in the present scenario. Deliberate international terrorism or accidental secondary fallout can be fatal. Creation of specific infrastructure is imperative to avoid a catastrophe in the future. However, rapid and effective response needs intensive research and laboratory support.

As the HPC's work was nearing completion, the terrorist attacks on New York and Washington D.C. on September 11, 2001, further highlighted the need to create mechanisms that are capable of managing unprecedented but now foreseeable manmade disasters of such large magnitudes.

The unique geo-climatic as well as socio-political conditions of the Indian Subcontinent make this region particularly vulnerable to disasters, not only natural but also man-made. The countries in this region are densely populated and are low-income economies. Recurrent disasters cause setbacks to sustained efforts towards economic growth in these developing countries. Such disasters in fact exacerbate poverty conditions in the region. In spite of current preparedness measures in the face of such eventualities the socio-economic costs mount every year.

Vulnerability Profile of India

Vulnerability is defined as "the extent to which a community, structure, service, or geographic area is likely to be damaged or disrupted by the impact of a particular hazard, on account of their nature, construction and proximity to hazardous terrain or a disaster prone area."

The Indian subcontinent can be primarily divided into three geophysical regions. The topographic and climatic characteristics of each region make them susceptible to different type of disasters. 54% of land is vulnerable to earthquakes while about 40 million hectares of land is vulnerable to floods.

The concept of vulnerability therefore implies a measure of risk combined with the level of social and economic ability to cope with the resulting event in order to resist major disruption or loss. This susceptibility and vulnerability to each type of threat will depend on their respective differing characteristics.

Physical Vulnerability

Physical vulnerability relates to the physical location of people, their proximity to the hazard zone and standards of safety maintained to counter the effects. For example people are only vulnerable to a flood because they live in a flood prone area. Physical vulnerability also relates to the technical capacity of buildings and structures to resist the forces acting upon them during a hazard event.

Socio-economic Vulnerability

The degree to which a population is affected by a calamity will not lie purely in the physical components of vulnerability but is contextual to the prevailing social and economic conditions and its consequential effect on human activities within a given society.

Disparate capacities of people are exemplified in risk analysis. Effects are seen to be directly proportionate to the poverty-gap and poverty-intensity in the society/ location as it is the poor that normally live in high concentration in marginal areas (unstable slopes, flood plains) with little infrastructure and fewer resources to cope. Research in areas affected by earthquakes indicates that single parent families, women, handicapped people, children and the aged are particularly vulnerable social groups.

Geo-physical setting with unplanned and inadequate developmental activity is a cause for increased losses during disasters. 1 million houses are damaged annually in India apart from high human, social and other losses. Urban growth and concentration of limited resources are realities of our times while the rural sector faces a lack of access. This compounds the problem of disaster vulnerability.

Following steps are imperative for vulnerability assessment and preparedness:

- Identification of various hazard prone areas. Preparation of detailed vulnerability profiles, mapping food insecurity, aviation hazard, landslide hazard etc.
- Vulnerability and Risk Assessment of Buildings.
- Disaster damage scenarios.
- Technical Guidelines for Hazard Resistant Construction of Buildings.
- Improving hazard resistance of existing housing stock by Retrofitting,
- Techno-legal Regimes to be adopted for implementation

Environmental Concerns

Disasters, manmade or natural have widespread repercussion on human lives, property and environments. Nature is an abundant resource but indiscriminate and rampant growth threatens all development efforts. The balance in nature between man, animal and resources must be nurtured. Oil spills, forest fires or nuclear leaks can cause wide spread and irreparable damage to the environment. Time cycles to renew these resources are long and therefore measures for safety, maintenance and containment have to strengthen.

Global Warming and Climate Change

Global warming will supercede all local environmental issues, because it has the ability to completely change the face of the Earth.

It is already leading to shrinking glaciers and rising sea levels. Along with floods, India also suffers acute water shortages. Earlier this year the western state of Rajasthan was struck by drought. The steady shrinking of Himalayan glaciers means that the entire water system is being disrupted - global warming will cause even greater extremes. Impact of El-Nino and La-Nina have increasingly led to disastrous impacts across the globe.

Statistically, it is proven that the Himalayan glaciers are shrinking, and in the next 50 to 60 years the glaciers will virtually stop producing the water levels that we witness at present. This will drastically cut down the water available downstream, and will adversly affect agricultural economies such as the plains of Uttar Pradesh (UP) and Bihar. That, as one may realize, would cause tremendous social upheaval as such regions already suffer from extreme poverty.

The changing environmental equilibrium as well as the diverse geographical setting of the region within India leads to extreme weather conditions that often emerge as disaster phenomenas. A large number of deaths are reported due to heat or cold waves, mostly from northern and coastal States of the country.

Agroforestry

Sustainable management of natural resources such as land, water and vegetation is essential in providing livelihood and environmental security. Ever-increasing demographic pressures coupled with developmental activities are causing tremendous pressure in the utilization of these resources leading to various kinds of ecological disasters such as droughts, floods, cyclones, landslides, mine spoils, siltation of reservoirs, deterioration of water bodies, loss of biodiversity etc. In recent times, India has witnessed large-scale disasters such as frequent floods in the Indo-Gangetic and Brahmaputra plains, the cyclones of the east-coast and Gujarat, the earthquakes of Uttarkashi, Latur, Jabalpur, Chamoli and Gujarat; and small-scale hazards, such as landslides in the Himalayan range, forest fires and desertification. These natural disasters have not only affected the economy but also took a huge toll of human lives. The increasing frequency of such disasters is the outcome of excessive biotic and abiotic interferences which have resulted in considerable degradation of our natural resources.

Large scale deforestation across the globe in general and under-developed and developing countries in particular alongwith faulty management practices have resulted in various kinds of environmental degradation such as wind and water erosion; physical and chemical degradation of soil, water and biodiversity; and global warming.

Deforestation is a slow onset disaster that contributes to other cataclysmic disasters. Rapid rates of deforestation in the tropics is the key factor towards increase in the frequency of flood disasters. The greatest and most immediate danger of deforestation is that gradually diminishing forested areas contribute or worsen other types of disasters such as accelerated soil erosion, floods, drought and desertification. Deforestation of watersheds, especially around smaller rivers and streams, increase the severity of flooding, reduces stream flows, dries up springs during dry seasons and increases the load of sediment entering the waterways. *Most hazards in the Himalayan region emanate primarily from the natural processes of geologic, hydrologic and physiographic nature but are greatly affected by human interventions.* Ever increasing demand for food and fodder has resulted in conversion of forests and exploitation of fragile and marginal lands for agriculture, migratory grazing and shifting cultivation practices. Mining and other human activities have led to over-exploitation of natural resources and consequent occurrence of ecological disasters. Rapid degradation of the Himalayan ecosystem is posing a potential danger to the greenery of the Indo-Gangetic basin, causing sporadic floods in some areas and drought in others. As a result, more than half of the geographical area of the country is now partially exposed to various forms of land degradation processes such as water and wind erosion, salinization, waterlogging, flooding, ravines, shifting cultivation, mining, quarrying, landslides etc. About two-thirds of the 142 million ha of agricultural land in the country is drought affected and about 40 million ha area is prone to flooding, of which about 8 million ha area gets flooded annually. It is estimated that about 56% of the country is susceptible to earthquake damages.

Population of India has already crossed the 1 billion mark and livestock population has reached a figure of 445 million. The per capita availability of cultivated land has

declined over the years from 0.53 ha in 1950 to 0.15 ha in 2000 and is expected to further reduce to 0.12 ha by 2015 A.D owing to population pressures. The requirements of food grains, fodder and fuelwood by 2015 A.D have been estimated at 275 million tonnes, 1083 million tonnes and 235 million m^3 respectively to meet the requirements of 1225 million human and 600 million livestock population indicating a shortfall of 73 million tonnes, 570 million tonnes and 195 million m^3 of food grains, fodder and fuelwood at the current level of production. Besides, tremendous pressure on limited forest resources (63 million ha) and over-exploitation of land resources, particularly the marginal lands, might further aggravate land degradation and jeopardise sustainability of these resources beyond repair. Agriculture is the mainstay of rural population in the country. There has been a spectacular increase in the food production since independence which has increased four times from 51 million tonnes in 1950-51 to 203 million tonnes in 2000-01 against three fold increase in population. However, uneven development of agriculture across regions and also among different sections of farming community has widened the disparity between resource-rich and resource-poor farmers and has resulted in low levels of productivity especially in rainfed areas and has led to degradation of natural resources. Of the 142 million ha cultivated area in the country, 63 % (89 million ha) is rainfed which accounts for only 45 % of the total food production while 37 % irrigated area (53 million ha) contributes 55 % to the national food basket. Moreover, agriculture on marginal and fragile lands in the hilly regions has resulted in enormous soil loss to the tune of 40 t ha^{-1}. The government has therefore accorded high priority to holistic and sustainable development of rainfed areas.

Diversification of landuse systems is a necessary strategy for providing variety of products for meeting varied requirements of the people, insurance against risks caused by weather aberrations, controlling erosion hazards and ensuring sustainable production of the land on a long-term basis. Agroforestry is a viable alternative to prevent and mitigate natural disasters. Besides, agroforestry may be one of the important tools for disaster management. Agroforestry may be defined as a technique of growing food crop annuals in association with woody perennials to optimise the use of natural resources, minimising the need for inputs derived from non-renewable resources and reducing the risk of environmental degradation. Agroforestry - a multiple use concept of land management is also capable of meeting the present challenges of shortage of fuelwood, fodder, fibre, timber, unemployment, environmental degradation, protection and improvement of wastelands and agriculture land. It has immense potential to ensure stability and sustainability in production and to provide ecological and economic security. In India, agroforestry practices are intertwined in the various developmental programmes/schemes in the Five Year Plans of Government of India either to prevent natural disasters or to overcome the problems of affected people during and after the natural disasters. These programmes include Flood Control/ Management Programmes, Multipurpose River Valley Projects, Agriculture Development Programmes, Integrated Rural Development Programmes (IRDP), National Watershed Development Programme for Rainfed Areas (NWDPRA), Forestry Development Scheme, Drought Prone Area Development Programme (DPAP) and Desert Development Programme (DDP). In other words, agroforestry has a wide and diverse potential to protect the environment in varying agro-climatic situations.

The major environmental functions of agroforestry may be summarized as :

- Control of soil degradation
- Control of desertification
- Flood control
- Drought moderation
- Reduction in the pollution of groundwater resulting from high inputs of fertilizers
- Increasing biodiversity in the farming system and watershed scale
- Increasing food security thereby reducing pressure on land resources
- Checking deforestation and its associated impact on the environment
- Reducing pressure on forests through on-farm supply of fuelwood, fodder and other forest products
- Reduction in the build-up of atmospheric carbon dioxide and other greenhouse gases
- Disaster prevention, rehabilitation and reconstruction.

Urban Risks

India is experiencing massive and rapid urbanization. The population of cities in India is doubling in a period of just two decades. It is estimated that by 2025, the urban component, which was only 25.7 % (1991) will be more than 50%. The Ninth Five Year Plan estimates India's population size, by 2011, to be 1178.89 million with an urban population share of 32%. A characteristic feature of the urbanisation process is the increasing metropolitanisation.

The trend indicates continued urbanisation and metropolitanisation in the decades to come. Some of the urban agglomerations today accommodate more than 10.0 million people. Their number and sizes will continue to grow. Such concentration trends in the Indian demographic scenario would surely subject its cities to greater risk of damage to life and property in the event of disaster.

Urbanisation is increasing risk at unprecedented levels: communities are becoming increasingly vulnerable when high-density areas with poorly built and maintained infrastructure are subjected to natural hazard: environmental degradation, fires, flooding and earthquake. Urbanisation dramatically increases vulnerability, whereby communities are forced to squat on environmentally unstable areas such as steep hillsides prone to landslide, by the side of rivers that regularly flood, or on poor quality ground causing building collapse.

Nature of Risks

Most prominent amongst the disasters striking urban settlements frequently are those of floods and fire, with lower incidences of earthquakes, landslides and cyclones. Of these, floods are more devastating due to their widespread and periodic effect. Fires have more localised effects but are very frequent in urban areas leading to heavy losses of life and property.

Studies indicate that the loss of life and property due to floods has been increasing over the past decades. The prime reason for this is unplanned urban growth on the banks of the rivers and in other low-lying areas in the vicinity. The floods of Punjab in 1993 and those of Haryana and Delhi in 1995 bear testimony to this. These kinds of disasters can only be averted with the help of disaster conscious urban planning and by restricting development in flood sensitive areas.

Fires have emerged as a critical issue in urban planning due to the rising frequency of fire incidents leading to huge losses. Fires

are very common in slum and squatter settlements in large cities and in high rise buildings.

Fire fighting capabilities are indeed very essential, but these are mostly curative measures. More importantly, preventive measures are required to address this critical issue effectively and efficiently. Hence, for efficient control and management of fire disasters it is essential to implement proper landuse zoning, land subdivision, and building regulations.

Development vs Environment

Developmental activities compound the damaging effects of natural calamities that we have always been facing. The floods in Rohtak (Haryana) in 1995 are an appropriate proof of this. Even months after the flood waters had receded, large parts of this town were still submerged This was not damage due to floods, but due to the waterlogging which resulted due to poor landuse planning. *Ad hoc landuse decisions are a common practice in our system due to immense demand pressures on a scarce urban land supply.*

Risk due to Environmental Stresses: Delhi, India

Every ninth student in Delhi's schools suffers from asthma. Delhi is the world's fourth most polluted city. Each year poor environmental conditions in the city's informal areas lead to epidemics. In 1995, 423 lives were lost due to dengue fever. In 1996 there were 8,992 cases of gastroenteritis, of which almost 8% were fatal. Poor precautions and ill-maintained electricity lines lead to innumerable fire incidents every summer. Fifty seven persons lost their lives in a major fire at a cinema hall in south Delhi in June 1997 due to electrical fault. Over one million citizens of Delhi face the risk of floods, should the level of river Yamuna rise by a few meters. Delhi is in seismic zone IV with expected earthquake of 6 -6.5 on the Richter scale threatening much of the old dilapidated and poorly constructed informal structures where 60% of the city's population resides. Delhi has one of the highest road accident fatality ratios in the world. In many ways Delhi reflects the sad state of urban centres within India that are exposed to risks which are misconstrued and almost never taken into consideration for urban governance.

Safety Factor for Human Existence

The quality of life of an individual is determined largely by socio - economic and physical environment. From a different perspective, enhancing quality of life is minimizing frequency and intensity of disturbances to average human existence. It is therefore important to reduce vulnerabilities of the communities. It is also obvious that the nature of the vulnerability of the community is largely dependent on the social structures, the physical structures, and the economic assets.

The core issue, therefore, becomes promoting measures that ensure safety of individuals against such vulnerability which often get manifested as hazards in form of accidents, illnesses and other factors that could contribute to mortality.

Need for Action

In the contemporary context, a broader approach is required which not just looks into technology, adaptability and cost aspects but also on how these aspects could be imparted effectively to the community. The users in general need to appreciate the high priority which needs to be given to *safer living.*

The urban planning, development and management processes have traditionally been dealt with in a sectoral manner. The safe city concept, particularly due to its participatory approach, would try to bring about strategic integration of various urban sub-sectors and present an integrated

development framework. This is a need that has also been stressed upon by the National Commission on Urbanisation's Working Group on Physical Planning in India, in stating that "it also provides for checking costs compared to the benefits of alternative packages of projects aiming at pragmatic goals, and permits a much tighter and more efficient implementation control and evaluation of large scale innovations".

> Risk reduction efforts need to be based as much in urban governance and management as in urban planning. Good urban governance includes the state, but transcends it by taking in the private sector and civil society. All three are critical for sustaining human development. The state creates a conducive political and legal environment. The private sector generates jobs and income, and the civil society facilitates political and social interaction-mobilizing groups to participate in economic, social and political activities. As each sector has weaknesses and strengths, a major objective of our support for good governance is to promote constructive interaction among all three. (UN Policy Document on Governance for Sustainable Human Development, Jan. 1997).

Within the framework of safe urban planning and management the traditional wisdom of urban planning that was evolved over thouands of years in India needs to be revived and imbibed in the current practices. The concept of the 'Vastu Purusha Mandala' that dealt with the habitat space as a living organism was very conscious of the fragile relationship between development and environment, and this consciousness led to design and development parameters that were far safer than those followed today.

Urban populations are growing rapidly and the situation is most alarming since it is taking place in the absence of well planned and structured settlements. Civic services and the general quality of settlements is of a low standard, as a result of which the urban communities are being subjected to an ever increasing risk of natural as well as technological disasters. In such a situation, the only viable way to a safer living is through preparedness to face disasters, since hazards cannot entirely be controlled. This requires concerted efforts on the part of the government agencies, voluntary organisations, and most importantly the community itself. Risk awareness has to be created and preparedness plans formulated, so that the urban populace may live a safer life.

It has been realized that with the introduction of relatively simple, effective risk reduction measures (those which 'reduce vulnerability and increase capacity') into existing urban improvement practices, and those which involve communities in decision making, degrees of protection can be afforded within the most vulnerable urban settlements, which in the long term contribute to both protecting lives and enhancing livelihoods, thus reducing poverty.

The Reducing Urban Risk Initiative

This assumption formed the basis of the project : Reducing Urban Risk India, carried out in four vulnerable communities in Delhi and Ahmedabad by the National Centre for Disaster Management in collaboration with the NGOs, SEEDS and DMI. The project was supported by DFID and the Oxford Brookes University, and set an example of low-cost urban risk reduction measures suitable for poor communities living in hazardous situations.

The principal need that emerges from the initiative is for developing a method that integraties risk reduction as a component of urban planning with major community participation. Its main objective is the need to have a methodology combining risk

identification with action planning to integrate sustainable risk reduction measures into existing urban planning practices for improving settlements vulnerable to environmental degradation and natural hazard. While an initiation has been made in this direction, the work needs to be consolidated and mechanisms need to developed, tested and be put in place for institutionalization of Urban Risk Reduction in India.

Some Recent Disaster Events in India

Gujarat Earthquake

A powerful Earthquake of magnitude 6.9 on Richter-Scale rocked the Western Indian State of Gujarat on 26th January,2001. It caused extensive damage to life & property. This earthquake was so devastating in its scale and suffering that the likes of it had not been experienced in past 50 years, leaving thousands seriously injured, bruised and handicapped; physically, psychologically and economically.

The epicenter of the quake was located at 23.6 north Latitude and 69.8 east Longitude, about 20 km Northeast of Bhuj Town of the Kutch district in Western Gujarat. At a depth of only 23 kms below surface this quake generated intense shaking which was felt in 70% region of India and far beyond in neighbouring Pakistan and Nepal too. The tremors were followed by intense after shocks that caused continued anxiety to the population in the region.

The seismicity of the affected area of Kutch is a known fact with a high incidence of earthquakes in recent times and in historical past. It falls in Seismic Zone V, the only such zone outside the Himalayan Seismic Belt. In the last 200 years damaging earthquakes have occurred in 1819, 1844, 1845, 1856, 1869,1956 almost as devastating as 2001 earthquake.

Twenty-one of the total 25 districts of the State were affected by this quake. Around 18 towns, 182 talukas and 7904 villages in the affected districts have seen large-scale devastation. The affected areas even spread up to 300 km from the epicentre. In the Kutch District, four major urban areas – Bhuj, Anjar, Bachau and Rapar suffered near total destruction. The rural areas in the region are also very badly affected with over 450 villages almost totally destroyed.

In addition, wide spread damages also occurred in Rajkot, Jamnagar, Surendranagar, Patan and Ahmedabad districts. Other urban areas such as Gandhidham, Morvi, Rajkot and Jamnagar have also suffered damage to major structures, infrastructure and industrial facilities. Ahmedabad, the State capital was also severely affected.

Gujarat Earthquake is very significant from the point of view of earthquake disaster mitigation in India. The problems observed in this disaster are no different from other major recent earthquakes in the world. Some of the issues in the recovery and reconstruction phase are: an understanding of risk among different stakeholders, training and confidence building among professionals and masons with appropriate development planning strategies.

This quake has provided numerous examples of geo-technical and structural failures. The traditional wisdom of design and construction practises of engineered buildings prevalent in this country came under criticism for the first time. It has triggered comprehensive understanding on what needs to be done in this regard.

Orissa Super Cyclone

A super cyclone slammed the state of Orissa on October 29, 1999 with wind speeds of 270-300 kmph accompanied by torrential rain ranging from 400 mm to 867 mm

continuously for three days. The turbulent sea surged up to 7 m high, with waves that rushed in and traveled up to 15-20 km inland.

The super cyclone caused extensive damage. Over 1.6 million houses were damaged. The sectors of agriculture, livestock, village industries, infrastructure and environment were badly devastated.

The State machinery was thrown out of gear in the initial response period. However, it recovered quickly with wide-ranging support from various sectors, including Central Government, other State Governments, notably Andhra Pradesh State Government, national, regional and local NGOs, and international aid agencies.

Rehabilitation programs have been taken up on a wide scale by Government as well as Non-Governmental Organisations in various sectors, including livelihood reconstruction, housing, cyclone shelter construction, water and sanitation, school buildings and books.

Rehabilitation is being viewed as a long term, phased activity. Mid term rehabilitation vision is focused on reconstruction of infrastructure and livelihoods, while long term programs are geared to address the issues of prevention, mitigation and preparedness.

Bringing in local interventions to mitigate the impact of future cyclones emerged as a major intervention area as the relief stage came to an end. It has been realised that it is time to set a safe development agenda.

Floods

Gorakhpur

The monsoon season during 1998 was very active throughout the country, causing floods in a number of States including Andhra Pradesh, Assam, Bihar, Delhi, West Bengal. The damage due to floods was very severe in Uttar Pradesh. The worst affected district in Uttar Pradesh was Gorakhpur which has had unprecedented floods. Over three lakh hectares of land area was affected in Gorakhpur and adjoining districts due to floods.

The floods in Gorakhpur were Two-Phased: first in the latter half of July and second in the later half of August. Three times more than normal rains in the

Table 1.2 : Flood Damages in Uttar Pradesh due to Floods-98

Items	Statistics
No. of districts in U.P.	83
No. of districts affected	55
No. of villages affected	15403
Land area affected M.Hactare	2.523
Population affected in million	12.191
Crop area affected in M. Hectare	1.415
Damage to houses in nos.	384090
Cattle heads lost in nos.	3379
Human lives lost	1388

Source: CWC, New Delhi

catchment areas of various rivers forced huge water discharge into the rivers. River Rapti, flowing through Gorakhpur, flowed at 85.82 meters above mean sea level on August 21, 1998 whereas the Gorakhpur city is at a height of 78 m above the sea level. The embankments of the river were breached at several places near the city. Heavy losses to property took place in the city and adjoining rural areas. A large number of villages were in two-meter deep water. Large areas of farming land were covered in sand sheet converting it into non-agricultural land. Thousands of ' temporary houses made of thatch and adobe collapsed rendering thousands homeless. The flood waters did not recede for more than a month in most areas and some remained water-logged even after three months due to a faulty network of embankments, roads and railways in the region.

Relief was immediate from the State with an expenditure of Rs.29.40 crores but discrepancies were reported in the distribution of relief to the affected community.

The NGOs also played a very active role in the provision of relief to the affected community. The NGOs distributed relief to the tune of Rs. 10.00 Crores in the flood-affected areas. Various NGOs helped the local administration include Oxfam, CARE, CASA, Red Cross, Gita Press, Anand Marg, UP Voluntary Health Organization etc.

Brahmaputra

The Brahmaputra basin extends over an area of nearly 5,80,000 sq km and covers an area of acute seismic activity. The river at one time was navigable to a distance of 1100 km up to Dibrugarh. However the deterioration of the channel has altered the situation. Brahmaputra under the influence of southwest monsoons is subject to severe and recurrent floods. The abnormal rise of bed of the river after the earthquakes of 1897 and 1950 in Assam region resulted in the spilling of the river on both banks. A number of spill channels have been thrown up. Uncontrolled discharge and subsequent spilling of these channels causes a serious flood problem. In the Upper reaches there is a problem of swinging and changing of course and in the lower reaches the problem is caused by inadequate drainage capacity of channels. The districts of Jalpaiguri and Cooch Behar and Siliguri subdivision of Darjeeling in the northern region of West Bengal suffer frequent and floods from the tributaries of Brahmaputra such as Tista, Torsa and Jaldhaka.

The erosive activity of the river has also increased. A major portion of the Palasbari town disappeared in 1954 and similarly Dibrugarh was endangered. Subsequent acute erosion has developed at Kokilamukh, Gauhati, Dhubri, Tarabari, Soalkuchi and numerous other locations threatening embankments.

Haryana

Heavy rainfall in Haryana during August-September 1995 caused one of the worst floods in the region's history. The average rainfall within two days was in the range of 200-250 mm. The existing drainage, already in spate, was unable to drain out the rain water resulting in severe flooding throughout the State. Fifteen out of seventeen districts of the State were severely affected due to the floods. Seventeen urban settlements were flooded bringing normal life in these areas to a standstill.

One of the biggest problems faced due to the floods was the excessive water logging in Central Haryana. Although no river passes through this region the topography with its saucer like shape is such that inflow of water due to excess rainfall could not be drained out except through pumping.

While the best possible short-term

measures were introduced to tackle immediate dewatering, the need for long-term strategy to tackle floods in such areas was felt ever more.

Malpa Landslide

Upper reaches of Uttaranchal (Formerly part of Uttar Pradesh) hills including the Pithoragarh district are highly prone to landslides. The week of 12th -18th August 1998 will go down in the history of Uttaranchal as one of compounded tragedies. A sudden landslide took place on August 17,1998 burying the Malpa village. The reactivation of old landslides due to human interference led to unforeseen disasters.

Malpa village is located on the right bank of River Kali in the Kumaon. Tribes inhabit the area. With the opening of the Mansarovar pilgrimage, the route began to burst with human activity. Before the landslide tragedy struck at Malpa there were base camps of Kumaon Mandal Vikas Nigam (KMVN), Public Works Department (PWD), Indo-Tibetan Border Police (ITBP) and local residential houses of the Malpa Tribal people.

The thunderous noise and the impact of the rock mass upon its sudden detachment and fall was so violent that flashes of blazing sparks and streaks of fire were seen by the distant eye-witness standing on the lower slopes. It is never easy to forecast when landslide will occur in the mountain region and these are regular features in the rainy season.

A number of landslides in Ukhimath Tehsil took a toll of 107 lives in 29 villages leaving about 1500 families homeless. The landslide began around 0200 hrs on August 12,1998.

In the mountainous districts heavy rainfall, landslides and floods have a close association. Prolonged rainfall cause heavy landslides. These massive landslides block the flow of rivers for quite some time. The formation of river blocks in that fashion causes great damage to the settlements downstream.

Bhopal Gas Leak

The gas leak incidence at the Union Carbide Chemical Plant in Bhopal, Madhya Pradesh was the worst possible industrial disaster that occurred on the unforgettable night of 2-3 December 1984. Over 40 tons of Methyl Iso-cyanate (MIC) and other lethal gases including hydrogen cyanide leaked from Union Carbide Chemical plant, and caught people unawares immediately killing 8000 people. It has affected thousands of people who till this day are experiencing the deadly after effects of the gas leak to which they had been exposed. More than 25 research studies have been conducted so far which state that the health of more than 530,000 people has been severely affected causing multi-systemic injuries. Death toll has crossed 20,000 and 15 years after the disaster 10-15 people continue to die every month.

The Union Carbide Chemical (UCC) Plant had been set up in the year 1969 as an outcome of the Indian Governments move towards the 'Green Revolution' and were committed to increase India's agricultural productivity through mechanized agricultural techniques, construction of dams, and production of chemicals and fertilizers.

The gas leak has had the most catastrophic effect on the health of the people who have been exposed and has affected people over a large area. Thirty six municipal wards were affected by the gas leak. The poisonous gas was absorbed into the blood stream of the people, which has caused lasting and damaging effect to the lungs, brain, kidney, reproductive as well as the immune system of the victims.

Even after 10 years of the carbide gas leak,

in 1992, exposed people continue to suffer menstrual irregularities, abortions, neurological disorders and mental abnormalities. Cases of respiratory problems, early eye cataract, still birthrates have all increased three folds. Expectant women, who were exposed to the gas leak, gave birth to children who had delayed motor and language sector development.

Various research studies conducted have indicated that there is an increased probability of congenital abnormalities in the future generations. Anxiety and neurotic depression were the most common disorders. However, various NGOs who have conducted similar studies state that the figures of affected population assessed by Indian Council of Medical Research (ICMR) are a gross underestimation of the seriousness of the situation and that the figures are likely to be very high. Though there is no latest data available, as the research and monitoring exercises were terminated prematurely, the doctors treating the victims state that cases of tuberculosis, cancers and infertility are on the rise.

As if the health impact and the acute state of depression being experienced by the people were not enough, the society started discriminating against those who were exposed to the gas leak. The most severely effected were the people who belonged to the unorganized sector such as daily wageworkers and petty traders. They are unable to pursue their trade and with no means to earn livelihood and with meager resources at hand, living has become difficult. Women exposed to the gas leak and who are patients of various gynecological and reproductive disorders were unable to carry out their reproductive functions. They were either maltreated by their husbands or have been deserted. Young girls also continue to be socially discriminated.

Surat Plague

Surat, India's diamond city, called so because of its flourishing diamond industry can be cited as a classic example of disaster due to environmental neglect and degradation. On 22nd of September 1994, hospitals in the city started reporting deaths due to plague. Within forty-eight hours over 600,000 people had fled the city. Suspected plague germs also spread to other parts of the country and the world, giving rise to international panic.

The plague of Surat could have been predicted and avoided through timely action of cleaning up the city of its garbage dumps and unsanitary conditions. Yet people continued to live quietly amidst the filth till they were given some cause for concern by the dying rats, and it finally took human toll to get the residents and the government into action for cleaning up the city.

Uphaar Cinema Fire

Fifty-nine people were killed and more than a 100 injured in a fire that broke out in a packed Uphaar grand cinema theater in South Delhi in 1997. Most of the victims, including a number of children, teenagers and women died of asphyxiation. The rest were trampled in the stampede as people tried to escape the thick black smoke engulfing the four storey theatre. An electric transformer in the basement burst during the movie show with more than 1000 viewers. Spewing boiling oil, the transformer burst caused mayhem in the ground floor car parking area. The petrol tanks of some vehicles exploded stoking the fire, and smoke soon filled the theater.

Fire safety norms were violated in the installation of a transformer within the building. Many shopkeepers and passers-by launched rescue operation. Some used cellular phones to alert the police. Angry people said that the first fire engine arrived about 45 minutes after the first call. “We got stuck in the narrow lanes and heavy traffic in the area,” said a fire official. Scores of policemen and firemen in gas masks took

over. Using three 100-foot hydraulic snorkels, firemen brought out unconscious persons from the upper floors. It took almost 2 hours, interspersed with heart rending scenes of comatose children being brought out, to completely evacuate the theatre, with police vehicles and ambulances rushing the victims to the nearby hospitals.

Railway Accident at Gaisal

In 1995, 358 people were killed in a rail accident near New Delhi. In 1981, a tropical cyclone blew a train off the tracks and into a river in the northern state of Bihar, killing 800 people. India has the world's largest rail network and rail travel is a very popular form of travel in the country. However, many trains are dangerously overcrowded and the rail infrastructure is inadequate to accommodate the demand.

A major rail accident took place when a collision occurred as the Brahmaputra Mail train en route to New Delhi sped through the Gaisal Station and slammed into the idle Awadh-Assam Express traveling from New Delhi. Witnesses said that the crash was powerful enough to send the engine of the Express sailing through the air onto nearby tracks. At least 15 of the two trains' passenger cars were shredded apart in the impact and several cars remained trapped beneath the rubble.

The army and other rescue teams brought in cranes to lift the mangled cars and free trapped bodies and potential survivors. About 200 people were confirmed dead and hundreds of others injured. The waiting room at the Gaisal terminal was transformed into a makeshift morgue. One of the lines was reopened to help transport the injured to hospitals. However, heavy monsoon rains plagued the rescue operation.

Patna Air Crash

An Indian Airlines Boeing 737 crashed into a government housing estate in Patna, capital of the eastern Indian state of Bihar, on July 17, 2000, killing 57 people, including six residents, and wounding dozens more. This tragic incident once again highlighted the decay of Indian infrastructure, including safety controls. Over the past 15 years more than 1,000 people have lost their lives in major air disasters.

The plane, operated by Alliance Air, a subsidiary of the state-owned Indian Airlines, caught fire and crashed in the early morning, around 7.30am. As firemen worked to douse the flames, some in the crowd of about 3,000 local residents formed a human chain to pass buckets of water to the burning plane in the hope of rescuing passengers.

Among the dead were the two pilots. Only seven passengers survived. They were admitted to the Patna Medical College and Hospital and then transferred to New Delhi, 1,000 kilometres away. The national government and Civil Aviation authorities immediately ruled out any technical fault in the aircraft and sought to blame the two pilots, Captain Sohan Pal, who had clocked 4,326 flying hours, and Captain A. S. Bagga. Indian Airlines regional director S.K. Ghorai and other officials also denied that the plane caught fire before it crashed.

Assam Bomb Blast

In December 1996, a bomb ripped through an express train packed with holiday travelers in the eastern Indian State of Assam, blowing the train off the tracks and killing dozens of passengers and crew, local officials said.

No one claimed responsibility, but police officials said they suspected a militant rebel group. Working in complete dark with cranes and floodlights, rescuers pulled out 26 bodies from the wreckage, while at least 42 people were injured and sent to hospitals. [At least 300 people were believed to have been killed, Reuters reported, quoting local police officials]

The explosion ripped apart the train, the

New Delhi bound Brahmaputra Express, that was carrying close to 1,200 passengers and had originated in Guwahati, the state capital of Assam in India's far east.

The blast could be heard in the railway station at Kokrajhar, from which the train had departed seven minutes earlier, as it blew apart three coaches holding about 300 passengers, railway officials said. The blast derailed the engine and the first of 18 coaches.

Forest Fires

India has about 1.7 million hectares of productive coniferous forests with such valuable timber and pulpwood species as fir (*Abies* spp.), spruce (*Picea smithiana*), deodar (*Cedrus deodara*), kail and chir pine (*Pinus wallichiana and P.roxburghii*). The estimated growing stock of these forests is over 200 million cubic metres the monetary value of which could be anywhere between Rs.40,000 to Rs.60,000 million (US$ 976 to 1464 million). Deciduous forests rich in bio-diversity get largely damaged by forest fires. Forests of the North-East region of the country are hotspots of biodiversity. To safeguard these precious forests and their value, it is necessary to have more rigorous protection from fire damage than that has been accorded hitherto.

The normal fire season in India is from the month of February to mid June. India witnessed the most severe forest fires in the recent time during the summer of 1995 in the hills of Uttar Pradesh & Himachal Pradesh. The fires were very severe and attracted the attention of whole nation, an area of 677,700 ha was affected by fires. The quantifiable timber loss was around Rs. 17.50 crores (US$ 43 million; Rs. 1 crore = 10 million rupees). The loss to timber increment, loss of soil fertility, soil erosion, loss of employment, drying up of water sources and loss to bio-diversity were not calculated by the Committee appointed by the Government to enquire into the causes of fires, as these losses are immeasurable but very significant from the point of view of both economy as well as ecology. The fires in the hills resulted in smoke in the area for quite a few days. The smoke haze, however, vanished after the onset of rains. These fires caused changes in the microclimate of the area in the form of soil moisture balance and increased evaporation. Lack of adequate manpower, communication and water availability in the hills helped this fire spread rapidly reaching the crown level. The thick smoke spread over the sky affecting visibility up to 14,000 feet.

Statistics on forest fire damage are very poor in the country. In the absence of proper data, it is difficult to arrive at accurate losses from forest fires. Moreover, the losses from fires in respect of changes in biodiversity, carbons sequestration capability, soil moisture and nutrient losses etc. can not be measured but, nevertheless, are very significant from the point of view of ecological stability and environmental conservation. To a certain extent, the loss due to forest fires can be estimated based on the inventories made by the FSI as reported in the 'State of Forest Report, 1995' and subsequent field observations conducted by hem. The statistics of losses from forest fires from various States of the Union is still very sketchy and fragmented. Much of the data available does not reflect the ground situation and is grossly under-reported. The total reported loss is around Rs 35 crores (US$ 7.3 million) annually.

According to the Forest Survey of India data on forest fires, around 50% of the forest areas are fire prone. This does not mean that country's 50% area is affected by fires annually. Very heavy, heavy and frequent forest fire damages are noticed only over 0.8%, 0.14% and 5.16% of the forest areas respectively. Thus, only 6.17% of the forests are prone to severe fire damage. In absolute term, out of the 63 million ha of forests, an area of around 3.73 million ha can be

presumed to be affected by fires annually. At this level the annual losses from forest fires in India have been moderately estimated at Rs 440 crores (US$ 107 million). This estimate does not include the loss suffered in the form of loss of biodiversity, nutrient and soil moisture and other intangible benefits.

Pest Infestation

Pest infestations have recurred as major disasters for the agrarian economy of India since time immemorial. Locust swarms coming from Central Asia used to be a major cause for concern. Besides such consolidated events, infestation of localized pests is a threat to plant as well as human life. The important factor responsible for deterioration and the loss of food grains, their products and the economic losses besides health hazards is the contamination with fecal matter and hairs and, urine is that of rodents.

The importance of moisture/drying of both raw and finished food products on the shelf life and the role of microorganisms is an important knowledge for all pest control operators. Proper advise to the parties/clients on the role of moisture/microorganisms, its implications on the development of toxins, likewise the role of insects in the development of moulds and the attendant biochemical changes including health hazards has been emphasized. In view of the restrictions on the use of pesticides and their residues, physical, biological, biochemical methods of control available could be adopted besides chemical methods, which is the last resort for checking the pest problem.

An important topic for pest control operators is the chemical method of control by fumigation, properties of fumigants, application methodology, both in the organized sector and in the food processing industries. The dosage exposure period toxicity and methods of detection will be useful to establish and standardize. The importance of prophylactic treatment for protection against cross infestation in extending the shelf life of the grain and their product needs to be emphasized. The properties of pesticides, their formulation residues, detection, permissible limits, occupational hazards, and safety considerations need to be demonstrated and discussed. This would help the pest control operators for selection of pesticides against the target species.

Weeds are unwanted and undesirable plants that interfere with the utilization of lands, water resources and affect crop production and human welfare. Aquatic weeds form the breeding grounds for mosquitoes. It is therefore necessary to appreciate the importance of weed control, the method of prevention, mechanical, biological and chemical methods of weed control and soil fumigation, as also the method of application, spraying equipments, precautions to be taken while handling the herbicides and control of problematic weeds.

Dam Burst

One of the great uncertainties about building high dams in the Himalayas for hydropower and flood control is the threat they would pose to the plains in the event of a major earthquake. The grandeur of Himalayan peaks and their stupendous height deludes observers with an image of permanence. This is actually a gigantic pileup resulting from the collision of the Eurasian and Indian plates that began 50 million years ago. India continues to bulldoze under the Tibetan plateau, creating tremendous tectonic tension under the mountains. Most areas of the Himalayas where future dams are planned are rising or slipping at between 10-20 mm a year.

It is the debris from the erosion of the young Himalaya that filled up the Tethys Sea and turned it into what is now the

Gangetic plains. This process of mass wasting of the deposits debris in the plains continues, so the notion of the floods in northern India and Bangladesh can be 'controlled' is wishful thinking.

The catastrophic impact of the failure of a dam like Tehri or Pancheswar with 2.6 to 6 cubic kilo-metres of impounded water on the downstream plains can be disastrous. In 1893, a rockslide on a river in the Garhwal Himalaya burst caused a huge flashflood and great loss of life all the way down to the plains. In 1970, debris flow on the Alaknanda River created a 60-metre high dam on this tributary of the Ganga. When it burst, it caused a flashflood that thundered down all the way to the plains of Uttar Pradesh destroying settlements, bridges and highways.

Oil Spills

On June 14, 1994, Indian authorities began siphoning off 700 tons of oil from the Sea Transporter, a 6,000-ton Greek cargo ship which had been anchored off Aguada after it ran aground following a cyclone on June 5.

Most of us will not forget one tragic aftermath of the Gulf War — birds drenched in oil, partially blinded by it, struggling to fly. Or the documentaries on National Geographic and Discovery television channels showing mass deaths of animals and birds because of various oil spills around the world.

The Gulf War, in particular, proved to be a wake-up call for the Indian government, which sanctioned a study to see how oil spills could be tackled. Scientists at the New Delhi-based Tata Energy Research Institute carried out the study.

Besides spills into water bodies, oil creates other hazardous situations. When oil is stored for a long time, its sludge settles at the bottom and has to be removed. Presently, refineries dump the sludge into another tank, the construction of which costs them approximately Rs 10 million. Alternately, refineries spend around Rs 3,000 per tonne to build pits where the sludge is dumped. As demand increases and the oil industry grows, the industry will be handicapped by lack of land to build such storage tanks.

According to some assessments, there are around 15 refineries in India and they generate around 20,000 tonnes of sludge annually. Many of them have been carelessly dumping the sludge in pits without any consideration for the resultant pollution of ground water. But, with stricter implementation of pollution laws and increasing awareness among the villagers who live around the refineries, better environmental methods will now have to be followed. The closure notice to the Digboi refinery is just the beginning.

Orissa Heat Wave

Large parts of India are periodically affected by extreme climate; cold waves and heat waves. In May 1999, a searing heat wave gripped a large part of India with temperatures reaching nearly 45 degrees centigrade in some places. The number of deaths in various parts of India reached nearly 150.

The eastern state of Orissa is reported to be one of the worst hit where state officials confirmed 40 deaths. In Uttar Pradesh various divisions of the State including Garhwal, Bareily, Allahabad, Varanasi, Faizabad, Agra and Lucknow experienced above normal temperatures for almost a fortnight. In Bihar, authorities said that such a long spell of heat has damaged mango and lychee crops. The heat was worst felt in the major cities such as Delhi with its teeming populations and over-stretched public facilities. Gastro-enteritis cases were said to be up by 25% from the previous year.

The authorities and non-governmental organisations launched public education campaigns and distribution of chlorine

tablets and oral re-hydration salts.

Three persons died in Delhi on the 16th of December, 1997, as a result of the continuing cold wave. All 3 victims were unidentified as pavement dwellers. Also, several flights were reschedule as heavy fog engulfed the runway of the Delhi airport in the morning. Thousands of passengers, who were to board early morning flights were stranded for as long as 6 hours as the fog over the runway did not clear till late in the afternoon.

School children and office goers also bore the brunt of the winter. Heavy fog engulfed the roads and vehicular traffic almost came to a standstill at several places. Road accidents involving multiple vehicles were reported from many locations. The meteorological department predicted heavy fog and low clouds for the next few days also. A high humidity level was responsible for the prevalent conditions. Some western disturbances were also observed.

Building collapse

In August 1998, rescue workers used bulldozers, blowtorches and bare hands to clear loose rubble and try to reach survivors of a mid-rise building collapse that killed at least 21 people in Mumbai.

In an overnight rescue mission, 22 people were taken out alive from the rubble of the building, which had been declared structurally unsound earlier in the year. All but one were injured and hospitalized, mostly with head injuries.

The Govind Tower building had shops on the ground floor. The top three floors, added on for a small hotel, were unauthorized, officials said. The rest of the building was divided into 18 apartments, many of whose occupants were believed to be inside when it collapsed. Officials said most of the people were trapped in bathrooms or on staircases as they either took shelter or fled when the building began to shudder about three minutes before it came down.

Municipal officials said they ordered residents to vacate the building several months ago, reportedly after it was noticed to be leaning toward one side. The warning was ignored.

Falling buildings are not uncommon in Mumbai, a city of about 2.5 million people. It is India's business and financial hub with about 20,000 sub-standard buildings, many of them old and poorly maintained. Officials say poor tenants take the risk because they are unable to afford the high rents prevailing elsewhere in the city.

2

Emergence of a Holistic Approach : Setting the Context

The Himalayas, the river systems and the coastal regions form the varied terrain of the country, each beset with varying typologies of disaster vulnerabilities. The vastness of our country and its unique regional features require a comprehensive approach to managing Disaster Scenarios. Perspectives and ideologies for calamity management need to be in terms of constitutional, legal, and administrative systems of response, recovery, development, prevention, and preparedness.

Himalayan, Riverine, Coastal Regions

Himalayan Regions

Human activities are prime cause of environmental degradation all over the world. The effects of human activities on environment may be direct or indirect, small or big, slow or fast, predictable or unpredictable depending on the nature, intensity and frequency of the disturbance to natural ecosystem.

The Himalayan range is one of the highest mountain chains in the world. Himalayas, also known as the Extra-Peninsula are one of the three main geological divisions of India. The other two divisions are the Peninsula and the Indo-Gangetic Plains.

Geographically, the Himalayas extend for about 2400 km, from western syntaxial bend-near Nanga Parbat to eastern syntaxial bend-near Namcha Barwa and exhibit a curvilinear disposition.

Burrad and Hayden classified the Himalayas from west to east, into four regions:

i) Punjab Himalaya - area between Indus and Sutlej rivers.

ii) Kumaon Himalaya - area between Sutlej and Kali rivers.

iii) Nepal Himalaya- area between Kali and Tista rivers.

iv) Assam Himalaya- area between Tista and Brahamputra rivers.

Presently Himalayas are divided into three regions: the Western, Central and Eastern Himalaya. Nepal Himalaya constitutes the Central Himalaya and the mountainous area to its west and east are known as Western and Eastern Himalaya respectively.

Thus the Western Himalaya includes Punjab and Kumaon Himalaya of Burrad etal covering Himachal Pradesh and parts of J & K and Uttaranchal.

The Uttaranchal Himalaya extends from Tons river in the west to Kali river in the east and covers an area of about 46,480 sq.km. Garhwal and Kumaon are two main regions of Uttaranchal Himalaya.

Major landforms of Uttaranchal Himalaya are arranged in three parallel ranges:

i) Great Himalaya (GH) lies south of Tibetan Plateau and contains highest elevations.

ii) Lesser Himalaya (LH) lies south of GH and has elevations between 10,000 and 15,000 ft.

iii) Outer Himalaya (OH) lies south of LH and borders Gangetic Plain. Altitude varies between 2000 and 3000 ft. and has geomorphological depression-the Dun.

Himalaya in Uttaranchal, can also be divided into four broad geological zones, each having distinct geological history. These are:

i) *Tethys Himalaya Zone (THZ):* exposes mainly fossiliferous rocks of Phanerozoic and lies north of the central axis (line of highest elevation of CH).

ii) *Central Himalaya Zone (CHZ):* contains crystalline and metamorphic rocks which are thrust over the sedimentary sequences of lesser Himalaya along the Main Central Thrust (MCT)

iii) *Lesser Himalaya Zone (LHZ):* exposes largely sedimentary, unfossiliferous sequences of Proterozoic period, which are disposed in distinct tectonic belts between the MCT and Main Boundary Fault.

Fossiliferous rocks of Palaeozoic, Mesozoic and Cenozoic periods have very limited extent.

The ongoing human activity has resulted in recurring floods and landslides. Interference in the environmental system in the form of indiscriminate felling of trees disrupts the ecological balance thereby resulting in the loosening of soil and consequent soil erosion. Over a period of time the eroded soil begins to settle down on the riverbed results in shifting of the river. This is one of the major reasons for the floods to occur.

Table 2.1: Major disaster events in the hill areas during the IDNDR

Date	Event	Area affected	Deaths
1990	Floods	Entire Country	882
20.10.1991	Earthquake	Uttar Pradesh	2,000
4.9.-2.10.1992	Floods	U.P., Himachal, J&K, Sikkim	1,500
8-31.7.1993	Floods	Ganga, Brahmaputra regions	953
28.9.1993	Flash flood	Uttar Pradesh	260
1994	Floods	Entire country	720
1997	Flash flood	Himachal Pradesh	n.a.
17.8.1998	Floods, Landslide	Uttar Pradesh	210
29.3.1999	Earthquake	Uttar Pradesh	100

Source: IDNDR Review, NCDM

Regionally metamorphosed rock masses occur as Klippe.

iv) *Outer or Sub Himalaya Zone (OHZ):* This is the southern most zone and exposes sedimentary sequence predominantly of Neogene period. The OHZ lies between MBF and Foot Hill Fault (FHF). FHF is the boundary between the outer Himalaya and Gangetic Plain.

The Himalayan region, characterized by a wide variation in topography, geology, soil, climate, flora and fauna and various ethnic groups having different socio-cultural traditions, is a unique geographical entity of our country. This region, hit by all major types of disasters has caused disruption in the socio-economic life of the people, and has brought immeasurable misery.

The ongoing human activity has resulted in recurring floods and landslides. Interference in the environmental system in the form of indiscriminate chopping down of trees disrupts the ecological balance thereby resulting in loosening of the soil and consequent soil erosion. Over a period of time the eroded soil begins to settle down on the riverbed results in shifting of the river. This is one of the major reasons for the floods to occur. The Himalayan region with soft weathering rocks covered with a thin layer of soil are increasingly susceptible and sensitive to landslides. Such landslides cause disruption and create blockades in the road network and river system, which in turn cause floods.

A very befitting example in support of the above statement is the slash and burn cultivation technique called 'JHUM' that is practiced in the hilly areas. Development of the communication system by means of road construction and mining of rich mineral reserves over a period of time has destroyed the dense natural evergreen forest cover.

Ongoing human activity has resulted in recurring floods and landslides. Interference in the environmental system in the form of indiscriminate chopping down of trees disrupts the ecological balance thereby resulting in loosening of the soil and consequent soil erosion. Over a period of time the eroded soil begins to settle down on the riverbed results in shifting of the river. This is one of the major reasons for the floods to occur

Report of 'The Central team On landslides in hill areas of Uttar Pradesh' during 1998 indicates the damages caused due to hailstorms, heavy rains and the resulting crop damage in the State during the months of May to September, 1998. The report observes that the Himalayan ecology is extremely fragile and falls under the Seismic Zone V. The main causes for landslides have been unplanned and unscientific development activities in the hilly areas, mindless and indiscriminate felling of trees, urbanisation etc. which have caused ecological imbalances in the Himalayas. Increasing pressure of human and animal needs, rapid denudation, biotic interference etc. have further aggravated the problem of soil erosion, avalanches, flash floods etc. The damages are caused by nature and induced by human activities.

Every year, landslide in the region kills dozens of people and causes widespread damage to several villages such that they have now become totally unfit for habitation. The landslides have caused havoc and the terraced fields have been destroyed that cannot be easily renovated or made productive again. The road network remains closed for long periods causing indescribable hardship to the villagers who get their basic supplies and provisions from neighbouring areas. The water source is also disrupted due to landslides as they were breached from several places and are choked by the debris. More so, the water channels are affected from the up hill side due to which the villagers are devoid of water for irrigation purposes. This adversely affects agriculture production in

Even though flood embankments have been constructed on both banks of the Yamuna, in the territory of Delhi, flooding can occur due to breaches as had happened in 1978. The danger of such flooding has increased with jacketing of river in the upstream reaches, thus denying the benefit of valley storage.

the region. The Planning Commission made specific recommendations on the Himalayan Region in 1996 that covered the various aspects discussed above.

Riverine Regions

Communities living in the great plains of India that spread across northern, western and central parts of the country and also include inland parts of the larger coastal states, are vulnerable to a host of disasters.

These communities are settled in river basins and are predominantly dependent on agriculture. They are subjected to extremes of rainfall - very high rainfall and very low rainfall. They are therefore most vulnerable to riverine flooding and also to food shocks during droughts. These are two of the main problems i.e. floods and food insecurity.

The major river systems in the country can be broadly classified into two groups viz. rivers of the Himalayan region and rivers of peninsular India. The Himalayan rivers are fed by the meeting snows and glaciers of the great Himalayan range during spring and summer as also rains during monsoons. They are often uncertain and capricious in their behaviour. They carry significant flows during winter. On the other hand, the peninsular rivers originate at much lower altitude, flow through more stable areas, and are more predictable in their behaviour. Their flows are characterized by heavy discharges during monsoons followed by very low discharges during the rain less months.

From the point of view of the flood problem, the rivers can be grouped under the four regions as under:

(a) Brahamputra region drained by Brahmaputra Ganga river system.

(b) Ganga region drained by Ganga river system.

(c) North West drained by Indus & it's tributaries.

(d) Central India & Deecan region drained by river likes Narmada and Tai

Brahamputra River System

The region drained by the Brahamputra, Barak and its tributaries covers the state of Arunanchal Pradesh, Assam, Meghalaya, Manipur, Tripura, Nagaland, Northern regions of West Bengal and Mizoram. The tributaries have very steep slopes and shallow braided channels, coarse sandy beds and carry heavy silt. They bring flash floods because of short distances between their source in the hills and the confluence. The major problems faced by this system is that of overspills, drainage congestion, bank erosion, land slides, and aggravation and changes in river course.

Ganga Region

Ganga has a large number of tributaries. Ganga basin with a drainage area of nearly 8,61,400 sq. Km. in India covers slightly more than one-fourth of the total geographical area.

The tributaries of Ganga are by themselves mighty rivers and most of them are highly flood prone.

The northern tributaries of Ganga rise in the hills, some in Nepal, causing most of the flood problems on account of heavy flows and sediment that they bring down from the Himalayas. Flooding takes place mainly in Uttar Pradesh, Bihar and West Bengal. In Haryana, the marginal areas along the Yamuna get flooded. Even through flood embankments have been constructed on both banks of the Yamuna, in the territory of Delhi, flooding can occur due to breaches as had happened in 1978. The danger of such flooding has increased, with jacketing of river in the upstream reaches, thus denying the benefit of valley storage.

North West Rivers Region

Compared to the Ganga and the Brahmaputra river basins, the flood problem is relatively less in this region. The major problem is that of inadequate surface drainage which causes inundation and water logging over vast areas. However, floods are sometimes by the Ghaggar river, which used to disappear in the sand dunes of Rajasthan after flowing through Punjab and Haryana. In recent years, besides flooding Punjab and Haryana areas, it has become active in Rajasthan also. Jhelum, Chenab and their tributaries also cause occasional floods.

Central India and the Deccan Region

The region does not have very serious flooding problem because the rivers mostly have well defined and stable courses. In Andhra Pradesh it is confined to spilling by the smaller rivers. Tapti and the Narmada are occasionally in high floods affecting areas in the lower reaches in Gujarat. Godavari and Krishna rivers on the east coast have acute drainage problem and face floods particularly in the wake of cyclonic storms. The small rivers of Kerala when in spate, cause considerable damage. However, in Orissa damage due to floods has been extensive, caused by the Mahanadi, the Brahmani and the Baitarni which have a common delta where the floodwaters intermingle, and when in spate simultaneously, cause considerable havoc. The problem is accentuated when floods synchronizes with high tides.

The Flood Commission has carried out the most extensive work done on formulating recommendations on the issue of floods in the country.

Table 2.2: Annual Average Flood Damages

Damage head	Magnitude
Land area affected	7.56 million ha.
Population affected	32.03 million
Human lives lost	1,504
Livestock lost	96,713
Houses damaged	11683
	(Rs. 1.37billion)
Crop damaged	Rs. 4.6 billion
Public utilities damaged	Rs. 3.77 billion

Source: IDNDR Review, NCDM, 2000

Coastal Regions

Natural disasters, primarily cyclones and accompanying storm surges, have been visiting coastal communities regularly, bringing their share of miseries with them. However, the damages incurred due to these disasters have grown in

Hazard impacts on the natural environment become more devastating because human development has altered the ability of natural systems to recover from such events. Natural hazard events can also spawn secondary hazards such as sewage releases or hazardous material spills that are particularly damaging to coastal environments.

Table 2.3: Major Floods during the IDNDR

Date	Event	Area affected	Deaths
June-Sept 1990	Floods	Entire country	882
30.7.1991	Flood, dam burst	Andhra Pradesh, Orissa, Maharashtra	524
4.9-2.10.1992	Floods	Punjab, Uttar Pradesh, Himachal, Bihar, Jammu, Kashmir, Sikkim	1500
Floods, Tropical Cyclone 10B		Tamil Nadu, Kerala, Karnataka, Andhra Pradesh	309
Floods		Ganges, Brahmaputra regions	953
28.9.1993	Flash flood	Uttar Pradesh, esp. Farrukhabad	260
May-Oct 1994	Floods	Entire country, esp. Kerala	720

Source: IDNDR Review, NCDM, 2000

recent past. The main reason for this is growing population pressures in the coastal regions. This continuing trend of settlements in hazardous zones, as well as the predicted climatic changes in the coming decades is expected to result in sea level rise and can be expected to indicate increasing occurrence of disasters in these communities.

India has a coastal stretch of 5700 km. Out of this the east coast bordering Bay of Bengal has a length of 2700 km and the west coast bordering the Arabian Sea has a length of 3000 km. Destructive natural system events that impact coastal areas can be either episodic or chronic. Together, these types of events define what is meant by natural coastal hazards. The destructive potential of such events is often made much worse by the increasing amount of development along the coastline. A variety of natural hazards regularly threaten the nation's coastal inhabitants. Severe meteorological events such as hurricanes and tropical cyclones are particularly harsh on coastal areas, often resulting in damages from high winds, storm surge, flooding, and shoreline erosion. Tsunamis, whose destructive force is characterized by potentially devastating flood inundation, are uniquely coastal events resulting from offshore earthquakes, landslides, or volcanic activity. Coastal locations are also subjected to the impacts of long-term hazards such as chronic coastal erosion, potential sea-level rise, and global climate change. Other hazards impacting coastal areas include biological events such as red tides and harmful algae blooms.

Hazard impacts on the natural environment become more devastating because human development has altered the ability of natural systems to recover from such events. Natural hazard events can also spawn secondary hazards such as sewage releases or hazardous materials spills that are particularly damaging to coastal environments.

Coastal hazard events can significantly affect or even alter the natural environment, but their impacts are generally not considered to be "disastrous" unless they involve damages to human populations and infrastructure. Many of the coastal ecosystems that are particularly fragile and sensitive to the cumulative impacts of human

Table 2.4: Major cyclone related disasters in coastal communities during the IDNDR

Date	Event	Area Affected	Deaths
7.5.1990	Tropical Cyclone 02B	Andhra Pradesh	962
13.11.1992	Flood, Tropical Cyclone 10B	Tamil Nadu, Kerala, Karnataka, Andhra Pradesh	309
1.12.1993	Tropical Cyclone	Tamil Nadu, Pondicherry	61
6.12.1996	Tropical Cyclone, Storm Surge	Andhra Pradesh	971
24.3.1998	Tornadoes	West Bengal, Orissa	200
9.6.1998	Tropical Cyclone, Storm Surge	Orissa	3000
17,29.10.99	Tropical Cyclones, Storm surge, Floods	Orissa, West Bengal	10000

Source: IDNDR Review, NCDM, 2000

development are also naturally fluid and generally capable of adapting to hazard impacts over time. When people and property are not present, hazards are merely natural processes that alter the environment. When people and property are present, however, the impacts of hazards on the developed and natural environments are viewed quite differently. The primary focus no longer is on the natural processes associated with a major hazard event, but instead on the disastrous results that can be measured by lives lost, property damages, and economic and environmental impacts. Hazard impacts on the natural environment become more devastating because human development has altered the ability of natural systems to recover from such events. Natural hazard events can also spawn secondary hazards such as sewage releases or hazardous material spills that are particularly damaging to coastal environments.

Among the main reasons for the continuing increase in the loss levels caused by natural disasters is the continuing growth of the population and by the constant migration of people to coastal areas that are generally more exposed to natural disasters. The development of industry in regions that are subject to natural hazards without appropriate protective measures being taken, is another reason for the growing increase in the loss levels caused by natural disasters. In Asia, natural hazards cause a high number of lives to be lost, and relatively small property losses in least developed and developing countries. However, in the relatively developed countries where disaster prevention and mitigation measures are adequately established, the loss of life is relatively small, but the damage to property is high. Losses may vary even within a country itself. The effect of natural hazards on the loss of human lives is directly related to the poverty levels in a country.

Another factor that exacerbates the effects of natural hazards is the environmental degradation taking place in many countries of the region. The damages caused by natural hazards are higher in countries where environmental degradation is rampant. Deforestation, erosion, overgrazing, or over-cultivation and incorrect agricultural practices and degradation of natural buffers amplify the effects of natural hazards.

Types of Coastal Hazards

(i) Geology-related hazards

(ii) Rip currents

(iii) Natural Hazards

(iv) Cyclones

(v) Sea level rise

(vi) Coastal flooding

  a) Floods caused by storms

  b) Floods caused by monsoon rains

(vii) Saline ingress

The most devastating of these have been cyclones. Though India has a long coastline stretching across many States, the States most exposed to cyclone related hazards, including strong winds, floods and storm surges, are West-Bengal, Orissa, Andhra Pradesh, Tamil Nadu and Gujarat.

Besides these, floods and droughts have also been affecting these communities on a regular basis. Floods are experienced almost every year in some State or the other. Major floods were experienced in 1990, 1991, 1993, and 1994. A large number of deaths also occur during summer months due to heat waves, particularly in States like Orissa, that had drought during 1995-98, and severe heat wave in 1999. This documentation however mainly covers cyclone disasters and accompanying floods and storm surges.

Cyclones

Over the warm water (sea surface temperature greater than 26°C) in the tropical ocean, little away from the equator within the belt of 30°N and 30°S, the occurrence of tropical

cyclones is almost a worldwide phenomenon. However, their characteristics such as frequency, intensity and coastal impact vary from region to region. But these have been the deadliest when crossing the coast bordering the north Bay of Bengal (coastal areas of Andhra Pradesh, Orissa, West Bengal and Bangladesh), mainly because of the serious storm surge problem in this area.

On an average, about 5-6 tropical cyclones form in the Bay of Bengal and the Arabian Sea every year, out of which 2 or 3 may be severe. Four times more cyclones form in the Bay of Bengal than in the Arabian Sea. There are two definite seasons of tropical cyclones in the North Indian Ocean. One is from May to June and the other from mid-September to mid-December. May, June, October and November are known for severe storms. The entire east coast is vulnerable to cyclones with varying frequency and intensity. Along the west coast, Gujarat and Maharashtra coasts are more vulnerable compared to the southern part.

The responsibility for undertaking rescue and relief measures in the event of natural calamities is that of the State Government concerned. The Union Government supplements the State's relief efforts by initiating supportive action.

Indian scientists are seriously studying the El-Nino effect on weather and the outcomes of these studies will help in better communication of early warnings as well as preparedness planning.

In order to control floods, politicians and bureaucrats have been laying stress on the construction of dams and embankments, which has necessitated much greater expenditures. It has been estimated that at the time of Independence about 6000 km of embankments were existing on various rivers, providing a reasonable degree of protection to about 3 million Ha. of flood prone area. However, the average flood affected population per year increased from about 16 million in the 1950's to 43 million in the 1970's to 53 million in the 1980's. Not only have the flood relief expenditure increased from Rs. 230 crores in 1980-81 to Rs. 537 crores in 1986-87, even the related damages have increased substantially from Rs. 60 crores during the 1950's. This figure increased 38 times to an astounding Rs. 2307 crore per year during the 1980s. The increase in flood damages and the affected area provides a clinching evidence as to the country's proneness to floods on one hand and lack of preparedness on the other.

Systems for Calamity Management: A Perspective

One of the many lessons learnt by victims of various natural disasters is that the aftermath of the disaster can be even worse than the disaster event itself. Thus, there is a need to acknowledge the need for preparedness towards disaster reduction. However, people are often surprised by the concept of *reducing* disasters. How, it is often asked, can a natural disaster such as an earthquake or a cyclone be *reduced* or *prevented*?

Unfortunately, due to rapid population growth and development of human settlements in disaster prone areas, more and more people and their assets are vulnerable to natural hazards. The number of disasters was three times higher worldwide in the past ten years than in the 1960s, and economic losses were eight times higher, exceeding US$ 60 billion a year!

Natural occurrences such as floods, earthquakes, cyclones, etc. simply cannot be avoided altogether; they are a part of the environment we live in. What can be done, however, is to take preventive measures at various levels within the society in order to minimize the impact of such natural hazards as much as possible for the people. The impact of a natural hazard can be *reduced*; its worst effects can be *prevented*.

A natural hazard only turns into a disaster when it hits a community and disrupts its normal functioning; when it affects people and causes economic damage. Natural

disasters hit all, rich and poor alike. But it is the poor who will be hurt most. Protecting the poor from disasters also contributes towards the alleviation of poverty.

The communities actively involved in working on prevention of natural disasters before they strike belong to all groups of society: international and regional organizations, national governments or private firms, local administrations or specialized associations.

What is important is to introduce a culture of prevention in all communities, at all levels. Action to save lives must be taken before the disaster strikes.

Administrative Response Framework

The responsibility for undertaking rescue and relief measures in the event of natural calamities is that of the State Government concerned. The Union Government supplements the State relief efforts by initiating supportive action.

The country has integrated administrative machinery for disaster management at National, State, District and Sub-District levels. India has a Federal system of Government with roles of Union and State Governments specified by the Constitution. The responsibility for undertaking rescue and relief measures in the event of natural calamities is that of the State Government concerned. The Union Government supplements the State relief efforts by initiating supportive action. Elaborate procedural mechanism outlined in relief manuals & codes and backed up by Contingency Action Plans along with allocation of resources on a regular basis facilitates emergency management operations.

The dimensions of the response at the level of Central Government are determined in accordance with the existing policy of financing the relief expenditure and keeping in view the factors like:

(i) the gravity of a natural calamity,

(ii) the scale of the relief operation necessary, and

(iii) the requirements of Central assistance for augmenting the financial resources at the disposal of the State Government.

The Department of Agriculture and Co-operation (DAC) in the Ministry of Agriculture is the nodal department for all matters concerning natural disaster relief at the Centre. The Contingency Action Plan (CAP) identifies initiatives required to be taken by various Central Ministries and Public Departments in the wake of natural calamities, sets down the procedures and determines the focal points in the administrative machinery to facilitate launching of relief and rescue operations without delay.

In the DAC, the Relief Commissioner functions as the nodal officer to co-ordinate relief operations for all natural disasters.

- National Crisis Management Committee (NCMC): Under the chairmanship of the Cabinet Secretary, the NCMC has been constituted in the Cabinet Secretariat. Other members of this Committee include the Secretary to the Prime Minister, Secretaries of Ministry of Home Affairs, Defense, Research & Analysis Wing and Agriculture and Co-operation along with Director Intelligence Bureau and an officer of Cabinet Secretariat. The NCMC gives direction to the crises management group as deemed necessary
- Crisis Management Group (CMG): A group under the chairmanship of the Central Relief Commissioner comprising senior officers from various ministries and other concerned departments reviews contingency plans every year that are formulated by the Central Ministries/departments to review the measures required for dealing with a natural disaster, co-ordinate the

activities of the Central Ministries and the State Governments in relation to disaster preparedness and relief and to obtain information from the nodal officers on measures relating to the above. The Joint Secretary (NDM) & Additional Central Relief Commissioner is the Convenor of CMG. The CMG meets every six months.

- High Powered Committee (HPC): The original mandate of the HPC was confined to preparation of management plans for natural disasters only. However, it was felt that a comprehensive and holistic approach towards disasters, whether natural or man-made, was imperative from the point of view of consequence management in order to develop an effective and implementable plan of action that would encompass disasters of all origins. Thus, enhancement of the Terms of Reference was considered to be essential in this context.
- National Committee on Disaster Management/Working Group: All Party National Committee is already in existence but the HPC feels that this should be made into a standing body renamed as the National Council on Disaster Management. At the same time it was deliberated that a Working Group of experts be formulated with a Scientific and Technical Advisory Committee.

Preventive Planning in India

Long-term planning and preparedness for disaster mitigation forms a part of the process of development planning in India. Science & technology inputs constitute its basic thrust, manifested in development of forecasting and warning systems, disaster resistant construction technologies and appropriate cropping systems.

A number of special programs are in operation over many years for mitigating the impact of natural disasters. As the country has been facing natural hazards over centuries, local communities have developed their own indigenous coping mechanisms. The rich storehouse of this knowledge is our country's proud inheritance. In times of emergencies, spontaneous mobilization of community action supported by non-government organizations add strength to national capability in disaster management.

Accepting the fact that the trend of losses is not indicative of any sign of improvement in spite of initiation of various disaster mitigation measures, the country is planning to lay more stress in some vital areas within this field in the coming years. These include linkage of disaster mitigation with development plans, effective communication system/ use of latest information technology, insurance, extensive public awareness and education campaigns particularly in the rural areas, involvement of private sector,and strengthening of institutional mechanism and international co-operation.

Disaster Management Cycle

In India traditionally the approach adopted in managing disasters has been reactive with activities mainly focussed on disaster relief. The approach has probably been based on experiences of severe famine that struck several parts of the country in the early part of this century.

The Disaster Management Cycle: Shifting from Response to Preparedness

It is only in recent decades that there is a perceptible shift in focus from disaster relief to disaster preparedness and prevention. The shift in approach has brought a significant positive change even though the multitude and frequency of disasters in the country has increased.

Constitutional and Legal Context

The subject of disaster management does not find mention in any of the three lists in the 7th Schedule of the Constitution. The basic

responsibility for undertaking rescue, relief and rehabilitation measures in the event of natural disasters is that of the concerned State Governments. The role of the Central Government is supportive, in terms of supplementation of physical and financial resources and complementary measures in sectors like warning, transport and inter-state movement of food grains, etc. The Department of Agriculture & Cooperation (DAC) is the nodal department for natural disaster management in the Government of India.

The policy and arrangements for meeting relief expenditure are, by and large, based on the recommendations of the successive Finance Commissions. Earlier however, margin money was allocated to each State for meeting the immediate needs of expenditure on relief measures. The quantum of margin money was calculated by averaging the non-plan expenditure (excluding advance plan assistance and expenditure of a plan nature) on relief measures.

The margin money so provided for each of the States was duly taken into account while working out the forecast of expenditure for each of the States on the basis of which the Finance Commission based its recommendations for the devolution of resources for the period covered by them.

On the legal front, there is no enactment either of the Union or of any State Government to deal with the management of disasters of all types in a comprehensive manner. The Environment (Protection) Act, 1986 was passed in 1986 for the 'protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property.' The Ministry of Environment and Forests prepared and published the Rules on 'Emergency Planning, Preparedness and Response for Chemical Accidents' in 1996 only. These rules pertain to toxic and hazardous chemicals, and provide a reference mechanism for Center, State, District and Local levels.

The Public Liability Insurance Act, 1991 casts a responsibility on the owner of a unit producing hazardous substance, as defined in the Environment (Protection) Act, 1986, to provide immediate relief where death or injury to any person or damage to any property results from any accident to the extent indicated in the schedule to the Act. The owner has been required to make one or more insurance policies so that the liability for providing relief is covered by a policy.

Multi-Hazard Approach by Governments and Concerned Agencies

The government response to natural disasters has progressively improved in terms of its effectiveness. This is chiefly due to the emergence of well organized administrative machinery, presence of Relief Manuals at the district level, predetermined allocation of duties and recognized public private partnerships. However, the absence of integrated policy at national level has led to the overlooking of some of the vital aspects of disaster management. As such, presence of a policy helps clearly define the government's basic approaches on a continuing basis, it provides for an appropriate legislation and associated regulations while helping contribute towards overall national competence and self reliance vis-à-vis international initiatives.

A critical input required for a comprehensive and coordinated approach is the adoption of a multi-hazard approach involving all concerned agencies within a systems approach.Table 2.6

A disaster site requires specialised input of various agencies; and a cross-section of activities need delineation. The Ministry responsible for a particular disaster needs the

Table 2.6: Type of Disaster and Nodal Ministry	
Disaster	**Nodal Ministry**
Air Accidents	Ministry of Civil Aviation
Civil Strife	Ministry of Home Affairs
Railway Accidents	Ministry of Railways
Chemical Disasters	Ministry of Environment & Forests
Biological Disasters	Ministry of Health
Nuclear Accident inside or outside the country which poses health or other hazards to people in India	Dept of Atomic Energy
Natural Disasters	Ministry of Agriculture

services of other ministries to supplement response management. Therefore a multi hazard approach is a recognition of this fact and effort is afoot that specialized tasks be defined to ascertain the roles and responsibilities of each agency in the eventuality of a disaster.

3

High Powered Committee on Disaster Management

Workings of the High Powered Committee in a span of two years concerned itself with the entire issue of disasters and disaster vulnerability for natural and manmade hazards. HPC was a first concerted effort in the country and it evolved through its adoption of a participatory approach. It identified various disasters and grouped them into five sub-groups considering the related nature of disasters.

High Powered Committee on Disaster Management

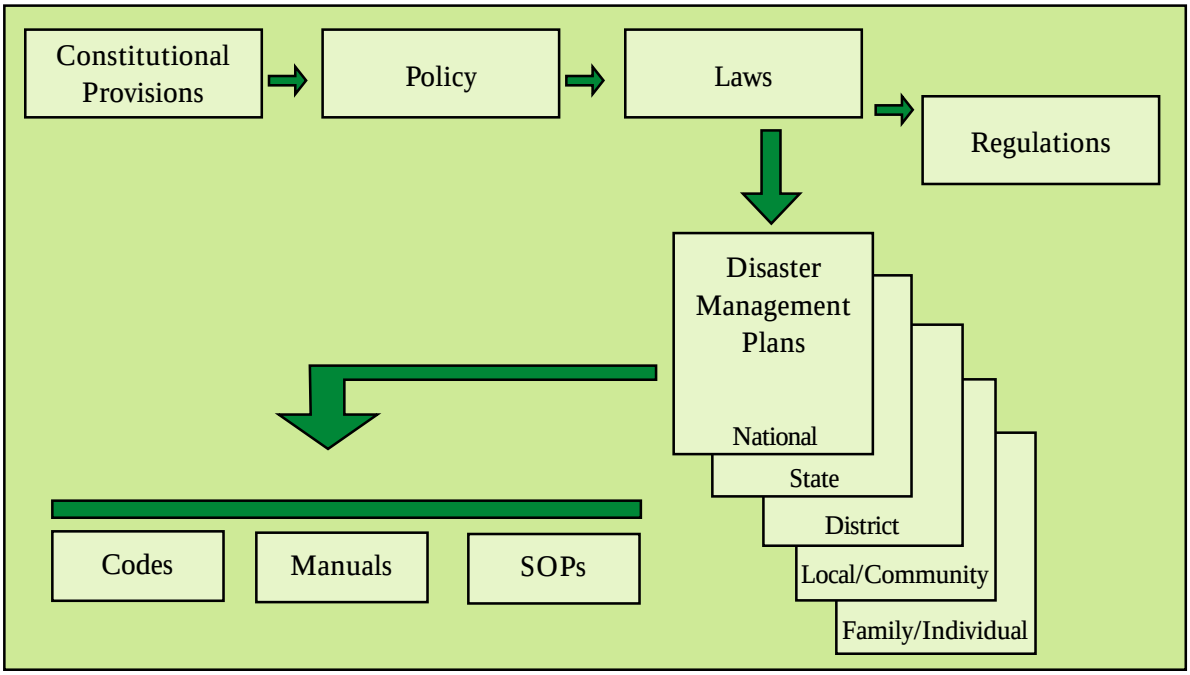
Mandate, Terms of Reference

The HPC was constituted in August 1999 under the Chairmanship of Shri J.C. Pant. HPC members were drawn from the Ministries, States, NGOs and experts drawn from relevant fields. It was a first attempt in India towards drawing up a systematic, comprehensive, and holistic approach towards disasters. (Refer Annexure 1: Order for Constitution of HPC).

The original mandate of the HPC was confined to preparation of management plans for natural disasters only. However, it was expanded to include man-made disasters and towards developing an effective plan of action that would encompass disasters of all origins. (Refer Annexure 2: Order for Enhancement of Terms of Reference).

The Terms of Reference of the HPC were subsequently enlarged to include non-

Conceptual Framework of HPC Mandate



natural or man-made disasters also with the approval of the Prime Minister vide order dated April 17, 2000. Representation from concerned Ministries dealing with industrial, nuclear, biological, chemical disasters were ensured by inclusion of experts from these Ministries.

The enhanced Terms of Reference of the HPC are as follows:

(i) To review existing arrangements for preparedness and mitigation of natural and man-made disasters including industrial, nuclear, biological and chemical disasters.

(ii) Recommend measures for strengthening organizational structures, and

(iii) Prepare model plans for management of these disasters at the National, State and District levels.

Certain important aspects considered by the HPC were:

(i) Measures for efficient forecasting and warning systems

(ii) Existing systems of response mechanism in the wake of natural and manmade disasters at all levels of government and steps to minimise the response time through effective communication and measures to ensure adequacy of relief operations

(iii) Development programs related to mitigation of disasters in different areas and priorities and strategies for inclusion of disaster reduction components in the ongoing plan/non-plan schemes

(iv) Measures for intensive training for building up of human resources to improve disaster awareness and capabilities

(v) Public awareness programs to build up society's resilience to disasters

(vi) Pro-active measures for disaster preparedness and mitigation - administrative, financial, legislative and techno-legal

(vii) Measures and programs to harness state-of-the-art information technology for effective communication network

(viii) Networking mechanisms by government and NGOs

(ix) Updating of codes, manuals, disaster management plans, items of relief, norms of assistance to State Governments

(x) Examining Construction practices/ codes, and mechanisms for hazard zonation surveys

(xi) Structural measures for disaster mitigation and preparedness - improving the design of check dams, raising and relocation of flood prone villages, renovation and desiltation of ponds, improved emergency drainage systems

(xii) Any other matter incidental or related to natural and manmade disasters.

Approach and Concerns

HPC adopted a strong process oriented and participatory approach involving different cross-sections of the society at all levels such as NGOs, media, governments at all levels as against an academic and technical approach.

In preparation of State and District Level Plans, the focus has been towards facilitating the States and Districts to prepare their own area specific disaster plans incorporating local characteristics. HPC has also suggested to States that State and district plans need to have a component of providing help to neighboring states and districts during disasters.

The establishment of the HPC for the formulation of disaster management plans for the country has been done with the idea to assess the present codes, manuals, plans and the working of the various agencies and departments and avenues for improvement. The need for an effective disaster management strategy to lessen disaster impact was felt in many quarters. The effort of the HPC was not to develop a plan de novo but to ensure its constant consolidation, upgradation, updation and rehearsal.

The contents of the document looks into all possible areas that need to be addressed and worked on in the face of future disasters and their impending impact. Contributions from all possible corners be it the government departments, ministries, the non-government organization working at the grassroots level and the community involvement in the entire process is imperative to the successful implementation of disaster management plans so formulated.

Methodology

The HPC and its various committees have had more than 49 meetings till date since inception and deliberated on various facets of disaster management planning in the country. These meetings included consultations with Relief Commissioners of all states, NGOs, media, ICSSR Institutions, Scientific & Technical Research Institutions etc. Thirty odd disasters were identified by the HPC for planning. These disasters have been categorized into five groups depending on generic considerations and various departments/ministries dealing with various aspects. Five sub-groups were constituted to discuss and deliberate on the preparation of Disaster Management Plans pertaining to their areas of concern. Besides these subgroups and State level subgroups set up to work on model State Disaster Management Plans, a number of parallel activities were taken up, such as preparation of the Source Book on District Disaster Management, NGO consultations, Relief Commissioners' consultations, three training programs etc. The HPC submitted two interim reports in July 2000 and subsequently in February, 2001.

For the formulation of disaster management plans for the country as a whole, a number of deliberations and consultations were held with the agencies belonging to various sectors such as

government agencies, non-government organization, national as well as the international aid agencies at timely intervals. With the result it led to the formation of disaster management plan that is comprehensive and one that looks into not only natural but also man made disasters. Intensive research and documentation has been carried out detailing out relevant information from all possible areas that could be tapped in crises situation.

Lessons Learnt during the course of HPC

During the tenure of the HPC, many unprecedented events led to new concerns and lessons that needed to be incorporated in the planning process. Following the Gujarat Earthquake of Jan 26, 2001, recommendations on a Quick Response Mechanism/system was also solicited from HPC.

Also, as per recommendations of the Eleventh Finance Commission, the HPC was requested to deliberate and advise on the concept vision and structure of the proposed National Centre for Calamity Management (NCCM).

Some of the other important lessons learnt during the deliberations were:

- that the report should include not only natural disasters but man made disasters as well.
- that the tasks performed by and the role of non-government organisations is extremely beneficial for downscaling the impact of disasters.
- that there is a need for monitoring and evaluation of the tasks being performed by various agencies at regular intervals.
- that disaster mitigation and preparedness be given top priority.

Key Considerations

In light of revisions made to the original Terms of Reference and the lessons learnt during its tenure, some of the key considerations that guided the development of final recommendations for the HPC were:

1. Revision of existing system of response mechanism in the wake of natural and manmande disasters at all levels of government and introduction of steps to minimise the response time through effective communication and measures to ensure adequacy of relief operations.
2. Development programs related to mitigation of disaster management in different areas and priorities and strategies for inclusion of disaster reduction components in the ongoing plan/non-plan schemes have to be considered.
3. Measures need to be introduced for intensive training for building up of human resources to improve disaster awareness and capabilities, and also public awareness programs to build up society's resilience towards disasters.
4. Pro-active measures for disaster preparedness and mitigation - administrative, financial, legislative and techno-legal
5. Measures and programs to harness state-of-the-art Information Technology for effective communication network. Networking mechanism by Government/NGOs. This would also improve advance warning systems against disasters.
6. Review of Global Best practices including study of the UN System and the Disaster Preparedness and Response mechanism of several countries.

Disasters identified by the High Powered Committee

I. Water and Climate related disasters

1. Floods and Drainage Management
2. Cyclones
3. Tornadoes and Hurricanes
4. Hailstorm
5. Cloud Burst
6. Heat Wave and Cold Wave
7. Snow Avalanches
8. Droughts
9. Sea Erosion
10. Thunder and Lightning

II. Geologically related disasters

1. Landslides and Mudflows
2. Earthquakes
3. Dam Failures/ Dam Bursts
4. Mine Fires

III. Chemical, Industrial and Nuclear related disasters

1. Chemical and Industrial Disasters
2. Nuclear Disasters

IV. Accident related disasters

1. Forest Fires
2. Urban Fires
3. Mine Flooding
4. Oil Spill
5. Major Building Collapse
6. Serial Bomb Blasts
7. Festival related disasters
8. Electrical Disasters and Fires
9. Air, Road and Rail Accidents
10. Boat Capsizing
11. Village Fire

V. Biologically related disasters

1. Biological Disasters and Epidemics
2. Pest Attacks
3. Cattle Epidemics
4. Food Poisoning

Even after enlistment and deliberations over thirty odd disasters, there were further suggestions for inclusion of more types of disasters such as civil strife, communal violence etc. However, the members were of the view that it was not possible to make the list exhaustive, but the basic condition of it having been designed to cater to all major categories of disasters should suffice for the purpose of the HPC. The HPC felt that the systems developed based on these listed types of disasters, further classified into five groups should suffice in catering to any additional types of disasters that may emerge.

The HPC and various sub-groups formed by it carried out a number of national and regional level consultations to create and disseminate opinions, views and recommendations that could be incorporated in disaster management planning process. Inputs from such consultations have contributed to the main body of thought created by HPC for the country.

Setting up of Sub-Groups

Sub-Group I - Water and Climate Related Disasters

The Sub-Group on Water and Climate Related Disasters, set up by the HPC, looked into a wide variety of meteorological, hydrological and climate phenomena that pose a threat to life, property and the environment. The hydro-meteorological hazards include Floods and Drainage Management, droughts, cyclones, tornadoes, hurricanes, hailstorm, cloudburst, snow avalanches, heat & cold waves, sea erosion, thunder and lightning. The spatial and temporal scales of these hazards vary widely

from short-lived, violent phenomena of limited extent to large systems. These events can subject large regions to disastrous weather phenomena like strong winds, heavy flood-producing rains, storm surges and coastal flooding, heavy snowfall, blizzard conditions, freezing rain and extreme hot or cold temperature conditions for periods of several days.

The application of meteorological, climatological and hydrological knowledge in the area of disaster management has a very significant role to play in the assessment of risk, land-use planning and the designing of structures which greatly contribute to disaster mitigation. The classical forecasting and warning role, the provision of warnings of impending severe weather, extreme temperatures, droughts or floods, contribute to preparedness. Updated warnings, forecasts, observations and consultations with emergency and relief agencies contribute to the response phase. Finally, special forecasts and other advice assist recovery operations. Natural hazards such as floods, extreme temperatures, high winds and droughts may cause or exacerbate other disasters. These include the possible risks of wildfires, insect and pest infestation, toxic gas releases, oil spills and nuclear accidents. Therefore, the provision of meteorological advice and products such as trajectory forecasts or advice based on dispersion modelling can represent a valuable contribution to addressing other non-hydrometeorological hazards.

Having realised that using traditional engineering methods it is not possible to control floods completely, non-structural measures aim at reducing flood damage by involving people.

Floods and Drainage Management

Floods are characterised as long, short or no warning. The main season for floods in India is the south-west monsoon period of June to September though floods occur in some parts of the conutry in the pre-monsoon season (March-May) and post-monsoon season (October-December) also. While heavy rainfall on successive days in the upper catchment of a river basin is the main cause of the flooding in rivers, there are some hydrological aspects too, which aggravate the flood situation. Where there are poor drainage conditions, heavy rainfall results in local accumulations of the water resulting in local flooding. The inadequacy of the carrying capacity of the river channel is accentuated by erosion and silting of the riverbeds. The Central Water Commission has established Flood Forecasting Centres (FFCs) in all major river catchments of India covering 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 analysed, and flood forecasting and warning messages are issued, generally 24 to 48 hours in advance.

The problem of flood management revolves around two aspects - structural measures and non-structural measures. Having realised that using traditional engineering methods it is not possible to control floods completely, non-structural measures aim at reducing flood damage by involving people. Long-term measures are execution of watershed management and major flood control works such as raising of flood control structures, land-use regulations, evacuation, emergency equipment, strengthening of forecasting, monitoring and warning system and public awareness. Medium term measures are bank protection, river training and anti- erosion works. Short-term measures are assessment of vulnerability of the flood control structures, strengthening the existing embankments and other flood control works; cleaning, de-silting, flood plain zoning, mapping, etc. There is a need to ensure that all village Panchayats have dug up the village ponds, and encroachments on ponds/ tanks or natural drainage channels are removed well before the onset of monsoons.

Suggestions for Removal of Gaps/ Constraints in the Present System

- There are areas where flood forecasting services, number of observation sites and forecasting stations may be increased.
- Reservoirs should have appropriate reservoir regulation policy consistent with management of risk to the downstream areas.
- Modern sensors and telemetry equipment, which can automatically record and transmit data, can be tried in areas prone to flash floods or for vital systems.
- Integrate the forecasting/warning with mitigation system.
- Prepare inundation maps of flood prone areas.
- Proper documentation of significant floods incidents.
- All developmental activities in flood plains must be compatible with the flood risk involved.

Future Requirements in Flood Disaster Mitigation

- Satellite based remote sensing facilities available in the country are presently not used for best advantage in flood management/ disaster mitigation measures.
- Better transport and communication facilities for the flood affected areas.
- Making people aware of the flood risk through appropriate programmes.
- Imparting training keeping in view the requirements of functionaries at various levels and educate people living in the flood prone area.
- Traditional knowledge and wisdom be supported by scientific management measures for disaster mitigation efforts.
- Role of NGO and people's participation is an important aspect.
- Support from local media in organising disaster management activities.

Droughts

Any lack of water to satisfy the normal needs of agriculture, livestock, industry or human population may be termed as a drought which could be classified as Meteorological, Hydrological or Agricultural drought. In general the major areas liable to drought are usually well known, periods of drought can be prolonged and there is long warning time. The primary cause for the occurrence of drought is the deficiency of precipitation. The major part of the country except Tamilnadu receives bulk of the annual precipitation during the southwest monsoon period June to September. October-December constitute the main rainy season for Tamilnadu. Winter precipitation is significant in Jammu & Kashmir, Himachal Pradesh and West Uttar Pradesh hills and its abundance or deficiency constitutes the level of stream flow in the following season.

Drought Management is generally by focus on employment generation, water conservation and power supply, standing crop saving and public distribution supplies of essential commodities.

Substantial areas of our country periodically experience droughts leading to considerable loss of agricultural production and livestock wealth besides causing misery to people inhibiting these areas. Drought management generally focusses on employment generation, water conservation and power supply, standing crop saving and public distribution supplies of essential commodities. The long-term solution of drought problems usually rests with national governments and involves major policy decisions. The prediction of drought is carried out mainly based on rainfall predictions. These are long range rainfall prediction, medium range rainfall prediction and short range rainfall predictions. Crop yield predictions are carried out based on rainfall and crop condition information received by the State agriculture department

and are compiled at national level by Department of Agriculture and Co-operation. Remote sensing data provides major input to all the three types of rainfall prediction.

An early warning of drought is basically linked to existing on-farm operations in case of agricultural droughts and local water utilisation pattern in case of hydrological drought. India Meteorological Department responsible for rainfall monitoring in the country has meteorological observatories at each district head quarters and observe the weather information on daily basis. In addition to rainfall monitoring, agro-meteorology wing of IMD generates weekly aridity anomaly maps for the country. Monitoring the water levels in all the medium and major reservoirs are carried out daily by the State irrigation departments and Central Water Commission. Each State Directorate of Agriculture has a well-established system to closely monitor sowing operations from village level to district and State level. Currently the district authorities assess damage with inadequate data on crop area and yield forecast. A unique feature of the Indian effort is spatial monitoring of drought conditions at the level of sub-district units. Programmes to combat or restore ecological balance through soil and moisture conservation on watershed basis have been in operation for almost two decades. In addition, the construction of major and medium scale dams to ensure irrigation and drinking water contributed to a large extent towards mitigation of drought in the country.

Special Problem Areas in Disaster Management of Droughts

- Response requirements may be extensive and prolonged, thus involving major commitment and expenditure.
- Prolonged drought may undermine self-reliance of affected communities, thus making it difficult to withdraw disaster management assistance.
- Logistic requirements may exceed in country capability, particularly if large inputs of outside (international) commodities are involved.
- Rainfall and other agromet data being monitored is inadequate in certain agro-climatic divisions to meet demands of drought monitoring. Space borne measurements integrated with computed aridity anomaly based on field measurements of rainfall and crop calendars are required.
- While new technological options are emerging as use of satellite data, modelling etc there is no operational procedure currently to forecast the impending drought conditions with respect to area of impact, extent and duration.

It is also recommended that besides drought management, efforts on drought mitigation need to be emphasised.

Cyclones

Tropical cyclones form in the warm tropical oceans where the sea surface temperature is at least 26°C. They may last with destructive power for two weeks or more where a large open sea is available. In the Bay of Bengal and Arabian Sea around India, their normal life span may extend up to 4 to 5 days. The long term average annual frequency of tropical cyclones in the north Indian Ocean (Bay of Bengal and Arabian Sea) is 5.6. The frequency is four times more in the Bay of Bengal than in the Arabian Sea. The storm surges are by far the greatest killers in a cyclone. As a result of storm surge, sea water inundates low lying areas of coastal regions causing heavy floods in the coastal areas, eroding beaches and embankments, destroying vegetation and reducing soil fertility. Very strong winds may damage overhead installations, dwellings, communication systems, trees, etc., resulting in loss of life and property.

IMD has a well-established and time-tested monitoring and forecasting organisation for tropical cyclones. A good

network of meteorological observatories is operated by IMD for monitoring of cyclone development and movement. The conventional observations are supplemented by observational data from polar orbiting and geostationary satellites. INSAT imageries are obtained at hourly intervals during cyclone situations, which have proved to be immensely useful in monitoring the development and movement of cyclones. IMD issues cyclone warning messages on the location, intensity and probable track from 6 cyclone warning centres located at Calcutta, Bhubhaneswar, Chennai, Mumbai, Vishakpatnam and Ahmedabad. In addition to existing mode of dissemination of cyclone warnings through high priority telegrams, telephone and telex/telefax by I.M.D., a new scheme, Cyclone Warning Dissemination System (CWDS) using INSAT has been implemented on an experimental basis for coastal areas of South Andhra Pradesh and North Tamilnadu in December, 1985 by establishing 100 CWDS Receivers. This scheme was made operational during cyclone season of 1986-87. The most essential aspect of the disaster management of tropical cyclones is the availability of warning information at critical times. The INSAT system could be very effective in monitoring the cyclone movement and assessment of its intensity.

Most of the coastal states have implemented cyclone distress mitigation measures. Shelters have been constructed in the coastal areas. Cyclone warning and dissemination systems have been established for dissemination of cyclone warnings for the areas prone to cyclones. However the main problem areas are the following:

Meteorological services: The observational network on the high seas and along the coastline are inadequate. Satellite systems with multi-channel image capabilities of higher resolution would improve current techniques of analysis and forecasting. Deployment and networking of Doppler Radar would facilitate improvement in analysis and prediction of cyclones. Communication problems between IMD and users at critical times need to be streamlined. Improvement, augmentation and networking of tide-guage to capture storm surges.

Inter-agency coordination be formulated between different departments/agencies of Central and State Governments, and State agencies and public.

Management system: A good network of motorable roads should be constructed in all vulnerable coastal areas to facilitate quick evacuation and supply of relief. Schools and hospitals may be built on the super highway and these may be used as a cyclone mitigation measures. All Government officials in the cyclone prone areas need to be trained in cyclone preparedness activities and relief works. There is a need for greater support to fisherman as they go for fishing at the time of cyclone with the hope of getting a big catch of fish, which is their livelihood.

Local Severe Storms

Local severe storms are small-scale disturbances that form due to strong convective motions in a moist and unstable atmosphere, and originate from well-grown cumulonimbus clouds. Thunderstorms occur in different parts of India during different seasons but widespread thunderstorm activity all over the country occurs during the hot weather period, also known as the Pre-monsoon period, from March to May. Some parts of the country experience thunderstorms during the monsoon season also from June to September. During the post monsoon season (October & November), thunderstorms occur in association with cyclonic storms and depressions mostly over peninsular India. Thunderstorms producing hail are known as hailstorms. The size of hailstorms may vary from less than a

centimetre to about 5 cm or more in diameter. A series of thunderstorms along a line often extending hundreds of kilometre is known as a squall line. The squall lines are therefore more severe convective phenomena than an isolated thunderstorm.

Another type of severe convective phenomena is the duststorms/sandstorms that occur over Northwest India during hot weather period. These are basically dry thunderstorms in which the strong downdraft from a Cb cloud raises loose dust or sand from the ground and reduces the visibility to almost zero. The most destructive meso-scale convective phenomenon which builds up in a thunderstorm is the tornado. Tornadoes are extremely severe vortices of very small dimensions occurring in association with intense and large Cb clouds or cyclonic storms. The visible symptom of a tornado is a funnel shaped cloud tapering from the base of a thunderstorm. It sometimes touches the ground and causes extensive damage along its path. The diameter of the tapering end touching the ground may vary from less than a meter to a few tens or hundreds of meters. With the available network of meteorological observations, it can hardly be detected. Its life cycle is from a few minutes to a few hours. It has not been possible to measure the meteorological parameters associated with tornadoes due to the above limitations. The exact cause of the tornado formation is not yet fully understood. The wind speeds can be as high as 400 to 500 kmph. The entire disturbance moves at a speed varying between 100 to 150 Kmph. In view of its severe intensity, it has a high potential for destruction. The most probable regions of tornado occurrence in India are Assam and adjoining states, West Bengal, Orissa and Gangetic plains, Punjab and Haryana.

There is a need to proceed from hazard assessment to vulnerability analysis and ultimately generation of earthquake risk maps/ figures

The entire life cycle of local severe storms from birth to dissipation is only a few hours. The severe storms being small in size with a short life span often escape detection on a synoptic weather chart with the existing network of observatories and frequency of observations. Special observing aids and techniques of detecting are necessary in addition to the routine weather charts. The advance warning of tornadoes is a difficult task. The radar comes in quite handy for tornado monitoring and warning. Unless the warning of tornado occurrence is disseminated to public at large, due to its short life, adequate steps cannot be taken by public to get away from the path of tornado. Various State Governments in the target region have promulgated building laws which specify design of houses capable of withstanding tornado fury.

Heat and Cold Wave

The human body is acclimatised to a particular combination of temperature and humidity. Long exposure to extremes of cold or heat may lead to severe thermal strain and ultimately to death. This needs monitoring of daily minimum temperature in winter and daily maximum temperature in summer. During March to July, normal temperatures over most parts of India are very high. Any abnormal increase leads to disastrous consequences. In each season we may expect two or three hot spell with temperatures much above the normal. Similarly, during the period November to March, when the winter is in full swing, two to three cold spells may be experienced. Both the hot and cold spells appear to migrate from one area to another, though their movement is not systematic. The heat and cold spells are called heat waves and cold waves respectively, though they have nothing in common with wave motion as is normally understood. Widespread heat waves normally occupy about 10 percent of the Indian land mass. Generally they develop over northwest India and north Pakistan and extend towards east and south.

Sub-Group II - Geological Disasters

Geologically related disasters deal with earthquakes, landslides, mudflows, sea erosion, dam bursts and dam failures, and

mine fires. More than half of the area of the country lies in high to moderate seismic zones that could have damaging seismic intensity. The areas affected by landslides are also wide spread in the Himalayas.

This National Plan highlights the national strategies for preparation, mitigation and response. They act as broad policy guidelines for disaster management efforts.

The plan on Geological Disasters includes:

(i) prevention plan of inter-state and sub-continental features,

(ii) prevention strategy of inter-state and international issues,

(iii) mitigation plan of inter state and sub-continental features,

(iv) mitigation strategy of inter state and inter national issues,

(v) preparedness plan at the national level, and

(vi) SAARC and international initiative in this regard.

The occurrences and current status of various geological disasters caused by earthquakes, landslides and mud flows, dam break/ dam failures and mine fires have been presented together with mitigation and response plans to cope with such disasters. A plan to mitigate and minimise the destructive geological hazards of natural disasters like earthquake, landslide & mudflows, dam burst and mine fires has been drawn. The Disaster Mitigation Plan is in two parts - Mitigation Plan and Response Plan. The details of these plans are also proposed for other geological hazards. The various levels of Trigger Mechanism are also specified.

For an effective Disaster Mitigation Plan hazard assessment, vulnerability assessment and risk assessment, prevention, preparedness activities have to be strengthened. The emphasis is made on Disaster Prevention, Mitigation and Preparedness Plan for effective Disaster Management in addition to a sound Disaster Response Plan. Disaster mitigation contributes to lasting improvement in safety and is essential to integrated disaster management.

Earthquakes

Although occurrence of an earthquake cannot be predicted precisely in terms of time or place, yet the seismic zones are very well drawn and careful planning, design and the appropriate measures can minimise the damaging effects. Earthquake is an unavoidable unpredictable infrequent phenomenon. Its parameters are its location, its destructive energy and the depth of its focus below ground level. Earthquakes destroy buildings and infrastructure with secondary effects, i.e., fires, embankment failure, release of poisonous gases, release of nuclear radiation, liquefaction etc. and the losses may some times be much more than as a direct consequence of earthquakes itself. Earthquake disaster mitigation planning must take both the primary and secondary effects into consideration.

People must be educated about the dangers and how to minimize them if not avoid them altogether if an area is identified to be having landslide activity of mass movements/ destruction.

Earthquake Disaster Mitigation

For effective earthquake disaster mitigation, the pre-earthquake phase needs to be utilised for planning and implementing preventive measures on the one hand and working out preparedness activities on the other. Earthquake in itself is not a disaster. Disaster is caused due to failure of man made structures, lack of preparedness and awareness. So far, earthquake disaster mitigation efforts are mostly reactive. Disaster prevention, mitigation and preparedness are better than disaster response. The first step towards the direction of disaster preparedness is risk assessment. There is a need to proceed from hazard assessment to vulnerability analysis and ultimately generation of earthquake risk maps/figures.

Earthquakes are being monitored by India Meteorological Department, Survey of India, National Geophysical Research Institute, Department of Earthquake Engineering, University of Roorkee and several other academic and research organisations. Macro level map has been prepared which helps in classifying the country into the earthquake hazard zones. The Vulnerability Atlas gives State and district-wise hazards to buildings and other infrastructure due to natural disasters. The disaster can be made much worse due to the vulnerability of the community itself. Vulnerability assessment of buildings, structures/infrastructure, lifelines, economy and people is to be undertaken.

Earthquakes occur repeatedly at irregular time intervals and with varying intensities in certain part of the earth, known as seismic belts, which, according to present hypotheses, lie on peripheral contacts of large tectonic plates of the earth's crust. Prevention is by permanent protection including engineering and other physical protective measures combined with appropriate non-structural measures for reducing damage and distress, and also legislative measures controlling land use and urban planning. The major preparedness activities are: developing damage scenarios, disaster mitigation cells for selected urban areas, and reducing vulnerability of existing infrastructures.

Earthquake Response Plan

The emergency measures of evacuation, search, rescue and relief form important action plans in disaster management. Once disaster occurs, disaster management machinery should plunge into action in rescue and relief operations. The Trigger Mechanism is a vital part of preparedness plan whereby the receipt of a signal of an impending disaster would simultaneously energise and activate the mechanism of response and mitigation without loss of crucial time. Other aspects are Rapid Damage/Loss Assessment for Emergency relief, documentation of damages and losses and reconstruction.

Gaps/Limitations

A strong R&D base of earthquake engineering in the country is required with research infrastructure and trained and highly skilled manpower. The gaps can be filled by honest evaluation of the status of earthquake engineering in the country vis-à-vis others prone to earthquakes. A significant improvement in R&D activities and additions to manpower in teaching and research institutions in the area of earthquake engineering is required. This will enable us to be in a position wherein a strong earthquake risk reduction programme can be launched. The strategies for disaster prevention and mitigation need to focus on:

- Creating policy supports at national, state and local levels.
- Improving public awareness and human resource development
- Strengthening of institutional infrastructure.
- Developing and implementing engineering interventions and improving regulatory mechanisms for effective response.
- Strengthening of R&D and technology transfer.
- Creating financial supports for disaster prevention and mitigation.

Landslides and Mudflows

Landslides and other mass movements can be predicted and the damage minimised or even averted with proper and systematic studies and with the adoption of remedial measures. The mass movements occurring with fast speed are more dangerous, e.g., rock falls, since very often these occur without any warning or signs of distress. However landslides, land subsidence and creep are relatively slow processes and precautionary

measures can be adopted in time to reduce the quantum of damage. Landslide studies are still being conducted in a somewhat disparate fashion by various scientific agencies. Cloudbursts and flash floods accompanied by heavy rainfall are the main cause of landslides in India. In the mountainous terrain such as the Himalayas, the landslides caused are due to structural features, geomorphic aspects or the relation of slope with major fabric of rock mass. The natural damming of rivers by landslides is a significant hazard in many areas.

Landslides and Mudflow Mitigation and Response Plans

Measures of landslide control are avoidance, surface drainage, sub-surface drainage, supporters, excavation, river structural work, vegetation, blasting and hardening. Hazard identification, mapping and assessment to identify the existing or potential landslides using various techniques are important and involve zonation and risk evaluation.

Each mass movement requires different site specific strategies. However, for minimizing the incidence of landslide and other mass movements some general suggestions including geotechnical survey, Landslide Hazard Zonation maps, involvement of people, basic knowledge, and education are the key issues. People must be educated about the dangers and how to minimize them if not avoid them altogether in an area that is identified to be having landslide activity of mass movements/ destruction. Priorities of R & D in this case are prediction of landslides, development of improved mapping, models of landslide processes, design of land use patterns, landslide control measures, and development of reliable risk assessment frameworks.

Dam Bursts/Dam Failures

A dam burst releases large quantities of water causing disastrous damage to downstream installations, disrupting socio-economic activities causing loss of life with adverse ecological and environmental impacts. The frequency of dam failures has markedly decreased in the recent past. The structural stability of a dam can be threatened by floods, rockslides, landslides, earthquakes, deterioration of the heterogeneous foundation, poor quality of construction, differential settlement, improper management, and acts of war. Three types of earth embankment problems commonly found are seepage, slope stability and vegetation outgrowth. Available studies indicate that extreme floods and uncertain geologic setting are the principal causes of dam breaches. Furthermore, the earth fill dams have been involved in the largest number of failures, followed in order by gravity dams, rock fills, and multiple and single arches.

Preparedness on Disaster due to Dam Failure

The failure of dams causes economic losses that transcend immediate property damages and loss of life. Predicting the consequences of dam breach is the primary step in dam safety programme. Preparation of inundation maps under postulated failure can be made a statutory requirement. However; disaster planning, compensation for loss, and penalties should also receive legislative attention. Dam safety program should consist of evaluation of hydrologic, subsurface, hydraulic, and stability conditions.

Prevention and Mitigation of Disaster due to Dam failure

Programs of disaster management/mitigation encompass a wide range of options ranging from issuance of flood warnings to reduction of flooding to actual evacuation. The effectiveness of these programs depends, to a large extent, on the accuracy of flood forecasting and management and cooperation between the public and respective

While for Disaster Warning System some experimentation has been done with the continuous monitoring systems of gases and temperature, there is practically no general prevailing disaster warning system in the Indian coal fields in respect of mine fires.

responsible agency. A comprehensive program for dam-disaster mitigation should encompass dam safety evacuation before as well as during a flood, forecasting and warning, and flood emergency preparedness. It is important that dam safety be periodically checked and rectified if required.

Mine Fires

Mine fires are caused due to spontaneous heating of coal and carbonaceous matter in the rocks. In coal mines the fires could be underground fires which have remained underground or may become surface fires, fires in coal benches in open cast mines, fires in overlying rock mass, fires in overburden dumps or fires in coal stacks. Such fires in the coalfields not only consume huge quantity of coal but also do not permit exploitation of coal in adjoining areas and in underlying coal seams. Combating mine fires, specially the underground fires that have remained underground and those that have become surface fires, is a costly proposition. The Trigger Mechanism should aim to prevent any further occurrence of the fires and quick liquidation of the existing fires.

The information needed during preparedness is: zonation of existing coal mine fire affected regions, modelling/ simulation of potential land subsidence and related impact, assessment of loss of property/energy; for warning/prediction it is real time monitoring of coal fires, prediction of spread and depth, pollution extent; for relief it is delineation of affected areas, ways to arrest spread of fire, support to affected population, and for rehabilitation it is long-term measures to control spread, awareness creation among public, relocation of affected people. Mine Fire Hazard Assessment is by mine fire monitoring, hazard estimation and mapping. Mining situations which may lead to development of the mine fires have been outlined and Coal Mining Regulations, 1957 and subsequent circulars amply provide for the safeguards against mine fires. While for Disaster Warning System some experimentation has been done with the continuous monitoring systems of gases and temperature, there is practically no general prevailing disaster warning system in the Indian coal fields in respect of mine fires.

The Directorate General of Mines Safety (DGMS) examines from all considerations each and every application for underground and surface mining and wherever necessary imposes conditions that require preparedness for taking actions in the case of occurrence of the mine fires, specially in the underground mines. The R&D activities in relation to mine fires address prevention and preparedness. Post disaster actions in respect of mine fires depend upon the type and location of fire. The most important fires are the ones that occur in the underground workings. The short-range and long range actions have been listed.

The strategies for disaster prevention in respect of the mine fires should be viewed and developed from the following considerations:

1. Prevent spreading of existing fires and their mitigation.
2. Integrate preventive measures in mine planning and design.
3. Provision of periodical technical audit of mines in order to check deviations from the planned activities.
4. Create a fire mitigation fund for meeting the expenditure on the mitigation of existing fires.
5. Permit mines to sell reclaimed land at prevailing rates to recover the costs of reclamation and development of land. This may require some amendments in the Land Acquisition Act.
6. Evolving a scheme of reward and punishment for prevention,

safeguarding and mitigation of mine fires.

7. Development of a catalogue of fire related characteristics of coal seams in Indian coalfields.
8. Development of a catalogue of details of mine fires prevailing in the Indian coalfields and actions being taken for their mitigation.
9. Assessment of potential fire areas in existing mines and suggesting preventive measures.
10. Strengthening R&D facilities at research and educational institutions.
11. Strengthening mine fire wings of the coal companies.

There are certain limitations in taking up mine fire management programme which need to be overcome through:

- Operational use of high technology (satellite/aerial data) for monitoring and estimation of extent and depth.
- Accelerating response time to meet needs of decision-makers.
- Mapping of fire-prone areas and appropriate planning
- Development of new tools such as thermal inertia mapping and AR interferometry for accurate information of fires.

The following recommendations are being made for the implementation of strategies for prevention of mine fires:

1. A comprehensive compendium of precise and accurate details of all existing mine fires in the Indian coalfields be prepared.
2. A workshop be organised with experts who should interact with the officials of the mining companies.
3. In the entire mining project proposals and related environmental management plans (EMPs), prevention of fire should be specifically addressed.
4. A comprehensive compendium on details of existing underground mines and open-cast mines be prepared coal field-wise so that the existing situation can be assessed for future occurrences of mine fires and hence implementation of preventive measures may be carried out.
5. Although a large number of claims have been made by R&D and educational institutions towards breakthroughs for mitigation and prevention of mine fires, a consolidated statement is not available. Hence, it will be advisable to direct the institutions to develop a compendium of achievements so far for the benefit of the industry.
6. The R&D and educational institutions may be directed to conduct studies addressing the problems faced by the mining industry in a time bound manner.
7. A high-powered committee comprising of real mining, mine fire, subsidence and environmental experts be formed to assess and oversee the actions being taken by the concerned agencies.
8. All the details be placed on a dedicated web-site with provision for continuous updating.
9. Wherever surface is likely to be affected by subsidence and their impacts with chances of fires, construction activities should not be permitted.
10. Actions should be initiated to relocate settlements from the coalfields that are threatened by mine fires.

The signal mechanism has been designed to minimise the response time when a disaster strikes and to ensure smooth and reliable flow of information while disaster management procedures are underway

Sub-Group III - Chemical/Industrial/ Nuclear Disasters

The Sub-Group, set up by the HPC, covered Chemical & Industrial Disasters, Forest Fires, Oil Spill Fires, Mine Fires and Nuclear Disasters. In the area of organisational structure and the mode of response activation an Integrated Crisis Management Plan (ICMP) has been evolved based on a synthesis of different approaches and on the Crisis Alert System established for chemical accidents. The Standard Operating Procedure (SOP) of the ICMP is based on the Trigger

Mechanism i.e. a chain of response actions is triggered off as soon as a disaster is reported. As per the SOP, different emergencies have to be scaled and the response would be based on the level of the triggering event. SOP also lays down a uniform Crisis Management Plan to help the Government Authorities to act more efficiently and promptly to any impending and occurring disaster in India and its neighbouring areas.

Activities related to emergency management involve co-ordination of planning and response actions within the "ICMP Authorities", with Central and State government, international bodies, and other governmental and non-governmental entities in times of emergencies and activation of those entities.

Modification and review of the existing Disaster Management Plan was carried out for the six Central Government departments/ ministries.

A standard ICMP was presented, taking chemical emergencies as an example, the format of which can be adopted by each of the six Central Government departments/ ministries.

The plan has been designed by evolving the following:

Review of the DMP Submitted by the Six Ministries/Departments

A detailed review of the existing Disaster Management Plans (DMP) as submitted by the different government ministries/ departments has been carried out. A gap analysis of the available DMP's has been conducted to ascertain the amount of missing or required information in the DMP's submitted.

Identification of Triggering Incidents/ Events

The triggering events have been identified, taking chemical emergencies as an example, based on the documents made available. This list is not an exhaustive one and needs to be completed by the respective department.

Classification of the Disasters Based on their Magnitude

Disasters have been classified into three groups based on their intensity or magnitude (Level 1, Level 2 and Level 3). The classification has been made with the philosophy that for Level 1 emergency, the District Emergency Response Group would be able to take control of the situation. For a Level 2 scenario the State Emergency Response Group would be activated and for a Level 3 disaster, the National Emergency Response Group comes into the picture. It has been assumed that we are dealing with offsite emergencies, which call for action from the district emergency authorities or higher level authorities.

Identification of Signal/Warning Mechanism

A proper warning mechanism lays the foundation for any good crisis management plan. The signal mechanism has been designed to minimise the response time when a disaster strikes and to ensure smooth and reliable flow of information while the disaster management procedures are underway. An emergency activation pathway has also been provided to delineate the alert mechanism.

Establish Organisational Structure for Disaster Management

A general Command & Control Structure (CCS) has been established for effective response in the event of a disaster. The CCS has been identified for all the three levels of disasters.

Phase-wise Identification of Emergency Response Activities

The overall response to a disaster has been split into three phases i.e. pre-emergency/ Phase I, emergency/Phase II and post-emergency/Phase III.

Identification of Authorities/Team Members and their Response Time

The general authorities and emergency group team members have been identified who will be responsible for carrying out the specified activities, taking chemical emergencies as an example. This exercise has been carried out for all three levels of disaster management. The response time allotted to each of the authorities have also been mentioned. The specific authorities can be identified only after consultation with the respective ministries/departments.

Fixing Roles and Responsibilities

After identification of the relevant authorities, emergency group team members and the disaster management activities, the general roles and responsibilities of the authorities have been depicted, taking chemical emergencies as an example. Again, the exact roles and responsibilities of the specific authorities can be identified only after consultation with the respective ministries/ departments.

Developing Incident Specific Emergency Procedures

After identification of the specific disasters/ events, response procedures to combat impending/occurring disasters have been developed. These responses are specific actions to be taken in case a particular type of disaster occurs or is about to occur. This section has to be completed in consultation with the six ministries/departments.

Establishing Communication Network

The basic communication network for the disaster management groups has been identified. This has been fixed keeping in mind the necessity for quick and reliable communication network. This has been done for all the three levels of disasters.

Classification of Disaster

ICMP calls for classification of disaster, for prompt activation of the Alert and Notification system, to determine which level of notification/response has to be applied. The three levels for classification of disaster are:

Level 1: Potential Emergency Situation

Level 2: Limited Emergency Condition

Level 3: Full Emergency Condition

Emergency Management by:

- The Signal /Warning mechanism
- Emergency Activation Pathway to trigger response activities
- ER Command Structure: Incident Controller and Emergency Response Group
- Emergency Control Centres

It lays down details of Action on Site and Centre of Emergency Action. The appropriate actions include important aspects such as Evacuation; Access to records; Communication; Public relations; Rehabilitation, etc. The Centre for Emergency Action should be located in the immediate vicinity of the scene of the accident and act as the common point of co-ordination for the first response team's personnel as also for communication to the Incident Controllers and others. Once declared by the respective Incident Controller, the emergency conditions will continue in the area until the same is withdrawn by the declaring authority.

ICM Plan Preparation, Training, Testing and updation

At the district level, once the ICMP requirement is established and the risk assessment made, a planning team would be convoked, which shall be multi-disciplinary in nature, involve persons concerned with emergency management, experts in the field of safety and persons who hold responsibility for emergency management in the area. It is extremely important for response personnel to be trained at regular intervals on technical aspects and emergency management. Those

involved in planning and preparing for emergencies must undertake periodic exercises to test the plan. Based on the analysis of the trials, the plan is updated.

Sub- Group IV - Accident Related Disasters

The Response Plan for Accident Related Disasters covers air accidents, boat capsizing, building collapse, electric fires, festival related disasters, forest fires, mine flooding, oil spills, rail accidents, road accidents, serial bomb blasts, urban fires and village fires. The need for vulnerability analysis of each individual type of accident is emphasized. Response action is the phase on which chances of survival of the victims depend. Actions to be immediately taken include:

i) Informing the nearest traffic police station/post through passing vehicles on either side

ii) Look for and rescue the injured or those still trapped inside

iii) Arrange for transporting the injured to the nearest medical centre by first available means

iv) Place dead bodies on one side to avoid obstructions

v) Traffic control should be organized locally using available manpower to avoid traffic jams

vi) Discourage people from crowding near the accident spot

vii) Prevent people from looting goods from the accident site.

The basic responsibility for undertaking rescue, relief, evacuation, rehabilitation measures, rebuilding of structures in case of accident is that of District Administration under District Collector.

Immediate Actions to be taken at organizational level are:

i) The State Police authorities are required to assist in rescuing persons in the accident or those affected as a result of the accident.

ii) The entire site of the accident area, including wreckage trail shall be immediately cordoned off and guarded by police including protection and safe custody of accident involved debris, personal belongings, documents, etc. and dangerous goods which may be present.

iii) Officials designated to handle Press shall keep in mind that only factual information is made available to the press. They should not pass on any information that could lead to panic, speculation or even distortion.

iv) They should avoid spending too much time in handling different sections of the press, electronic media, and answering individual queries from each one of them throughout the day. For this purpose fixed time slots should be decided upon for press briefings, which could be 2-4 times a day at nominated place and time and for a specified duration.

v) Establish information centers at pre-designated locations for giving details of the accident and answering public queries etc. Telephone numbers of all such information centers should be given wide publicity in electronic media. These information centers should have details regarding total number of persons involved, their names, nature of injury, present location and current status, number of persons likely to be still trapped inside, total number of crew members, dangerous cargo, etc.

vi) The medical examination, post mortem examination shall be arranged by the police authorities.

Under long-term action, causes of all accidents should be investigated and report made public in a time bound manner. All recommendations made in such reports and accepted by the Government both Central and State must also be implemented within a fixed time frame. Accident inquiry reports should not be permitted to be closed unless and until recommendations made are accepted and fully implemented.

Responsibilities of the Central Government, State Government, Local Government, NGOs and other national and international agencies need to be clearly laid out. There should be contingency plans prepared to manage such disasters, and personnel must be designated to manage the situation and to keep the plans updated. There should be manuals clearly laying down duties and responsibilities of role-players. The process of setting up and manning of control rooms must be clearly laid out.

Sub-Group V - Biological Disasters

Disasters related to this sub-group are biological disasters and epidemics, pest attacks, cattle epidemics and food poisoning. Our response mechanism to diseases which are forgotten or considered as conquered as well as the vulnerability of the population even to infections which respond favourably to most of the widely available anti-microbial agents such as plague needs to be strengthened. We have virtually no infrastructure, tools or expertise to contain them. Handling exotic pathogens warrants suitable infrastructure, notably, high containment laboratories of bio-safety level 3 and 4; recruitment of highly committed, dedicated and trained professionals; continuous availability of diagnostic reagents; enhancement of skills at various echelons of health professionals in early identification of such infections, investigation of outbreaks and institution of specific control measures. The impact of Transboundary Animal Diseases (TAD) causes constant loss to livestock production directly but also inhibits investment in the stock of higher productive potential and production system. India is currently following the eradication program for rinderpest.

The disease burden due to communicable diseases in India is perhaps the highest in the World. Scarcity and poor water management across the country gives rise to various water borne infections and also provides suitable environment for vectors of a large number of diseases. At present the public health infrastructure in India is inadequate to sense early warning signals of outbreak of an epidemic and to respond in time.

Considerable infrastructure in the form of institutions and laboratories of excellence have been created in our country since Independence. However, efforts to consolidate their strengths and harness their expertise towards the national cause of containment of known communicable diseases have been minimal. No mechanism exists by which their services can be utilised in the wake of a threat by a communicable disease. Current system of surveillance and mechanism to control the outbreak of endemic diseases are through the National Programme for Surveillance of Communicable Diseases.

Action Plan for Disaster Management could be dealt effectively only if there is a disaster plan well integrated in the system and there is mechanism of post disaster evaluation. Disaster Stage actions needed is for Public Health Control Measures. Post disaster stage evaluation is most important step in disaster management in order to rectify deficiencies in management and to record the entire operation for future guidance.

Post disaster stage evaluation is most important step in disaster management in order to rectify deficiencies in management and to record the entire operation for future guidance.

Planning

Short term planning would involve early detection of a crisis situation caused by

micro-organisms within existing resources and infrastructure. A long term plan would be put into operation as soon as the existing inadequacies are overcome. New infrastructure that need to be created are containment laboratories with adequate bio-safety measures. Existing technical expertise and infrastructure in large number of laboratories across the nation can easily be harnessed towards the national cause. It is proposed that at least 10-12 such laboratories on regional basis can network to provide support to efforts in detecting and containing diseases of international public health importance.

Modalities for undertaking epidemiological investigation are by initial and preliminary investigation by local public health officials, specialised investigations by rapid response teams and identification of early warning signals.

Recommendations

A national policy and action plan is required to be formulated to meet these ever-growing challenges. The following broad issues are being suggested:

1. Establishment of a national high level intersectoral committee.
2. Quick response medical teams.
3. Surveillance and rapid response activities.
4. Strengthened surveillance.
5. Efficient functioning of surveillance machinery.
6. Developing more effective international surveillance networks.
7. Ensuring the ready availability of professional expertise and support personnel needed to better understand, monitor, and control emerging infections.
8. Identification of endemic areas for different diseases with seasonal variations through charts and maps by the State Health Authorities.
9. Laboratory support to diseases of international public health importance.
10. Developing infrastructure for BSL3 and BSL4 laboratory support within the country.
11. Creating a network of national laboratories that can provide support for early diagnosis of these infections and harness the expertise available.
12. Improving laboratory capabilities to identify and characterise pathogens.
13. Ensuring timely development, appropriate use, and availability of diagnostic tests and reagents.
14. Developing and evaluating new diagnostic tools.
15. Networking of laboratories within the country, with other countries on bilateral basis.
16. Recruitment of professionals for maximum containment laboratories.
17. Upgradation of skills of professionals by providing state of the art training and establishing a public health laboratory training programme.
18. Ecological studies to understand dynamics of disease transmission.
19. Dissemination of information to general public and professionals.
20. Stockpile antimicrobial agents and biologicals.
21. Promoting and encouraging R&D.
22. Availability of safe drinking water.
23. Enforcement of preventive measures to ensure unadulterated and hygienic food.
24. Funds for prompt medical assistance from the Central Government.
25. Establishment of a Control Room in National Institute of Communicable Diseases.

4

Select Global Practices

The world is afflicted with disasters. We can learn from the experiences of the developing countries and even our neighbours for supply management practices, urban risk reduction, defining minimum standards of relief, etc. Various international projects and particularly the IDNDR expressed concern for the continued human suffering in disasters and developed the Yokohama Strategy and Plan of Action for a Safer World which provides us with a model for developing our own strategy.

Select Global Practices

In 1989, the General Assembly of the United Nations proclaimed the decade 1990-2000 as the International Decade for Natural Disaster Reduction (IDNDR).

At the World Conference on Natural Disaster Reduction in the city of Yokohama, Japan in 1994, deep concern was expressed for the continuing human suffering and disruption of development caused by natural disasters and a Yokohama Strategy and Plan of Action for a Safer World was developed.

The framework of action of the International Decade for Natural Disaster Reduction provides all vulnerable countries, in particular the developing countries, with an opportunity to achieve a safer world. In this regard, the international community and the United Nations system in particular provided support to the IDNDR and its mechanisms.

In India too, in accordance with the objectives of the IDNDR, there is now an increased awareness on disaster management. The Government of India

and many institutions within the country are now part of various worldwide initiatives on reducing disaster risks. Regional cooperation between countries in South Asia have also been initiated to exchange experiences on good practices and convergence of preparedness action.

There was however a need to understand the working models and best practices existing internationally by the HPC.

United Nations System

FEMA's charter encompasses all hazards and not just natural calamities. Its domain covers all stages of the disaster life cycle with "rescue, relief and rehabilitation" to be treated as response and "reconstruction" as recovery.

The emergency management system of the United Nations is complex. They have designated OCHA (Office of the Coordinator for Humanitarian Affairs) for handling immediate disaster responses and UNDP to promote disaster prevention, mitigation and preparedness. The specialized UN agency OCHA that mobilizes emergency response services worldwide in the event of catastrophic disasters, has set up INSARAG (International Search and Rescue Assistance group), UNDAC (UN Disaster Assessment and Coordination) Team and OSOCC (On Site Operations Coordination Center) to provide emergency services to countries overwhelmed by natural calamities or other "Complex emergencies" viz. accidents, terrorist incidents and NBC emergencies with human dimensions. Many of the international Urban Search and Rescue Teams, which handled Kutch earthquake, were trained by INSARAG/ OCHA. UN-OCHA have standing MOUs with international agencies for "environmental emergencies" e.g. for chemical weapons related emergencies, they have an MOU with OPCW (Organization for prevention of chemical Warfare and another for chemical/ industrial accidents with UNEP (UN Environmental Programme) and for radiological/nuclear emergencies they have standing arrangements with IAEA (International Atomic Energy Agency). The role of international agencies is critical to the functioning of the systems adopted as above, and this fact was duly recognized by the HPC and consultations with international agencies were carried out in accordance.

United States of America System

Of the national emergency management structures, the United States of America has the most comprehensive and efficient emergency regime and institutional structures. In USA, domestic emergencies are handled by FEMA (Federal Emergency Management Agency) set up in 1979 by president Carter. Overseas emergency assistance is handled by OFDA (Office of Foreign Disaster Assistance), which functions under the Administrator USAID with a tenure coterminous with the President. The focal point of US Government Domestic Emergency Management System is FEMA. FEMA's mission is to reduce loss of life and property and protect nations critical infrastructure from all types of hazards through a comprehensive, risk based, and emergency management programme of mitigation, preparedness, response and recovery. From the mission, it is clear that FEMA's charter encompasses all hazards and not just natural calamities and that its domain covers all stages of the disaster life cycle with "rescue, relief and rehabilitation" to be treated as response and "reconstruction" as recovery. FEMA's charter also mandates it to cover disaster mitigation, prevention and preparedness.

Emergency Management Units

Natural and technological disasters happen without warning with little respect for national boundaries, human life, property and environment and little can be done to prevent their occurrence. However, their effects can be mitigated

through the adoption of emergency preparedness and response organisation and capabilities. Also, advanced techniques, policies and planning efforts can assist in minimising the effects of technological emergencies.

The emergency management domain can be categorized into four generic management levels such as response management, situation management, risk management and knowledge management. The basic objective of emergency management agencies is to promote the establishment of a global emergency management network, encourage participation, create information protocols, establish process based system, standards for emergency management etc.

The development, implementation, and operation of a global emergency management information network would yield many benefits such as increased exchanges of emergency management information system that would stimulate developed nations to improve their emergency management practices, enhanced international communication about emergency management, improved coordination of international responses to disasters that would assist the developing countries to shift from crises response to a measure of emergency management and technology transfer to developing countries would be facilitated.

Communication is one of the most important areas to provide information in disaster situations and technology and has an important role to play in furthering this task.

A Case Study of Florida's Emergency Management since Hurricane Andrew

Following Hurricane Andrew, which made a landfall on the morning of August 25, 1992, questions arose in the State capital concerning whether Florida in conjunction with Federal and local agencies had optimally prepared and then responded to one of the most destructive natural disasters. Following this, the Governor passed an executive order under the chairmanship of the former state Senate President Philip D. Lewis to evaluate existing state and local statutes, plans and programmes for natural and man-made disasters, and to make recommendations for improvements to the Governor and the State Legislature.

The order directed state departments, agencies, offices and units of state and local government to develop and implement disaster preparedness plans in the event of natural and manmade disasters.

Bangladesh, which is one of the world's worst disaster affected nations, has set up a separate ministry for disaster management.

Bangladesh System

In the Bangladesh Disaster Management System, the council/committee which is responsible for policy formulation and coordination of disaster management at national level comprises of:

1. National Disaster Management Council (NDMC).
2. Inter-Ministerial Disaster Management Coordination Committee (IMDMCC).
3. National Disaster Management Advisory Committee (NDMAC).

The head of NDMC is the Prime Minister. NDMC formulates policies regarding Disaster Management and issues guidelines in this respect. It also examines the recommendation of IMDMCC and NDMAC and issues directives for their implementation. The Ministry of Disaster Management and Relief (MDMR) is the focal point of the Government for disaster related issues. The Disaster Management Bureau (DMB) assists the Ministry with all necessary information during normal time, alert and warning stage, disaster stage and post-disaster recovery stage. The Ministry supplies information to National Disaster Management Council and Inter-Ministerial Coordination Committee and

assists them in taking decisions. The Secretary of the ministry will control the activities of all officials engaged either directly or indirectly for emergency relief work. Most noteworthy is the fact that Bangladesh, which is one of the world's worst disaster affected nation, has set up a separate ministry for disaster management.

Australian System

In the Australian System of Disaster Management, the body for disaster management is called the 'State Counter Disaster Organisation' (SCDO), which consists of the following members -the Coordinator-General; the Director General of Health, the Under Treasurer; the Under Secretary, Premiers department; the Commissioner of Police; the Director of Harbour and Marine; the Directors, State Emergency Service, and any other person appointed by the Governor in Council.

The basic functions of the SCDO are to coordinate the resources necessary to ensure that all the steps are taken to counter the effects of a disaster and to give advice and assistance to the minister on all the matters with respect to counter disaster. Under the SCDO there is a 'Central Control Group' to carry out its functions. The Coordinator General is the chairman of the group and the Director of State Emergency Service is the Executive Officer. The Chairman presides at all the meetings at which he is present and in his absence any other member thereof appointed presides and while so presiding he has the powers, authorities, functions, duties and immunities of the chairman. The Minister in consultation with the Minister in charge of any department of the government of the state or statutory corporation appoints the Head of the Department or statutory corporation as the member of the central control group for specified period.

Japanese System

In Japan, a disaster management body, called a Central Disaster Preventive Council (CDPC) is established in the office of the Prime Minister, for the formulation and implementation of disaster preventive plan and emergency measures. The Prime Minister consults the Council for basic policy of disaster prevention, major points in overall coordination of measures undertaken for disaster prevention, outline for urgent measures of temporary nature for disaster, declaring a state of emergency and any other necessary related matter for disaster prevention.

The CDPC, headed by the Prime Minister who is also the Chairman of the Council, directs and supervises the affairs of the Council. He appoints members from among Ministers of State and persons with pertinent knowledge and experience alongwith technical experts for matters requiring expert and technical knowledge for disaster prevention. The Secretariat of the Council is headed by a Chief and members under him to manage the affairs.

The CDPC has the right, with respect to its business, to seek data, opinions, views and any other necessary cooperation from the Chief Officer of an appropriate national or local administrative organ, local government, executive agency or any other appropriate agency. In addition, the CDPC also makes recommendations and provides instructions to local disaster prevention councils for disaster prevention.

Similarly, a Prefectural Disaster Prevention Council (PDPC) is established, headed by the Governor of the prefecture as its chairman. In each prefecture for the formulation and implementation of a prefectural are disaster prevention plan; formulation and implementation of a plan for emergency measures in times of major disaster, that has occurred involving the

area of said prefecture; liaisons and coordination in matters of emergency measures and rehabilitation programs among the said prefecture and appropriate designated local administrative organs of the city, town or concerned village, designated public cooperation and designated local public corporations.

In an event of extremely unusual devastating disaster, the PM establishes on ad hoc basis and with Cabinet approval a headquarter for major disaster control within the PM office. When the headquarters for major disaster control already exist during the establishment of headquarters for emergency disaster control, the former is abolished and the headquarters for emergency disaster control succeeds the duties and responsibilities of the said headquarters for major disaster control.

When the disaster has occurred or likely to occur, a disaster control headquarter is established in the affected area (at prefecture, city or town, or village level) as provided under the prefectural city, town or village area disaster prevention plan, headed by the Chairman and the Governor of the prefecture, or the Mayor of the city or town, or the head of the village serves as chairman at their respective levels. The Vice-Chairman, headquarter members and other officials of the headquarters are appointed by the Prefectural Governor or the Mayor of the city or town or the head of the village from among officials of the prefecture, city, town or village. The headquarters for disaster control work in coordination with the Local Disaster Prevention Council to take preventive and emergency measures. Mayor of the city or town, head of the village reports to the Governor of the prefecture and incase it is not possible to report to the governor of the prefecture, reports to the Prime Minister about the conditions of the disaster and provide an outline of the measures taken.

SUMA-WHO/PAHO: Supply Management Project in the Aftermath of Disasters

An excellent exercise that can be implemented with immediate effect is the one that is presented by the SUMA model, launched as a collective effort of the Latin American Countries to improve the administration of supplies in the aftermath of disasters.

Many a times relief agencies are confronted with the problem of identification of what relief material has been received, where it is, and to determine exactly how useful the supplies are. Very often, useless supplies take up the attention and resources at the expense of other articles of prime necessity.

Situation such as this brings out the following problems:

1. The means of transportation and time are limited
2. Technical information on the supplies is missing
3. The donors and mass media receive a negative impression.

Through the adoption of the SUMA model problems such as above are sidelined with the assistance of: capable personnel, versatile materials with easy to use electronic tools in order for the supplies to be classified, taken inventory of, and prioritized from the moment of arrival. The basic problems can be resolved in the following manner:

1. Health personnel, duly trained, sort and classify the supplies
2. Tickets with the following information are attached to the boxes and/or packages
   (i) Distribution priority
   (ii) Whether it is a health provision or medicine
   (iii) Whether it needs refrigeration

3. Relief provision inventory that arrive, based on technical and operational criteria
4. Registration of donations at the point of entry using a computerized system
5. Daily report to the national authorities about the donor organizations, the addressees, the type of provisions, etc.
6. Demonstration of efficiency of the countries using advanced technology
7. Visitors will have a favorable first impression at the airport.
8. Donors will receive immediate proof of delivery (e-mail, via fax, etc.), as soon as the addressee receives the shipment.

The SUMA field unit uses manual forms in case for any such reasons such as the computers going down, or in the event that the need to gather data requires their use.

For this, all donations, regardless of where they have come from should be processed by SUMA at the time of their entry before they are delivered to the addressee. This implies the adoption of operation policies and strategies by those organizations and institutions related to the administration of the assistance given, whether governmental or not. This model can be used not only in large-scale emergencies but even when there is a need for mobilisation and /or to receive supplies.

Components of the System

The system is composed of three levels:

- SUMA Central
- SUMA Field Unit
- Warehouse Management

SUMA CENTRAL is designed to operate in a place where national authorities are managing a disaster or emergency.

At this level, the principal duties are:

- Defining parameters to be used by the Field Units, such as reception sites, shipment directories, defining the main user, etc.
- The creation of Field Units
- The integration of information sent by the Field Units.
- Supporting consultations and making up reports which serve to lend support to the decision making process and promote internal coordination of the structure.

The FIELD UNIT is designed to work at points of entry, borders, water ports, and large centers for local collection (centers at which supplies arrive during emergencies, such as airports, collection stands, etc.).

The main work accomplished at this level is:

- The separation and identification of supplies through labels, under the categories: urgent-immediate distribution, non-urgent distribution and non-priority articles.
- The classification of supplies by categories, subcategories and items.
- Selective checks (consultations) on items.
- Making up various reports on the content of the supplies registered at that field unit.
- Making proof of delivery receipts for the addressees.
- Consolidating data on diskettes to send to the Center.

The SUMA field unit uses manual forms in case for any such reasons such as the the computers going down, or in the event that the need to gather data requires their use.

The WAREHOUSE MANAGEMENT module registers in-coming supplies and issuing of supplies to and from the storage centers or warehouses once the supplies and registration information have been delivered.

The main duties to be developed at this level are:

- Balance of local inventory
- Elaboration of existing reports and deliveries through diverse parameters
- Inventory follow-up of other subordinate warehouses

Incident Command System

The incident command system is one of the many best practices that have contributed to the success of FEMA. The ICS is a very effective method whereby the most experienced and knowledgeable person at a disaster site is designated as "Incident Commander" and charged with the responsibility of on scene interagency coordination and management of the incident. This is a very effective device to overcome constraints imposed by inter-sectoral-seniority and it obliterates departmental hierarchies and selects the best man intellectually equipped to ensure high quality of decision process.

The basic elements of Incident Command System are:

- Providing a single management system for all multi-jurisdictional incidents.
- Initially evolved from management of wild land fires, the ICS has now been adapted for "all-risk incident" viz flood, fire, cyclone, earthquake, terrorist activities.
- It is modular and allows for expansion/ contraction depending on complexity of incident.

HAZUS

HAZUS stands for HAZARDS US. It is a software that utilizes geographic information system (GIS) technology to produce detailed maps and analytical reports that describe a community's potential losses due to disasters. HAZUS is widely prevalent in USA where it is used by the Federal Emergency Management Agency (FEMA) . HAZUS has been sent to more than 700 users, divided almost evenly between public and private organizations.

Loss estimates calculated with HAZUS are intended to be used by local, state, and regional officials for planning and stimulating mitigation efforts to reduce losses before earthquakes occur, and for preparing of emergency response and recovery following earthquakes. Additionally, the loss estimates form the basis for a nationwide assessment of the earthquake risk, and can provide a basis for allocating national resources for future disasters.

Several foreign countries are using HAZUS as a model for the development of their own earthquake loss estimation product.

HAZUS is also an important tool in FEMA's PROJECT IMPACT, a program to reduce losses and making communities 'disaster resistant' through public and private sector cooperation.

In an actual earthquake event, HAZUS will automatically receive data on the event from the network and run an analysis based on that data. These results will represent FEMA's first official estimates of damage and loss.

RADIUS

The United Nations General Assembly designated the 1990s as the "International Decade for Natural Disaster Reduction (IDNDR)" to reduce loss of life, property damage, and social and economic disruption caused by natural disasters. The IDNDR Secretariat launched the RADIUS (Risk Assessment Tools for Diagnosis of Urban Areas against Seismic Disasters) initiative in 1996. It aimed to promote worldwide activities for the reduction of urban seismic risk, which is growing rapidly, particularly in developing countries. The primary goal of the initiative is to help people understand their

seismic risk and raise public awareness as the first step towards seismic risk reduction.

Direct objectives of the RADIUS exercise were to develop tools for effective management of earthquake risks in cities. For this earthquake damage scenarios and action plans for select cities around the world were taken up.

It has been envisaged that the tools developed as part of the project would serve a very useful purpose to all earthquake vulnerable cities in the world. For decision makers and government officials who are responsible for disaster prevention and disaster preparedness in their respective cities, the project is expected to help in:

- Deciding priorities for urban planning, land-use planning, and building regulations;
- Preparing an improvement plan for existing urban structures such as reinforcement (retrofitting) of vulnerable buildings and infrastructure, securing of open spaces and emergency roads; and
- Preparing for emergency activities such as life saving, fire fighting, and emergency transportation.

The project was carried out in 74 cities around the world. The usefulness of the project has been proven in many of the subsequent international meets.

The usefulness of a worldwide urban earthquake disaster index was illustrated by the RADIUS project. The conclusions of the project indicated that a comparative index would be a successful way to assess risk, raise disaster awareness and promote a worldwide network of earthquake professionals. This led to the institution of Global Earthquake Safety Initiative (GESI).

GESI

The GESI (Global Earthquake Safety Initiative) Project offers cities a method of quantifying the risk of life loss in earthquakes with the purpose of motivating community leaders to plan development that reduces risk. While attempting to include as many relevant indicators as possible, the initiative was designed to be simple enough so that the results are meaningful and useful for the communities and decision makers:

1. To develop a means to express urban earthquake risk in lay terms. It is critical that earthquake-threatened communities and their political leaders understand the nature of risk they face. GESI synthesizes technical information about the effect of earthquakes into simple characterizations of the risk while identifying the most vulnerable aspects of the community.
2. To measure trends in the urban earthquake risk of the world's major cities. As people continue to move to cities and urban areas develop and expand, the risk of urban earthquake disaster has increased considerably.
3. To understand the long-term growth patterns of a city understanding in growth patterns is the first step in preparing mitigation plans. Another objective of this initiative is to measure how rapidly a developing city's risk of life loss due to earthquakes is increasing due to growth, or decreasing due to mitigation efforts.
4. To produce a tool to evaluate the effectiveness of various means of reducing earthquake casualties. The most important reason for cities to understand their risk from earthquakes is to enable them to work to reduce that risk. However, it is not always easy to know how to reduce risk most effectively. Another objective of this project is to produce a tool that can help cities evaluate measures that will have maximum impact in saving lives.
5. To highlight the increasing earthquake risk of schools in developing countries

and the potential for reducing that risk. Another objective of this project is to apply tools described above to reduce the risk of seismic hazard to public schools. Schools are an important, yet vulnerable component of the society, and they are a popular place for earthquake risk reduction activities to begin. Specifically, this initiative compares the risk of life loss of school children in cities around the world by broadly identifying the factors that are likely to cause most deaths in schools.

The recent earthquake in Gujarat has clearly demonstrated the enormous risk cities in India are in. Strategic thinking is now required more than ever to initiate measures that can help in reducing risk in urban areas.

The HPC proposes that the Global Earthquake Safety Index type of index be carried out exclusively for all cities in India that lie in Earthquake Vulnerable Zone. This would be an extremely useful starting point for policy level as well as local level awareness on disaster prevention and mitigation.

DRAWING LESSONS FROM BEST PRACTICES

The HPC reviewed the above select global best practices, and others, with a view to identifying salient features and adapt and appropriately incorporate in the disaster management systems being proposed for India. Some of the key features that were found appropriate to Indian conditions and incorporated in the plans are:

- Incident Command System
- Supplies Management System
- Emergency Operations Centre
- Emergency Support Functions
- Field Operations Guides
- Information Network Systems
- Media Management Guidelines
- Search and Rescue Teams
- Mobile Hospitals
- Disaster Medical Assistance Teams
- Helplines
- Urban Assessment Tools
- Earthquake Safety Initiative

5

Disaster Mitigation and Preparedness

A growing shift in approach to disaster management is the initiative for prevention and preparedness rather than relief. Relief is a temporary provision and does not guarantee any future devoid of disasters. The world conference at Yokohama in May 1994 helped realize that the focus of disaster management therefore has to be towards sustainability of communities and managing disasters as a long-term strategy of developing lives.

Paradigm Shift towards Prevention and Reduction

International Decade for Natural Disaster Reduction (IDNDR)

Recognizing the rapidly rising world-wide toll of human and economic losses due to natural disasters, the UN General Assembly in 1989 took a decision to launch a far reaching global undertaking during the nineties to save human lives and reduce the impact of natural disasters. With this aim in mind, the decade 1990-2000 was declared as the International Decade for Natural Disaster Reduction (IDNDR).

The objective of the IDNDR was to reduce, through concerted international action, especially in developing countries, the loss of life, property damage and social and economic disruption caused by natural disasters such as earthquakes, floods, cyclones, landslides, locust infestations, drought and desertification and other calamities of natural origin.

By the year 2000, as per the plan of the IDNDR, all countries should have had:

a. Comprehensive national assessments of risks from natural hazards, with these assessments taking into account their impact on developmental plans,

b. Mitigation plans at national and/or local levels, involving long term prevention and preparedness and community awareness, and

c. Ready access to global, regional, national and local warning systems and widespread dissemination of such warnings.

A major conference of the IDNDR programme was held in Yokohama in May 1994, where a plan of action for disaster reduction called the Yokohama Strategy was evolved. The Yokohama Strategy gave guidelines for Natural Disaster Prevention, Preparedness and Mitigation, shifting the focus and emphasis from disaster management to disaster prevention and preparedness.

The World Conference, based on the assessment of the progress accomplished during the first half of the decade, formulated a strategy for disaster reduction centered on the objective of saving human lives and protecting property. The strategy called for an accelerated implementation of a Plan of Action to be based on certain variables such as development of a global culture of prevention as an essential component of an integrated approach to disaster reduction, adoption of a policy of self-reliance in each vulnerable country and community comprising capacity building as well as allocation and efficient use of resources, community participation in the disaster reduction process, improved risk assessment, broader monitoring and communication of forecasts and early warnings.

During the remaining part of the decade, it called upon all countries to unequivocally give political commitment to reduce their vulnerability through appropriate means. Disaster prevention, mitigation and preparedness was given emphasis.

Yokohama Strategy and Plan for Action for a Safer World

The world conference on Natural Disasters at Yokohama May 1994 was a definitive step in Disaster Planning. It emphasized that natural disasters were beyond the control of human beings. However, vulnerability towards disasters usually stems from human interventions and activities.

Some of the important factors that were addressed for the strategy are as follows:

- Emphasizing and reaffirming the need to increase awareness on the importance of disaster reduction policies.
- Stress on support to States from the international community. Principle 19 of the Rio Declaration was also kept in mind.
- Integrated approach to disaster management in all spheres.

Principles of Mitigation and Preparedness

- Risk assessment is a required step for the adoption of adequate and successful disaster reduction policies.
- Disaster prevention and preparedness are of primary importance in reducing the need for disaster relief
- Disaster Prevention and preparedness should be considered an integral part of the developmental policy and planning at national, regional, bilateral, multilateral and international stage.
- Early warning of impending disasters and their effective dissemination using telecommunication are the key factors to successful prevention and preparedness
- Preventive measures are most effective when they involve participation at all levels, from the

local community to national level to the regional and international level.

- Vulnerability can be reduced by the application of proper design and patterns of development focused on target groups through appropriate education and training.
- The international community accepts the need to share necessary technology to prevent, reduce and mitigate disasters, which should be made freely available and done in a timely manner as an integral part of technical cooperation.
- Each country bears the primary responsibility of protecting its people, infrastructure and other national assets from the impact of natural disasters. The international community should demonstrate strong political determination required to mobilize adequate and make efficient use of existing resources, including financial, scientific and technological means.

Prevention, Mitigation and Preparedness Strategy

- Development of a culture of prevention as an essential component of an integrated approach to disaster reduction.
- Prepare and maintain in a state of readiness 'Preparedness and Response Plans' at National, State and District levels.
- Adoption of a policy of self reliance in each vulnerable area.
- Education and training in disaster prevention, mitigation and preparedness for enhancement of capabilities at all levels.
- Identification and strengthening of existing centres of excellence in order to improve disaster prevention, reduction and mitigation capabilities.

6

Ushering in a New Culture of Disaster Management

HPC's thrust from its own learning was towards building a Culture of Prevention. It is important that we look afresh at the issues of saving lives and property and build a new culture of disaster management; one of preparedness, quick response, strategic thinking and prevention of eventualities in the context of developing immense possibilities in man and technology.

The HPC, after deliberating on existing systems and their upgradability for serving the purpose of proposed disaster management approaches and systems, felt the need to lay the foundations of a new culture of disaster management in the country. Disaster management, and disaster preparedness and mitigation in particular, are issues that concern the cultural and attitudinal attributes of the government, other organizations, and the public at large. It was felt that a new culture of being prepared for, and managing disasters is needed that permeates all aspects of national life - physical, social and economic. Based on this philosophy, four cultures were identified: cultures of preparedness, quick response, strategic thinking and prevention. These were detailed out to provide guidance for plan preparation and implementation process to take place in appropriate accordance.

Culture of Preparedness

Hitherto, the approach towards coping with the effects of natural disasters has been post-disaster management involving many problems such as law and order, evacuation

and warnings, communications, search and rescue, fire-fighting, medical and psychiatric assistance, provision of relief and sheltering, etc. After the initial trauma of the occurrence of the natural disaster is over within the first few days or weeks, the phase of reconstruction and economic, social and psychological rehabilitation is taken up by the people themselves and by the government authorities. Soon thereafter the occurrence of the disaster is relegated to historic memory till the next one occurs either in the same area or in some other part of the country.

Warning systems and preparedness measures reduce and modify the scale of disasters.

The UN General Assembly Resolution 236 of 1989 launched the International Decade for Natural Disaster Reduction (IDNDR, 1990-2000) to reduce, through concerted international action, especially in developing countries, the loss of life, property damage, and social and economic disruption caused by natural disasters. This effectively set the trend in shifting the focus of attention from rescue and relief to preparedness and mitigation.

The vulnerability of a human community is determined by its exposure to disasters, the degree to which houses and other structures can be damaged, the existence and size of vulnerable groups, the extent of inherent capacity and local coping mechanisms available, and the likelihood that secondary effects could occur. A new element has now entered the scene: a World Bank report published a few years ago places a good deal of the responsibility for the consequences of natural disasters on human activities, carried out ostensibly in the name of development. With the increase in the number of natural disasters during the last three decades, there has been a growing awareness of the relation between the declining quality of the earth's environment and the frequency and severity of natural catastrophes.

It is not possible to do away with the devastation of natural hazards completely. However, experience has shown that destruction from natural hazards can be minimized by the presence of a well-functioning warning system, combined with preparedness on the part of the vulnerable community. Warning systems and preparedness measures reduce and modify the scale of disasters. A community that is prepared to face disasters, receives and understands warnings of impending hazards and has taken precautionary and mitigatory measures, will be able to cope better and resume their normal life sooner.

The United Nations Disaster Relief Office (UNDRO) uses the following definition for Disaster Preparedness: "*Disaster Preparedness may be described as (a series of) measures designed to organize and facilitate timely and effective rescue, relief and rehabilitation operations in cases of disaster.... Measures of preparedness include among others, setting up disaster relief machinery, formulation of emergency relief plans, training of specific groups (and vulnerable communities) to undertake rescue and relief, stockpiling supplies and earmarking funds for relief operations.*"

Ironic as it may appear, there is a strong probability (as borne out by events world-wide) that never before have so many people in so many places needed so much help all at one time. An associated paradox is that recipients of both disaster and development are increasingly becoming one and the same-usually the poorest and weakest groups within the developing countries. These groups are the people most likely to be affected by disaster phenomena and also those most likely to require the assistance of long-term development programmes.

The traditional view is that the more severe the force of the phenomena, the greater the losses. Hence the concentration on disaster response, rather than prevention or preparedness. However, this position is only partially accurate as the scale of damage and destruction always depends on what might

be affected. The size of the disaster therefore varies, depending on the vulnerability, i.e. the number of elements that can be damaged and their ability to withstand the forces of the phenomena.

It is becoming increasingly evident now that a relatively smaller investment in disaster preparedness can save thousands of lives and vital economic assets, as well as reduce the cost of overall relief assistance.

It therefore becomes important for the global community to lay greater emphasis on ways and means of preventing and preparing for disasters. This proactive approach is by far better than seeking to restore the country to its pre-disaster status and then, waiting for history to repeat itself. There is a need to examine the relation between environmental degradation and vulnerability to disasters, and their combined effects on both natural and man-made habitats. There is also a need to co-ordinate efforts to reduce vulnerability to disasters. While preventive measures will not halt earthquakes or cyclones, they will minimize the impact of such disasters on the environment. Such reasons need to address the following needs at various levels as mentioned:

National

- Role of various ministries
- Role of media
- Role of educational institutions
- Role of NGOs

State

- Provision of plans
- Coordination
- Training
- Strengthening of warning systems

District

- Provision of plans
- Rehearsals
- Coordination
- Training officers and NGOs
- Strengthening of warning systems
- Strengthening of data base

Village

- Village level plan
- Training to PRIs non-official
- Documentation of the previous disaster
- Checklist of the resource available

Family

- Do's and Don'ts of the each disaster
- Awareness
- Rehearsal
- Checklist of the items needed in disaster situation
- Family insurance

Individual

- Knowledge of vulnerability
- Awareness
- Risk
- Responding to warning

Retrofitting for Disaster Management

The study on Retrofitting for Disaster Mitigation carried out under the HPC, deals with the problem of natural disaster in general and the earthquake disaster in particular. The study also deals with policies and strategies to be adopted for Disaster Mitigation of which retrofitting of existing unsafe buildings and structures forms a very important component in view of the fact that India has a very large stock of weak unsafe buildings which have very high risk of damage in natural hazards. It looks at the

Retrofitting of existing unsafe buildings and structures forms a very important component in view of the fact that India has a very large stock of weak unsafe buildings which have very high risk of damage in natural hazards.

repair, restoration and retrofitting of masonry buildings and covers the approaches that have been used in the earthquake affected areas in Jabalpur and Chamoli in particular. It lays emphasis on the repair, restoration and retrofitting of reinforced concrete buildings in which the design criteria for restoration and strengthening of reinforced concrete buildings are dealt with in detail. It presents the repair materials and technological aspects involved in restoration and retrofitting of buildings in general and reinforced concrete buildings in particular.

Strategic thinking unfolds scenarios before they occur and enables continuous revision of the road map and the gameplan. Sharing of resources, pooling of expertise and leveraging of capacities come naturally with strategic thinking.

Some examples of cases where retrofitting has been effectively adopted and the benefits derived have also been cited. The cost aspects of retrofitting and the long range benefits that will be available by adopting retrofitting of existing unsafe buildings have been brought out as well. In view of the huge losses suffered by the country in the earthquakes in the last 15 years, it is strongly recommended that retrofitting of buildings and structures as a component of disaster management should be adopted as a point of policy of the Government of India as well as the State Governments and funding be earmarked for the purpose urgently. It is also recommended that a small expert group may be constituted to recommend an action plan for taking up retrofitting work in a prioritized manner in high risk areas.

Culture of Quick Response

Following the disasters such as the Orissa Super cyclone (October,1999) and the Gujarat Earthquake (January, 2001), the HPC has highlighted the need to respond at the earliest in the most appropriate manner.

The HPC has highlighted the need to institutionalise a Cabinet Committee of a group of ministers, comprising of ministers from the Ministries of Defence, Health, Agriculture, Railways, Surface Transport, Power etc, to be chaired by the Prime Minister. This Group of Ministers would have the benefit of the presence of the Cabinet Secretary, the three Chiefs of Staff (Army, Airforce and Navy), Secretaries of concerned Departments and all DGs of Paramilitary forces.

The HPC has also recommended that all Armed Forces should have a dedicated component of personnel and equipment at the Command level for disaster management. The five Army Commands may have fully equipped centres in the five command regions at appropriate locations which may have heavy equipment necessary to carry out relief and rescue activities in the region at short notice, with trained personnel to operate them.

An appropriate organisational set up at the State level to cope with the incoming relief and rescue measures is an urgent necessity, so that in disaster situations of colossal magnitudes, no time is lost in directing the incoming relief and rescue measures to the exact locations where they are required. Such a set up could be formulated on the lines of the one presented by the SUMA model, version 5.0, launched as the collective efforts of Latin American Countries in order to improve the administration of supplies in the aftermath of a disaster situation. It provides a solution to the problems with the arrival of unsolicited supplies thus enabling speedier distribution of relief material and assistance as the situation warrants in reference to SUMA Model and PAHO. This too would be worked out and incorporated in the Disaster Management Plan in due course. Necessary exercises were carried out by the HPC in order to ascertain government's perception regarding the role of the Armed Forces and Para-military Forces in rescue and immediate relief in disaster situations.

The principles of quick response have been consciously added in the plans for National, State and District level. The proposed design and layout of documents provides for easy and quick reading on appropriate action to immediately follow.

Culture of Strategic Thinking

Disaster mitigation is both a science and an art of instant decision-making under uncertain premises in crisis times. Between disaster management and disastrous management lies the shadow of our degree of preparedness. The length of this shadow diminishes in direct proportion to the quality of our preparedness to face disasters. Strategic thinking and swift decision-making are the two wings of the bird called preparedness. Deeper the strategic thinking and quicker the decision-making, the higher the bird would fly,the richer will be the dividends and safer will be the landing platform.

When the hazardous events are frequent, degree of preparedness is low and urbanization goes unchecked, the losses are bound to be staggering. The routine development plans frozen in time and space are naturally irrelevant in a dynamic situation, such as the one we face, where change as well as the gradient of change, are fast. Strategic thinking unfolds scenarios before they occur and enables continuous revision of the road map and the gameplan. Sharing of resources, pooling of expertise and leveraging of capacities come naturally with strategic thinking.

HPC has emphasized the importance of knowledge pertaining to disasters and the need of linking with institutions engaged in the pursuit of knowledge. Based on the deliberations of the committee a National Natural Disaster Knowledge Network has been proposed. It was also felt that National Centres of Excellence be established.

Human endeavour to prevent and mitigate disasters can be successful only with the aid of an effective knowledge base. A country like India, which is rich in knowledge, both traditional and modern, needs to utilise this base for more effective disaster management. It was realised that an integration of modern scientific knowledge and disaster information presently available in conjunction with the traditional knowledge would be beneficial in planning for disaster management. Each disaster situation is a unique event, which needs to be recorded for posterity in order to draw appropriate lessons. It is in this context that the concept of networking of knowledge is being evolved. The process of recording data during any disaster situation has to be properly structured for different types of disasters, for which networking of knowledge would be essential. This exercise would also be useful in forecasting disaster situations.

A national workshop on Networking of Knowledge based Institutions was organized by Disaster Management Institute, Bhopal on the 14th & 15th of July, 2000 under the aegis of the HPC. This workshop provided an opportunity for the participants to know about the knowledge already available with different institutions to cope with disasters as also the scope of further research and improvement of the existing knowledge base. A group of eminent persons from the field of science and technology were commissioned to prepare a blueprint of the proposed network encompassing all branches of science and technology. Three organisations were identified as nodal agencies for networking the knowledge based institutions. These are:

CRRI, New Delhi	-	Natural Disasters
IICT, Hyderabad	-	Man-made Disasters
ICMR, New Delhi	-	Biological Disasters

Since then two more workshops have been organised at IIPA, New Delhi on March 7, 2001 and May 10-11, 2001 in which the nodal organisations were requested to make presentations of the status of their respective groups.

Culture of Prevention

One of the many lessons learnt by victims of various natural disasters is that the aftermath of a disaster can be even worse than the disaster event itself. Thus, there is a need to acknowledge the necessity for efforts towards disaster prevention. However, people are often surprised by the concept of reducing disasters. How, it is often asked, can a natural disaster such as an earthquake or a cyclone be reduced or prevented?

Natural occurrences such as floods, earthquakes, cyclones, etc simply cannot be avoided altogether, they are a part of the environment we live in. What can be done, however, is to take preventive measures at various levels of society in order to make the impact of such natural hazards as harmless as possible for people and people's properties. The impact of a natural hazard can be reduced, its worst effects can be prevented.

> Active involvement in prevention of disasters requires commitment from all groups of society: international and regional organizations, national governments or private firms, local administrations or specialized associations.

Early Warning

Building codes do not exist against storm surge inundation. Prescribed means today to save life and properties against storm surge inundation is to evacuate people to safer places as quickly as possible on receipt of warnings. Coordinated early warning systems against tropical cyclone are now in existence around the globe and it is possible to warn the affected population at least 24 to 36 hours in advance about the danger from a tropical cyclone. By taking advantage of early warning systems, it is now possible by prepared and knowledgeable communities to minimize the loss of lives and properties.

Development Planning

There is a need to integrate development plans and regulations with disaster-mitigation. The construction of roads, railway lines, bridges, etc should be according to the topography and geology of that area in terms of risk and vulnerability. All development projects (engineering and non-engineering) including irrigation and industrial projects should be targeted towards disaster-mitigation.

Environmental protection, afforestation programmes, pollution control, construction of earthquake-resistance structures should have priority for implementation.

The communities actively involved in working on prevention of natural disasters before they strike belong to all groups of society: international and regional organizations, national governments or private firms, local administrations or specialized associations.

What is important is to introduce a culture of prevention in disaster managers and all communities, at all levels: action to save lives must be taken before disaster strikes.

7

Operational Framework

We have an elaborate system of constitutional, legal, and tiered organizational framework. It works with a defined team of role players that now need to have their roles redefined or realized to full capacity. Human resource development, information systems, health and medical facilities, communications, youth movements etc all need to be revamped to support the cause of developing a Disaster Free India.

Part I: Frameworks

Constitutional Framework

The subject of disaster management does not find mention in any of the three lists in the 7th Schedule of the Constitution. However, the State Governments are provided financial assistance for meeting expenditure on identified natural calamities on the basis of the recommendations of the Finance Commissions inorder to ensure that the assistance is used only for calamity relief. A Calamity Relief Fund has been constituted by each State, where annual assistance is credited and utilized on the basis of guidelines issued by the Union Ministry of Finance.

A subject that is not specifically mentioned in any of the lists would ordinarily have to be dealt by the Union Government under Entry 97 of the Union List. However, the primary responsibility for management of any disaster, on its occurrence, is borne by the State Government and, at its first stage, by the district administration, whatever may be its nature. Plans for the management of

different type of disasters identified by the HPC are hardly available for any district, except for some natural calamities such as droughts and floods, and in some cases cyclones. In recent years, States prone to cyclones and to some extent earthquakes have started preparing comprehensive plans area-wise and district-wise. But in most States disasters of various nature are handled on an adhoc basis, and the funds are made available for specific incidents.

The only two entries in the State List that are remotely related to the subject of disaster management are entry 14, which deals with agriculture, including protection against pests and plant diseases, and entry 17, which deals with water, including water supply, drainage and embankments. The HPC strongly felt that this is grossly inadequate, and that Disaster Management needs to be included in the Seventh Schedule of the Constitution under whichever list is felt most appropriate.

The proposed National Calamity Management Act envisages the formation of a National Centre for Calamity Management for the purpose of effective management of all disasters arising out of calamities.

Legal Framework

There is no enactment either of the Union or of any State Government to deal with the management of disasters of all types in a comprehensive manner. The Environment (Protection) Act, 1986 was passed for the 'protection and improvement of environment and the prevention of hazards to human beings, other living creatures, plants and property.' The Ministry of Environment and Forests prepared and published the Rules on 'Emergency Planning, Preparedness and Response for Chemical Accidents' in 1996 only. These rules pertain to toxic and hazardous chemicals, and provide a reference mechanism for the Central, State, district and local levels.

The Public Liability Insurance Act, 1991 casts a responsibility on the owner of a unit producing hazardous substance, as defined in the Environment (Protection) Act, 1986, to provide immediate relief where death or injury to any person or damage to any property results from any accident to the extent indicated in the Schedule to the Act. The owner has been required to make one or more insurance policies so that the liability for providing relief is covered by a policy.

In the absence of an enactment, the HPC has prepared a "National Calamity Management Act"; the draft of which has been circulated to all the States as well as all the concerned ministries of Government of India for their comments. The Act aims at ensuring efficiency and effective management of natural and other calamities, for 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.

The proposed National Calamity Management Act envisages the formation of a National Centre for Calamity Management for the purpose of effective management of all disasters arising out of calamities. Refer Annexure 5: National Calamity Management Act)

A Committee to prepare a Model State Disaster Management Act was constituted by the HPC. This Committee had the mandate to prepare the draft Act within two months time, under the chairmanship of Shri P.K Mehrotra, Director General, Madhya Pradesh Academy of Administration, Bhopal. The Committee perused disaster-related legislation in several countries such as the Robert T. Stafford Disaster Assistance and Emergency Relief Act of USA and decided to adopt relevant aspects suitable to Indian conditions. The Committee also decided to take into account available codes and relief manuals and the relevant Acts related to Disaster Management in India in preparing the Model Act. The Committee met on two more occasions and finalised the draft of the Model State Disaster Management Act. (Refer Annexure 8: Model State Disaster Management Act). A copy of

this draft Act was also circulated to the State Chief Secretaries and Relief Commissioners of all states and DGs of all state ATIs for their comments, suggestions and further follow-up actions. It was submitted as part of Interim Report I, and was accepted by the Central Government, and circulated to all Chief Ministers.

Building Codes and ByeLaws: Proper conceptualization, risk evaluation, proper designing, construction and maintenance of houses and building are all disaster reduction measures. Compliance to building guidelines and codes covering all aspects of disasters needs to be addressed by building codes and bye-laws and these need to be uniform as far as possible. The situation warrants a high degree of coordination between organisations involved in the formulation of the building codes. Setting up of "Disaster Hazard Mitigation Codes Coordinating Group" is required that would look into the existing gaps and fill them. *It has been suggested that 'Building Code Formulators and Administrators Conference of India' (BUCFAC) be created to discuss common problems and concerns and provide feedback on code enforcement, implementation problems and gaps.*

Building codes and standards need to be made a part of the building byelaws and regulations thereby forcing the developers, engineers, architects and engineers in adhering to them.

Organisational Structure

Disaster management needs a dedicated political commitment at all levels of national and local government. A structure with clearly defined authority and appropriate budget to maintain an effective disaster plan is needed. Preparedness plans should be comprehensive in scale and operational, ideally through a nominated national body.

Disaster management planning is a sequential and continuous process. Good planning requires diagnosis, resource evaluation and feedback towards fulfilling the goal of disaster reduction. Due to the wide scope of disaster management and the numerous actors involved, it is essential that a framework for coordination is accepted and provided for. Management is needed at all stages of a disaster: The Disaster Event, Recovery Phase for relief, rehabilitation and reconstruction or Mitigation Phase. The HPC took note of the ongoing proposal for raising of a Specialised Disaster Relief Organization (SDRO), and in due consideration of this along with other options available and best practices studies, evolved a comprehensive organisational structure for disaster mitigation and management in the country.

The national approach has to be to consider the full cycle of disaster management activities, and the HPC therefore, after weighing all options arrived at the recommendation of a separate ministry.

Central Level

At the national level, a National Crisis Management Committee, headed by the Cabinet Secretary, has been constituted with the nodal ministries in charge of various types of disasters and supporting ministries as members. The Central Relief Commissioner functions as the coordinator at the national level, under whom a Crisis Management Group (CMG) has been constituted. The CMG meets as often as required in the wake of natural hazards to co-ordinate at the Central level and also liase with the State Government. The national Contingency Action Plan (CAP) facilitates launching of relief and rescue operations without delay. The CAP identifies initiatives to be taken by various Central Ministries and Public departments in the wake of natural hazards, sets down procedures and determines focal points in the administrative machinery.

The Department of Agriculture and Co-operation (DAC), within the Ministry of Agriculture, acts as the nodal Department for Disaster Management. In the DAC, the Relief Commissioner functions as the nodal officer to coordinate relief operations for all natural disasters.

Besides the Ministry of Agriculture other ministries are assigned responsibility of disasters that fall in their preview of activity such as railway or aviation accidents etc.

The HPC deliberated at length on the need for a comprehensive and efficient national level disaster management system, and recommended that a separate Ministry of Disaster Management be created which may subsequently create appropriate instrumentalities, including authorities and centres such as the NCCM, or strengthen and utilise existing centres, for support functions. With the kind of direction we seem to be moving in, that is multi-hazardous and comprehensive management approach, the national approach has to be to consider the full cycle of disaster management activities, and the HPC therefore, after weighing all options arrived at the recommendation of a separate ministry.

The strength of creating State level centres/ agencies/bodies be appreciated and adhered to during plan preparation

The HPC further is of the view that it is positive development that an All Party National Committee on Disaster Management has been constituted, chaired by the Prime Minister. Keeping in mind the importance of this issue and the high level of this body, it is recommended that this be converted into a National Council. The National Council and the Working Group may thus be two standing bodies on disaster management.

The move to establish the Empowered Group of Ministers may be further consolidated through the formation of a Cabinet Committee on Disaster Management. This is felt necessary due to the kind of elaborate follow-up action that will be required to make disaster mitigation and preparedness a regular agenda of the government for which a clear cut mechanism needs to be available. It is thereby recommended that the Cabinet Committee be a government body and the National Council be an all party body for this purpose. For implementation and follow-up action by these two bodies, a high level body of experts is required, which is a role that can be played by the Working Group on Disaster Management, which will be a standing body as part of the sub-committee of the National Council, under the Vice-Chairman's leadership. Keeping in view the additional work that the Working Group has to undertake for operationalization of the National Response Plan, and State and District Disaster Management Plans; the Working Group will steer and supervise these activities which will be carried out by the nodal institutes including National Centre for Calamity Management and National Centre for Disaster Management/National Institute of Disaster Management along with suitable technical institutions. It is also recommended that a Scientific and Technical Advisory Committee be constituted to assist the Working Group. The Committee will be a powerful subset of the Working Group such that the Working Group always has the benefit of best advice in science and technology, including appropriate technology, technological upgradation and identification of need for development of new technologies. (Refer Annexure: National Disaster Management System).

State Level

In the context of the Federal structure of the country, the responsibility to cope up with natural disasters is essentially that of the State Government. The role of the Central Government is supportive in terms of supplementation of physical and financial resources.

Most of the States have Relief Commissioners who are in charge of relief and rehabilitation measures in the wake of natural disasters in their States. The Chief Secretary is in overall charge of relief operations in the State and the Relief Commissioner and Additional Relief Commissioners function under his direction and control. In many States, Secretary Department of Revenue is also in-charge of

Relief. State Governments usually have Relief Manuals and the districts have their Contingency Plan that is updated from time to time. In case of a disaster, the State Government also invites NGO's and other national and international relief organisations to join in the efforts to reach out to the victims.

The HPC took special note of the recent positive developments that have taken place in the new State of Uttaranchal, where a separate Department of Disaster Management has been created under a Minister of Disaster Management and Health. The State has also created the position of a Principal Secretary of Disaster Management. The HPC took note of the change of nomenclature also, from Relief to Disaster Management. The Uttaranchal State Government is also making a move to creating a Disaster Management and Mitigation Centre under the Department of Disaster Management. The HPC recommends this model to be appraised before taking up of State Disaster Management Planning exercise by individual States, and the strength of creating State level centres/agencies/bodies be appreciated and adhered to during plan preparation.

District Level

The district administration is the focal point for implementation of all government plans and activities. Considerable powers have been vested in the District Collector to carry out relief operations in the shortest possible time. In the event of shortage of funds, he is also empowered to draw money from the district treasury under the emergency powers.

The district administration is also required to prepare an advance Contingency Plan depending on the type of disaster likely to affect the district. The actual day to day function of administering relief is the responsibility of the Collector/District Magistrate/Deputy Commissioner who exercises coordinating and supervising powers over all departments at the district level.

There is also a district level Relief Committee consisting of officials and non-officials including the local legislators and Members of Parliament to review relief measures.

A district is divided into sub-divisions or Tehsils or Talukas. While the head of the sub-division is called the sub-divisional officer, the head of the Tehsil is generally known as Tehsildaar (Talukdar or Mamlatdar in some States). At the Block or Circle level, there is the Block Development Officer or Circle Officer who looks after relief works. At the village level, the Patwari or the village-level worker remains in contact with the villages under his charge.

Some Recent Initiatives

The Establishment of State Disaster Management Authorities In Gujarat And Orissa

The existing administrative structure to deal with the ravages of the earthquake were not found satisfactory and hence the Gujarat government constituted "The Gujarat State Disaster Management Authority" on 8th February 2001 with the Chief Minister as the Chairperson and ten other members. The Resolution spoke of the need for a permanent arrangement to handle a calamity. It is therefore evident that the existing disaster management system at the State level was found inadequate.

The objectives of the Gujarat State Disaster Management Authority are the following:

1. To undertake rehabilitation and reconstruction as also social and economic activities for restoration of the situation.

2. To make efforts to minimise the impact of natural disasters.

3. To make the best use of funds, grants, donations, assistance etc received from the government of India and other foreign countries or any other institution/persons for prevention of such natural calamities or handling the after effects.

The jurisdiction of this authority will be the entire State and it will work as an autonomous body. It has been registered as a Society under the Societies Registration Act,1860. The Government of Gujarat has also created a separate Rehabilitation and Reconstruction Division under the General Administration Department of the State Government and the work of the Gujarat State Disaster Management Authority has been transferred to the General Administration Department.

Further, the State Government constituted a taskforce to suggest effective measures for preparation of a long-term Disaster Management Plan, headed by the Chief Executive Officer of the Gujarat State Disaster Management Authority.

The Gujarat State Disaster Management Authority constituted on the pattern of a similar authority formed in Orissa earlier, has a C.E.O and two Additional C.E.Os. It has six Directors and a Chief Engineer who look after different aspects of work relating to disaster management. The Chief Minister is the chairperson of GSDMA and it meets at least once a month. It has the powers of the State Cabinet.

Besides this, two committees have been constituted for redressal of grievances – one at the District level, which is headed by the Minister in charge of the concerned districts and the other at the village level headed by a officer not below the rank of the deputy collector or Mamlatdar.

It was learnt that the Disaster Management Cell which is at present functioning at the District Collector's level may be transferred to GSDMA.

The District Collector with the help of the Deputy Collector looks after the requirements of the urban areas and the District Development Officer looks after the rural areas. Reconstruction cell has been created in each affected district and in every line department, chief coordinators have been designated to smoothen over the problems. It is also proposed to establish regional centres and work on:

1. Search and rescue teams to be attached to the regional centres of GSDMA
2. Making inventory of resources.
3. Risk transfer through insurance cover.
4. To shift the focus from relief to reconstruction and disaster mitigation.
5. Disaster planning through creation of a task force at the State level.

The setting up of the GSDMA followed the setting up of a similar authority, the OSDMA in Orissa following the 1999 super cyclone. Thus, we see that with the establishment of the Gujarat and Orissa State Disaster Management Authorities a central authority has been created at the State level that will take up social and economic activities for rehabilitation and resettlement of the affected people in the shortest possible time.

Suggestions emerging from deliberations on organisational structure:

1 An 'All Hazards Management System' with an integrated institutional structure be set up.

2 Nodal ministry not to be Ministry of Agriculture keeping in view the global security environment and threat of weapons.

3 Specialized Emergency Operations teams and medical Assistance teams to be instituted.

4. There is a need to integrate Development Plans and Regulations with disaster-mitigation.

   - The construction of roads, railway lines, bridges, etc., should be according to the topography and geology of that area in terms of risk and vulnerability.
   - All development projects (engineering and non-engineering) including irrigation and industrial projects should be targeted towards disaster-mitigation.
   - Environmental protection, afforestation programme, pollution control, construction of earthquake-resistance structures should have priority.

The role of the State Disaster Management Authorities, constituted by Gujarat and Orissa should be defined. Their relation with the District Collectors has not been properly defined. They could switch from their current role of a fund management and reconstruction entities to entities focussing on disaster-mitigation.

The office of Special Relief Commissioner needs to be strengthened.

District administration is a vital part of our disaster management system. It is, therefore, essential to develop this level of the government machinery with respect to disaster management operations in cohesion with the local community.

There is a multiplicity of tasks at hand. Both for planning and actual handling of disaster situations there should be a clear-cut demarcation of responsibilities and an effective system of co-ordination and support through appropriate administrative and organisational arrangements. Disaster management systems need to be revamped at different levels.

The most recent example is of the DMMC (Disaster Mitigation and Management Centre) established by the Government of Uttaranchal. This is a pathbreaking initiative as in contrast to the authorities set up in Orissa and Gujarat, this is an intervention made before a disaster strikes in a known vulnerable area.

PART II: INSTRUMENTS

GOVERNANCE

Disaster management should be seen as a part of good governance. The 73rd and 74th constitutional amendments have been a turning point for the Panchayati Raj Institutions and the Urban Local Body System. The amendment recognises these bodies as "Institutions of Self- government". It has also laid down necessary guidelines for the structure of their composition, powers, functions, devolution of finances, regular holding of elections and reservation of seats for weaker sections including women. These institutions can be effective instruments in tackling disaster through early warning system. They can be relied on at the time of relief distribution, providing shelter to the victims, medical assistance etc since they are closer to the communities. Such organizations are therefore in a better position to undertake such tasks than the State and Central government.

Community mobilisation in disaster situation is extremely important- creation of motivation, community level coordinated action, disaster mitigation education etc are all tasks that can be provided by the Panchayats and Urban Local Bodies.

For the above, it is required that they be involved in the formulation and implementation of disaster management plan and subsequently look into the short term, medium term and long term development plans. Funds or grants need to be earmarked that would be utilized at the time of disasters and to enable them to initiate relief work immediately. *For effective implementation of disaster mitigation*

strategies, training and awareness needs to be provided to the members of local bodies as well as the gram panchayats, thereby setting up a trained task force that would be immediately activated should a disaster strike. They should be provided with training to handle modern communication equipment such as fax, wireless sets etc.

Of critical importance in a disaster situation is coordination between the various government agencies and at all levels — both vertically as well as horizontally.

Health and Medical Care

Health and medical care is one of the most critical and immediate response components in any disaster situation. Adequate planning needs to be carried out for:

- Medical First Responders (MFR)
- Medical Assistant Teams (MAT)
- Mobile hospitals
- Hospital preparedness for mass casualties
- Search and Rescue units
- Epidemic prevention
- Trauma counselling

The entire concept of providing medical assistance in disaster situations needs, besides the emergency response qualities, attention to the concept of 'Healing Touch', to ensure a humane approach through trained personnel and appropriate sensitivity in procedural systems.

It is also required to address the issue of epidemiology as a hazard in itself. The National Surveillance Program for Communicable Diseases (NSSCD) has been launched by Govt. of India to strengthen the disease surveillance system in the country. The main objective of the programme is capacity building at district and state levels so that early warning signals of outbreaks are recognized and appropriate timely follow-up action is initiated. The programme is coordinated at the Central level by the National Institute Of Communicable Diseases, Delhi. The ICMR engages in surveillance through a network of its Institutes.

India is highly vulnerable to diseases, which includes Japanese Encephalitis. NIV investigated many epidemics and outbreaks of JE and carried out several serosurveys. Reports indicated that children between 5-15 are highly affected. Pigs and water frequenting birds play important role to amplify host. NIV has investigated several epidemics/outbreaks of dengue fever which breeds in domestic and peridomestic surroundings in stored water and water bodies. Epidemics of classical measles and also unusual measles manifestation have been investigated, such as the investigation of outbreak of measles in young infants below 4 months of age in Pune and investigation of unusual outbreaks of encephalitis without rash in children from North, West and South India. ICMR have investigated 65 outbreaks of viral hepatitis throughout the country. During 1999, 25 outbreaks in different parts of Maharashtra and one outbreak in Pathankot were seen logically to be due to HEV. Enterovirus Research Centre initiated poliomyelitis surveillance in Mumbai in 1950. The Center has 50 years continuous data on poliomyelitis. Their study shows widespread circulation of very closely related 3 strains of poliovirus in UP, Bihar, Delhi, Haryana, Punjab, West Bengal, MP, Maharashtra and Karnataka. One of the largest studies on sub typing of HIV-1 prevalent in India has been carried out at NARI, Pune. Identification of recombinant strains is very important in HIV control strategies especially vaccine development. In India all species of An. culifacies complexes provisionally designed as A,B,C,D, and E have been found. Malaria is endemic in most parts of the country. RMRC, Port Blair plays a leading role in the field of leptosporosis by undertaking studies in different fields like epidemiology, diagnostics, disease

transmission and its control and also investigates outbreaks of febrile illness.

Food poisoning is an acute gastro-enteritis caused by ingestion of food or drink contaminated with either bacteria or their toxins or inorganic chemical substances and poisonous matters derived from plants and animals. Salmonella are wide spread in the environment and their persistence has been shown in environment of human beings, calves, poultry units and other susceptible populations. Brucellosis is primarily a disease of domestic animals and humans get infected indirectly from animals. The disease is of great economic importance by way of loss of livestock and a major concern to public health around the world ever since its recognition over a century back. The disease is located almost everywhere in India.

Climate and Health Studies

Human health is strongly influenced by climate and weather. Firstly, there is a basic effect on the essentials of human life – food and shelter. Climate imposes the need for humans to seek shelter in most of the populated portions of the planet and controls the availability of food. Changes in the environment at the global, regional and local levels determine changes in human health. The urban environment is deteriorating due to high density of population as urbanization has become the keystone to modern activities.

Healing Touch: Socio-Psychological Aspects

World Disaster Report (1996) states that "many factors may affect how an individual reacts to a traumatic event. The most important individual factor is the level of personal loss and the meaning of that loss. Death of a spouse or child will have a significantly greater meaning than loss of a home, career or personal possessions".

Strong sense of self esteem, personal belief system which enhances one's ability to cope with stresses, perceived family support and a strong social support system, and religious affiliation are all factors known to modulate the incidence, pattern, course and outcome of psychosocial consequences of disasters.

Disaster situations cause anxiety, depression and Somatoform disorders in people. In some cases it can result in alcoholism or drug abuse. We need to build up a strong Mental Health Programme to help people reconstruct their lives and communities post disaster. District Mental Health Programme needs to be geared up.

Components of such a programme:

- Community specific mental health services need to be provided.
- For active outreach, genuine concern is needed for productive intervention.
- Interventions must be appropriate to the phase of disaster.

The cadre of trained nurses in the country is a vast potential that needs to be tapped for this aspect as well as general emergency support during disaster situations. Other than this, this whole sector needs special attention through what has to be a research based information and training programme of building confidence back into the people and supporting them with a healing touch.

Use of Technology

The use of state-of-the-art technology is required for effectively implementing preparatory as well as response actions. The key areas to be addressed under use of technology are:

Communications

Technological advancements in the field of communication have made the concept of global village a reality. Communications can be of immense use in effective disaster management by being instrumental in awareness and dissemination mechanisms during preparedness times and for emergency communications during disaster response times.

The use of modern communication is of relevance not only to disaster managers but also at grassroots levels low-cost options such as HAM radios.

HAM

Whether it is cyclone hit Orissa or Bhopal after the gas tragedy, radio hams, have been a lifeline for millions of stricken people.

The first to set up emergency communication systems in cyclone ravaged Orissa, hams are the lifeline in national calamities. From the Bhopal gas tragedy to the Latur and Uttarkashi earthquakes, or the landslides that hit the Amarnath Yatra in 1996, they've proved to be of immense help.

Satellite images give a synoptic overview and provide very useful geomorphologic information for a wide range of scales, from entire continents to details of a few meters.

Within hours of being informed about the cyclone, teams of ham operators rushed from Hyderabad,Bangalore and Calcutta to the affected districts of Orissa. Many hams in fact, actually trekked several kilometers just to track down people. Apart from helping people connect, the HAM averted two major air disasters at the Bhubaneshwar airport. "With the ATCs down, it was upto the hams to provide the planes landed safely,"

The Govt of India has funded National Institute of Amateur Radio for developing the infrastructure. Considering the important role played by NIAR in the recent disasters, it is suggested that HAM systems be made a part of any regular disaster management exercise and be an important communication requirement.

Remote Sensing

Space technology plays a crucial role in efficient mitigation of disasters and help to

i) minimise potential risks by developing early warning strategies.

ii) prepare and implement developmental plans.

iii) mobilise resources including communication and tele-medical services.

iv) help in rehabilitation and post disaster reconstruction.

The use of remote sensing applications help in evolving a suitable strategy for disaster preparedness and operational framework for their monitoring, assessment and mitigation, identifying gap areas and recommending appropriate strategies for disaster mitigation vis-à-vis likely developments in space and ground segments.

With a constellation of both INSAT and IRS series of satellites, India has been able to develop operational mechanisms for disaster warning especially cyclone and drought and their monitoring and mitigation. The vast capabilities of communication satellites are available for timely dissemination of early warning and real time coordination of relief operations. The advent of Very Small Aperture Terminals (VSAT) and Ultra Small Aperture terminals (USAT) have enhanced the capability further by offering low cost, viable technological solutions towards management and mitigation of disasters. Satellite communication capabilities- fixed and mobile are vital for effective communication, especially in data collection, distress alerting, position location and coordinating relief operations in the field. In addition, Search and Rescue satellites provide capabilities such as position determination facilities onboard which could be useful in a variety of land, sea and air distress situations.

Space borne platforms have demonstrated their capability in efficient disaster management. While communication satellites help in disaster warning, relief mobilization and telemedicine support, earth observation satellites have established their unique capability to continuously monitor land and water environments, forest fires, floods, atmospheric disturbances, etc. to provide advance warning of major hazards. Thus, earth observation satellites provide basic support in pre-disaster preparedness programmes, disaster response and monitoring activities and post-disaster reconstruction.

Indian satellites – IRS series and INSAT series are currently being used for obtaining information necessary for disaster management, communication, disaster warning and search and rescue activities. The WiFS sensor on board the IRS-1C and IRS –1D is of special significance to disaster monitoring due to its wide swath and revisit period of 5 days. INSAT data collection systems can be made use of for monitoring disaster related parameters in critical locations. Data related to meteorological, hydrological and environmental parameters as well as events such as earthquakes, floods, forest fires, etc. can be monitored to provide alert signals. Beginning with INSAT-2A, there is also a Search and Rescue transponder in the INSAT series, which provides real time relay of distress signals from within the footprint of the antenna. Table 3 summarizes the characteristics of various satellites launched under the Indian Space Program giving details of spatial resolution, swath, repeativity and application areas.

Nowadays we have access to information gathering and organizing technologies such as remote sensing and geographic information systems (GIS), which have proven their usefulness in disaster management (CEOS, 1998; ISU, 1993; Lee and Davis, 1998). In more ways than one, remote sensing is ideally suited for disaster management: First of all it provides a data base from which the evidences left behind by disasters that have occurred before can be interpreted and combined with other information to derive at hazard maps, indicating which areas are potentially dangerous. Satellite images give a synoptic overview and provide very useful geomorphologic information for a wide range of scales, from entire continents to details of a few meters. Secondly, many types of disasters, such as floods, drought, cyclones, volcanic eruptions, etc. will have certain precursors. Satellites can be used to detect the early stages of these events as anomalies in a time series. Images are available at regular short time intervals, and can be used for the prediction of both rapid and slow disasters. Then, when a disaster occurs, the speed of information collection from satellites and the possibility of information dissemination with a matching swiftness make it possible to monitor the occurrence of the disaster. Many disasters may affect large areas and no other tool than remote sensing would provide a matching spatial coverage. Remote sensing also allows us to monitor the event during the time of occurrence while the forces are in full swing. The impact and departure of the disaster event leaves behind an area of immense devastation. Remote sensing can assist in damage assessment and aftermath monitoring, providing a quantitative base for relief operations. Finally, satellite data can be used to map the new situation and update databases used for the reconstruction of an area, and to prevent the recurrence of the disaster.

The relief support in the event of a disaster necessitiates image and data of the affected areas with quick turn-around-time. Frequent cloud cover is the primary hindrance to visibility over the affected areas. Aerial photography provides an ideal solution to acquire data at short notice and use of sensors such as Synthetic Aperture Radar (SAR) has the capability for cloud penetration and all weather observation. The aerial data so collected also needs to be processed urgently to support relief operations.

India has it's own earth observation programme, and expertise is built-up in a wide variety of remote sensing applications. The development of a remote sensing based disaster management programme is especially important for India, for several reasons described below.

India has the second largest population in the world, and the rapid population growth leads to dramatic increase of the country's' vulnerability to natural disasters.

In order to effectively utilize remote sensing for natural disaster reduction in India it is equally important to set up a network of organizations dealing with this problem, to develop techniques specifically adapted to the regional situation, and to train many persons in utilizing these techniques at various institutional levels. The Indian Institute of Remote Sensing (IIRS) has three decades of experience in resource identification, analysis and operationalization of remote sensing. Its basic mandate to train scientific workers has effectively resulted in a national trained manpower in satellite data utilization. The institute possesses the needed technological background and organizational maturity to dedicate itself to the cause of disaster management.

The use of remote sensing in disaster management is increasing. Pre-disaster uses include risk analysis and mapping; disaster warning, especially cyclone tracking, drought monitoring, volcanoes, large-scale fires and agricultural production; and disaster assessment, especially flood monitoring and assessment, estimation of crop and forestry damages, and monitoring of land-use changes in the aftermath of a disaster. Meteorological satellites monitor weather patterns, detect and track storm systems, and monitor frosts and floods.

While geo-stationary satellites provide continuous, synoptic observations over large areas (like continuous weather watch, including cyclone monitoring capabilities), low earth orbiting satellites have the advantage of providing much higher resolution imageries, even though at a low temporal frequency. Satellite communication capabilities – fixed, mobile, personalized are vital in a large number of disaster management situations, especially in data collection, distress alerts, position location and coordinating actual relief operations in the field. In addition search and rescue satellites provide capabilities such as, position determination facilities onboard which could be useful in a variety of land, sea and air distress situations.

Thus, a combination of remote sensing, meteorological and search and rescue satellites at LEO and communication and weather satellites at geo-stationary orbits provide appropriate information for effective disaster management. Disaster management system, which involves both short and long term strategies, must integrate the functions related to disaster mitigation prior to the onset of disaster and implement the relief operations once the unavoidable extreme disasters occur. Efficient delivery and co-ordination of disaster relief measures is equally important to ensure amelioration of the affected population and areas.

In recent years, considerable understanding has been gained on the evolution and characteristic features of various disasters including floods, earthquakes, cyclones, droughts, landslides, etc through satellite remote sensing. India, with its varied geographical, geological and climatic conditions has faced major disasters like: cyclones in the coastal regions of Southern India, floods in the river valleys of Ganges, Yamuna, Brahmaputra, Godavari, Krishna, etc.; earthquakes in the Himalayas, Kutch, NE regions, the Lattur earthquake, landslides in the sub-Himalayan regions of North India, drought in the major arid and semi-arid tracts of Central/Southern India; major diseases like malaria/encephalitis in Delhi, plague in Surat, catastrophes like the Bhopal gas tragedy, building collapses in Mumbai, fire in Delhi, floods in Hyderabad, and the most recent Bhuj earthquake in Gujarat, which recorded 7.9 on the Ritcher's scale, etc. The most important application of satellites in disaster management lies in detecting, providing and delivering early warnings using earth observations and communication capabilities offered by various sensors on board satellites. Both earth observation and communication satellites play an important role in providing:

- disaster alerts,
- locating the disaster stricken area,
- continued accurate and timely monitoring and assessment of the current status of damage and post disaster situation
- efficient delivery of aid, and
- aid co-ordination with the Central Relief Management Agency.

Satellites are particularly suited to deliver locale specific disaster warning communications to those entities/groups/ persons located in remote, rural and underdeveloped areas and in providing communication support for administrative actions towards emergency preparedness. The existence of satellite based surveillance system to track the evolution of cyclonic storm in the 1990 Andhra cyclone, for example enabled the authorities to evacuate 60,000 people to safe shelters. The death toll during this period was limited to 1000 as compared to 20,000 killed by an earlier cyclone in 1977. This has been made possible through satellite based weather forecasts and advance warnings of severe weather. Such forecasts help in minimizing the loss of life and other damages thus facilitating emergency operations, relief and rehabilitation. This example of hazard reduction effort clearly demonstrates how a focused application of available technologies can significantly reduce disaster proportion of natural hazards.

Remote sensing technology and GIS technologies hold the potential for effective support in the events of:

- Cyclones
- Floods
- Droughts
- Crop pests and diseases
- Forest fires

Work is continuing to enhance the capabilities of these technologies to be more effective in earthquake and landslide situations also.

The HPC fully recognized the importance of geoinformatics in disaster management and laid stress on its incorporation in the National Response Plan as well as Preparedness and Mitigation Plans at all levels. The role of the Indian Institute of Remote Sensing was examined by the HPC and it took special note of some recent initiatives taken by the IIRS which include development of new course curricula on environmental assessment and disaster management, improvement and upgradation of educational and research facility for disaster management and a comprehensive strategy for human resource development.

Analysis of geographic features with a GIS allows the analyst to view new patterns, trends, and relationships that were not clearly evident without visualization of the data especially in the case of a disaster.

Geographical Information System (GIS)

Geographic Information System (GIS) software uses geography and computer-generated maps as an interface for integrating and accessing massive amounts of location-based information. This unique characteristic of a GIS makes it an effective tool in the field of disaster response and preparedness. It can be used for scientific investigations, resource management, disaster and development planning. For example, a GIS might allow emergency planners to easily calculate emergency response times in the event of a natural disaster, or a GIS might be used for locating wetlands that need protection from pollution.

GIS applications offer numerous advantages for disaster management systems in various areas:

- In the Disaster Management cycle
- In disaster response
- L3 Declaration
- Quick response
- Continued response
- In preparedness for disasters (L0 phase)
- Water and climate related disaster

- Geology related
- Biology related
- Accident related
- Nuclear and chemical hazard related

GIS allows public safety personnel to effectively plan for emergency response, determine mitigation priorities, analyze historical events, and predict future events. GIS can also be used to get critical information to emergency responders upon dispatch or while en route to an incident to assist in tactical planning.

Disaster resistant development practices need to be incorporated in higher level education systems, at college level and particularly in technical education streams such as engineering, architecture and development planning streams

It also enables international agency staff to integrate data for planning and implementation purposes. Analysis of geographic features with a GIS allows the analyst to view new patterns, trends, and relationships that were not clearly evident without visualization of the data especially in case of a disaster. GIS can also be used to get critical information about a humanitarian crisis to appropriate response agencies in a coordinated and efficient manner. Once in the field, the coordination can continue as new data can be added and disseminated via wireless applications and Internet/Intranet connectivity.

GIS applications are very appropriate tools for endeavors such as geo-spatial data, infrastructure creation, geo-informatics capacity building, geo-chemical mapping of the country and mapping of priority sectors.

Capacity Building

In an effort to sensitise the role players towards disaster management efforts in the States, a few training programmes were organized under the aegis of the HPC as follows:

- Training programme for Relief Commissioners – organised by Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie on April 26-27, 2000.
- Training programme for ATI faculties - organized by Lal Bahadur Shastri National Academy of Administration (LBSNAA), Mussoorie on May 15 – 16, 2000.
- Sensitisation Programme relating to the Trigger Mechanism for Personnel from PSUs as well as Central Ministries and Departments – organised by the National Center for Disaster Management (NCDM) from July 26-28, 2000.

The LBSNAA, the State ATIs and the NCDM are emerging as parts of a nationwide training structure for Disaster Management, which would need further strengthening.

A National Fund for Disaster Mitigation of Rs. 500 crores for human resource development has been suggested by the HPC.

The structure of a National Disaster Management System and the National Centre for Calamity Management (NCCM) as suggested by the Eleventh Finance Commission has been evolved by HPC.

> Capacity building is a complex, long-term phenomenon requiring the development of human resources, the establishment of well functioning organisations within a suitable work environment and a supportive socio-political environment, for improving the performance of institutions and personnel.

For planning at all levels, capacity building is critical. Appropriate level of training and knowledge availability is required otherwise such plans would tend to be incomplete and short sighted. A step towards disaster mitigation and in an effort to reduce the scale of losses, the component of building capacities of the vulnerable communities and the other role players such as government, international aid agencies, public and private sector, NGOs/ CBOs gains significant importance and need to be

woven into the development policies and programmes initiated by the government. The basic aim underlying such action is to strengthen awareness and response.

- Capacity Building in Disaster Management has to be at Policy, Institutional and Individual level.
- Capacity Building needs to be done in terms of Resources, Skills and Information availability.
- Capacity Building includes development of appropriate tools that can be used to convey as well as elicit useful information pertaining to disasters from the citizens at large and vulnerable sections in particular.

Human Resource Development

Training is an integral component of capacity building. It needs to however be designed for specific needs and equipped with a practical technically sound approach. Strengthening of resources and information is also essential to capacity building for a coordinated quality effort. Role players in disaster management include Government Organizations, NGOs, CBOs, International development aid agencies and donors, academic institutions, private sector organizations, religious organizations, defence (Army, Navy, Air-Force), home guards, police, and the community. Since each of these have specific work areas, strengths and weaknesses, it is important for them to complement each others efforts for achieving an efficient overall disaster management system. It has to be a true enterprise of public-private partnerships in the flow of skills, finances and specialized personnel or institutional knowledge. Media can play an important role to highlight the vulnerable condition of the community that is acutely affected at the time of disaster and can become an active medium for community awareness.

A network of training institutions led by a national level disaster management institute with symbiotic linkages with other National and State level institutions like National Civil Defence College, National Fire Service College, ATI's, Disaster Management Institutes, National Institute of Rural Development, State Institutes of Rural Development (SIRD), Indian Institutes of Technology, Indian Institutes of Management etc. will need to be forged and developed.

The networking concept has to be one of building partnerships. The basic premise is that all players are important and can contribute to the cause.

Awareness of natural hazards and disaster mitigation techniques can be facilitated by effective networking of all major players.

All the activities of NCC tend to develop trained and disciplined manpower to help the country in the eventuality of disaster emergency.

National Institute of Disaster Management

The issue of a National Institute of Disaster Management, to be established as a Center of excellence in the area of disaster management has been debated on numerous earlier occasions. The matter had been considered by the Ministry of Agriculture and the Planning Commission, and also came up as a strong recommendation from consecutive IDNDR seminars organized by the National Centre for Disaster Management. However, it was felt then that the time was not ripe for establishment of this intensive a resource. The HPC feels that the time is now ripe, and in view of an urgent need that has been felt in the country for trained disaster managers, particularly in the aftermath of recent mega disasters, for such an institute to be set up. A blueprint for the institute has been conceptualized by the HPC. (Refer Annexure : NIDM:A Vision Document).

Education and Youth Movement

The HPC considered education as one of the most important thrust areas in order to achieve its defined paradigm shift from a culture of response to culture of preparedness. It was strongly felt that prevention, mitigation and preparedness are possible only through large-scale awareness and knowledge generation, for which the education sector needs to play a critical role.

Basic Education System

The debate over inclusion of disaster management in educational curricula at school and college education has been going on for a long time. The biggest argument against inclusion of another subject to the curricula has been the overburdening of the children. It is in this line that the option of inclusion of disaster preparedness and mitigation aspects along with current related curricular components, or as informal inputs needs to be examined. It was deliberated and recommended that regular co-curricular activities such as painting activities, posters, games, media activities etc be taken up in schools to create awareness on disaster management amongst young citizens. Teachers are a critical resource for disaster mitigation and preparedness programs, and as such orientation, sensitization and training programs for teachers are required in order to effectively operationalize disaster preparedness programs in educational institutions.

College and Technical Education System

Through various deliberations it was strongly felt that the aspect of disaster management and disaster resistant development practices needs to be incorporated in higher level education systems, at college level and particularly in technical education streams such as engineering, architecture and development planning streams. It was recognised that the NCDM has been organizing periodic disaster management education camps in colleges and universities across the country, but the need was felt to strengthen the system and institutionalise it by carrying an in-depth appraisal and appropriate action to include disaster management as an integral part of higher level education.

National Cadet Corps

The National Cadet Corps (NCC) came into existence on the 16th July, 1948 under the NCC Act XXI of 1948 under the Ministry of Defence with the following objectives:

1. To develop character, comradeship, ideals of service and capacity for leadership in the youth of the country;
2. To stimulate interest in the defence of the country by providing service training to the youth; and
3. To build up a reserve to enable the Armed Forces to expand rapidly in a national emergency.

The NCC was given an inter-services image in 1950 when the Air Wing was added followed by the Naval Wing in 1952. In 1952, the NCC curriculum was also extended to include community development as part of the NCC syllabus at the behest of late Pt. Jawaharlal Nehru. In December 1972, an evaluation committee was set up under the chairmanship of Dr. GS Mahajan, Vice Chancellor of Pune University which recommended the following aims for NCC:

1. Development of leadership, character, comradeship, spirit of sportsmanship and ideals of service.
2. To create a force of disciplined and trained manpower which, in a national emergency, could be of assistance to the Army.
3. To provide training to students, with a view to developing in them officer-like qualities, thus also enabling them to obtain a Commission in the Armed Forces.

Activities of the NCC fall under the following categories:

1. Institutional Training
2. Community Development
3. Youth Exchange Programme
4. Sports
5. Adventure Training

A study of the role of NCC in Disaster Management activities brings out the following points:

- The physical fitness including their participation in adventure, sports and games to make them eminently suitable for assisting the country in such situation.
- Activities to shape defence force aims and objectives. As defence forces are sometimes required to work in disaster management area, the NCC also tries to give some similar inputs to NCC Cadets, and some training inputs are there in their activities which enable them to provide first-aid services.
- All the activities of NCC tend to develop trained and disciplined manpower to help the country in the eventuality of disaster emergency.

Bharat Scouts and Guides

The Boy Scouting and the Girls Guiding as movements started in India in 1909 and 1910 respectively. In the beginning, there were three separate organizations, viz. 1. The Boy Scouting Organization; 2. The Hindustan Scouts Association, and 3. The Girls Guide Organization. After India got Independence, the Boy Scouts Association and the Hindustan Scouts Association merged on 7th November 1950. The Girl Guides Organization also joined them on 15th August 1951. Thus, came into existence the Bharat Scouts & Guides.

Level-Wise Objectives:

- To make boy scouts and girl guides resourceful, self-reliant, and ever helpful towards others.
- To enable them discover their latent faculties and talents.
- To enable them to express them creatively.
- To promote character-building spirit of adventure and spirit of service amongst the youth.

These objectives were discussed with the organizing officers and studied with relation to organizing activities. Thus, working objectives of BSG can be stated as:

- Providing recreational and enterprising expression to students, providing expressions which go a long way in developing endurance.
- Providing opportunities to serve the society.
- Building competencies to survive in difficult situations.
- Providing experience or increase the degree of preparedness and minimizing response time in the event of disaster.

Thus, it is seen that the major emphasis in their training is on resourcefulness, self-reliance, character building and service to the community. With certain skills such as first-aid and providing relief, the Scouts can be good resource in disaster scenarios especially when it comes to distribution of food and other relief material to the victims of disaster. However, there is a need to focus on those activities to enable them to become effective disaster management volunteers specially in strengthening communication network and in certain cases even in rescue work.

National Service Scheme

National Service Scheme (NSS) was

The digitized version of hazard maps when overlaid on infrastructure map can help us identify elements at risk and the consequent economic worth of loss for any given disaster scenario.

introduced in India in a formal way in 1969. The central theme, which Mahatma Gandhi tried to impress upon his student-audience time and again, was that they should always keep before them, their social responsibility. The foremost duty of the students should be not to treat their period of study as one of the opportunities for indulgence in intellectual luxury, but for preparing themselves for final dedication in the service of those who provided the sinews of the nation with the national goods and services so essential to the society. The Central Advisory Board on Education (CABE) in 1950 recommended that students should devote some time to manual work on a voluntary basis. A National Service Committee was appointed in 1959 under the chairmanship of Dr. C.D. Deshmukh to make definitive suggestions in this regard. Prof. K.G. Saiyidain studied National Service Schemes in other countries. The Education Commission of 1965-66 recommended that students at all stages of education should be associated with some form of social service. In 1969, Prof. VKRV Rao launched the NSS Programme in 37 universities covering all States. Some other similar programmes are:

- Youth Against Dirt and Disease (1974)
- Youth for Rural Reconstruction
- Orissa Cyclone Relief Work
- Gujarat Earthquake Relief Programme

The National Policy on Education, 1986 has recognized the role of NSS in serving the community. The main objectives of NSS are:

- Understanding the community in which they work
- Understanding themselves in relation to their community
- Identifying the needs and problems of the community and involving themselves in problem-solving process
- Developing among them a sense of social and civic responsibility
- Utilizing their knowledge in finding practical solution to individual and community problems
- Developing competence required for group living and sharing of responsibility
- Gaining skills in mobilizing community participation
- Acquiring leadership qualities and democratic thoughts
- Developing capacity to meet emergencies and natural disasters, and
- Practical national integration and social harmony.

The NSS programmes may be classified into:

Regular NSS activities

Special camping programmes

Broad areas of activities are:

a. Environment enrichment and conservation
b. Health, family welfare and nutrition programme
c. Programmes aimed at creating an awareness for improvement of the status of women
d. Social Service Programmes
e. Production oriented Programmes
f. Relief and Rehabilitation work during natural calamities
g. Education and recreation

Nehru Yuvak Kendra

Now one of the largest grass root level organisation of its kind in the world, NYKS was established to harness and channelise the power of youth on the principles of voluntarism, self help and participation. On the present reckoning, youth in India form nearly 35% of the total population which has already crossed 1 billion mark. *India's youth also account for 35.8% of the world's*

total youth population. This is a vital vibrant and dynamic human resource bearing on the future state of not only India but the also the entire world.

The Nehru Yuva Kendra Sangathan has 500 district offices, 46 regional offices, 18 zones, 1000 youth development centers and over 181 thousand village based youth clubs enrolled under it. The purpose behind these clubs at the grass-root level is to form village-level voluntary action groups of youth that may come together with concern for the poorest of the poor.

NYKS' strength lies in 5000 national service volunteers and nearly 8 million youth volunteers through a vast network of Youth Clubs and Mahila Mandals at the grass-root level. Through NYKS, these village-based organizations have become local pressure groups as well as catalytic agents for socio-economic, cultural, political and environmental transformation. These groups have in fact become Functional Action Groups with rural sustainability and self-reliance as their hallmark. When viewed in these terms, the role of NYKS could be defined as that of not merely an organization but a mass movement that can play an important role in disaster management.

Mapping

Destination Disaster Free India will be unattainable without ensured availability of reliable maps, especially for areas of known hazard. For the national programme of production of hazard maps to succeed, it is imperative that we ensure availability of topographic and other maps at appropriate scales. Once the base maps are available other factor maps, such as those of geology, hydrology, landuse etc can be produced. And their eventual integration could then lead to single and multi hazard maps. The digitized version of the hazard maps when overlaid on infrastructure map can help us identify elements at risk and the consequent economic worth of loss, for any given disaster scenario. The vulnerability Atlas of India provides a broad-brush picture of hazards due to earthquakes, cyclones and floods on a small scale. Developmental Planners, architects and engineers do require large scale maps, preferably of scale 1:10 000.The following recommendations are made, which should be implemented by the concerned departments of the Government on priority basis, in a time bound manner

Precision GIS/Digital Maps of all States/ Districts and urban centres, with spatial and non-spatial data be made available for multi-purpose use, at appropriate scale. Identification of agencies, tasks, resources, and funds should be taken up at the earliest.

For the national programme of production of hazard maps to succeed, it is imperative that we ensure availability of topographic and other maps at appropriate scales

The presently available maps of certain hazardous areas are reportedly at scales of 1:50 000 and 1: 25 000.These should be imaginatively used until maps of 1:10 000 become available. Survey of India maps have to be suitably supplemented for information relating to specific and individual disasters as well as for planning of development projects.

The seismic-macro zonation map of India introduced by the Indian Standards Institute in 1984 stands revised in 2001.The next logical exercise is to prepare seismic micro-zonation maps of all our metropolises, major cities and urban centres. Priority should be accorded to all major cities falling in seismic zones IV and V. Simultaneously, seismic array of instrumentation for continuous upgradation of maps and for GIS based decision support system should be developed.

A scientifically sound and widely acceptable methodology of landslide hazard mapping has eluded us so far. Landslide hazard mapping methodology should insist on certification of such maps after their validation in the field. The recommended scale for such mapping is 1:10 000.

In order to assess the mapping needs of vulnerable areas for disaster preparedness, a sub committee on Mapping Mission under

the Chairmanship of Shri. Ramesh Chandra was constituted by the HPC. The sub-committee in its report has recommended taking up a pre-disaster proactive approach consisting of prevention, reduction and mitigation with precise maps prepared for this purpose. The Committee felt that easy availability of precise maps for each disaster focussing on the vulnerable areas would go as long way in taking preparedness measures for future disasters.

The major recommendations of this committee may be summarised as follows:

(i) Disaster Management efforts viz. prevention, reduction, mitigation, relief and rehabilitation require:

  i. Precision Maps with Spatial and Non-Spatial data

  ii. Identification of activities, agencies, resources and funds for carrying out the works

  iii. Implementation and Monitoring at all stages (L0, L1, L2, L3)

(ii) Survey of India maps have to be suitably supplemented for information relating to specific and individual disasters as well as for planning of developmental programmes.

(iii) Effective flood disaster management requires large-scale maps on 1:15,000 scale with contour intervals from 0.3 to 0.5 m to cover all areas up to 3 m.

(iv) For drought prevention/reduction and monitoring of drought onslaughts, the existing maps of 1: 50,000 and 1:25,000 supplemented by remotely sensed maps could be used for initial planning. For detailed planning of watershed areas, large-scale maps of 1:15,000 or 1:10,000 scale are required.

(v) Mapping for coastal areas require identification of critical reaches before planning protection works. The committee proposed 1:25,000 scale maps for critical areas and those on 1:10,000 for very high eroding and critical reaches to plan preventive and reduction measures.

(vi) Large-scale maps of 1:10,000 have been recommended for the purpose of developmental planning and preventive measures. Production of topographic maps for hazardous locations on a priority basis has been strongly recommended.

(vii) Based upon the maximum water levels to be attained as per dam break analysis, the inundation map is required to be prepared on a scale of 1:15,000 showing contours preferably at 2 meters or less from the dam site and up to the last point. The emergency action plan (EAP) could be formulated from this inundation map.

(viii) It is extremely useful to prepare road maps for all national, provincial and other highways with all such information about location and address of petrol pumps with first aid, telephone and telecom centres, medical care centres, hospitals, police stations, fire brigade stations, flying squads and volunteering agencies. Special identifications ought to be for medical centres offering trauma services, orthopedic surgery and fracture treatment facilities. Such maps need to be specially prepared for all common road routes and travel with metropolitan cities. The existing topographic maps of 1:50,000 scale and 1:25,000 scale can be used for marking them as spatial and non-spatial data.

(ix) Maps for the entire country are available at 1:50,000 and at 1:25,000 scale for more than half of the area. Further exercise of the nature mentioned above need to be carried out in a detailed and systematic manner for hazard zones identified by the group. This can be done in a phased manner so that information becomes available for all hazard areas on 1:25,000 scale. For this purpose it will be necessary to complete

the topographic maps of all hazard areas on 1:25,000 scale that remain to be done by Survey of India. Cadastral survey maps on 1:4,000 scale can be used for urban and town dwelling areas.

(x) As of now, all maps and digital data are required to be put to use only after obtaining requisite clearance from the MOD. Besides, maps of coastal and hill area, which are the prime areas vulnerable to cyclones and earthquakes, are treated as restricted maps. There has been a concern across a section of map users in the development and disaster management sectors for rationalization of this stand and making access to maps easier, more so in view of the fact that such maps are nowadays freely available anywhere outside India due to advancements in the mapping technology sector.

Insurance

Despite efforts at mitigation, economic losses from natural disasters continue to grow exponentially. In such a situation, insurance has played a very important role in disaster mitigation and recovery.

In developing countries the coverage of insurance sector is less due to the following reasons:

- Information failure
- Market failure
- Lack of awareness
- Poverty and lack of purchasing power
- Lack of interest in reaching the vulnerable people
- Lack of data base insurance needed to calibrate risk models
- Public apathy to educate itself about the true risks posed by natural hazards.

There are a large number of insurance schemes and quite a large number of agencies doing the insurance cover. They are to be given a social mandate for insuring people in vulnerable areas and governments have to support them. These agencies are skewed towards the urban areas for business but in the uncovered areas through pre-existing infrastructure like Post Offices, Local Bodies etc. it can be spread in the rural areas as well. There is need for policies for personal, property as well as disaster oriented schemes.

International and Regional Cooperation

Most countries of the world like India, are perennially bogged down by repeat of natural and man made disasters, and have virtually no time to address to the potential and possibility of benefiting from a united fight again disasters.

Global Initiatives are essential to deal with regional and global issues like global climate change, rise of sea levels, advancing of sediment load in the deltaic region, melting of glaciers and so on.

Then there could be examples of cross border spread of hazards like travel of smog or epidemics across national borders. *Disasters like tornadoes, earthquakes, oil fires, etc, know no national boundaries and therefore call for united regional effort.*

Joint research and development work, especially in advancing our fundamental knowledge about natural disasters, and in learning from one another's experience carries the potential seldom appreciated. Department of Science and Technology, Council of Scientific and Industrial Research, Indian Space Research Organization and many others pursue international cooperation with many countries of the world. The subject of Disaster Mitigation deserves high priority in such cooperation. Sharing of information by networking of

Indian Disaster Knowledge Network with the global databases, and availing of the connectivity with global early warning systems can be mutually advantageous. Infact IDNDR has infused a new life into a number of local, regional and global networks. For example, many satellite based networks consisting of digital seismicity and strong motion instruments located in earthquake prone areas are fully operational today. International cooperation can facilitate a combination of seismic monitoring and tide monitoring, or a continuous monitoring of cyclones and floods, and use this information as an input to early warning.

When a cataclysmic event hits a country, it is natural for friendly countries to share expertise, and rush helpful agencies carry a reservoir of experience and could prove to be of great service in the hour of need. Voluntary contributions may also flow from other international organizations. A well-drawn strategy alone can help us maximize the gains of such external contributions, and closely relate what is offered with what is needed. It is always better to draw upon international cooperation in capacity building so that the country can move on the path to self-reliance, to the extent possible.

In disasters of very large proportions affecting extensive areas and population, effective disaster response might involve one or more countries. At this juncture, it may be mentioned that almost 83% of floodwaters in Bihar originate in Nepal. Management of disasters of such intensity involves sharing of crucial information to all role players, even in neighbouring countries for efficient response and mitigation, as the case might be. In this context, evolving disaster management strategies with the co-operation of neighbouring countries is imperative.

The HPC felt that collaboration among SAARC and other neighbouring countries with respect to flood management, cyclone and monsoon forecasting systems would go a long way in managing disasters holistically especially in terms of pooling of resources and expertise.

Trees, shrubs and grasses, in fact vegetation in general, are crucial to the whole process of conservation of rainwater. Without appropriate conservation measures, rainfall causes soil erosion and subsequently, floods and even flash floods. A common approach to the issue, amongst the SAARC and other neighbouring countries, through their national forest policies is essential. This could lead to some useful and imaginative collaboration between all the countries in the Region. The Ministry of External Affairs, Ministry of Environment & Forests, Department of Science & Technology (IMD) and Ministry of Agriculture need to evolve a common approach in this regard.

Part III: Roleplayers

Community Participation

It has now been revealed that the community as an institution in itself is emerging as the most powerful among the entire mechanism of disaster administration. In event of actual disasters, the community, if well aware of the preventive actions it is required to take, can substantially reduce the damage caused by the disaster. Awareness and training of the community is particularly useful in areas that are prone to frequent disasters.

The effort of people in certain areas is laudable, where communities have formed their own organizations that take initiative in such situations. One such community-based organization is the Village Task Force formed in villages of Andhra Pradesh by the Church's Auxiliary for Social Action (CASA). The Village Task Force has been trained in emergency evacuation and relief within the village. Salient features of the training are:

- Orientation training on disaster preparedness for villagers and staff members
- Discussion on disaster preparedness in general meetings
- Sponsoring of staff for specialized training
- Preparation of a handbook for emergencies

The people elect the Task Force themselves and during disasters it serves as the nodal body at village level, which has to mobilize resources for the community and disseminate necessary information passed on by outside agencies.

While the community as an effective institution is yet to take shape in this country with low literacy levels and widespread poverty, considerable efforts are being made to form and strengthen community based organizations at grassroots levels.

Over time, the component of community preparedness has gained considerable significance in handling disasters. If human interventions can be listed as the cause for increase in the scale of destruction then it is through community preparedness that the scale can be reduced. In such circumstances, adhering to building bye-laws and standards could be crucial.

The report on improving Preparedness And Reducing Vulnerability of different Communities by the HPC emphasizes the need to look into community preparedness components and strategies such as hazards evaluation, risk assessment, disaster prevention, emergency planning and public information and awareness. On the lines of 'Yokohama Strategy for Safer World' certain goals need to be fixed, national and state strategies formulated and financial allocations made that are disaster specific, area specific and task specific, such as mapping missions, engineering of structures, disaster resistant building material, evacuation preparedness, community awareness etc.

Creating awareness among the community through education and training and information dissemination about disasters and empowering them to cope with hazards are all mitigation strategies. On the other hand, establishment of monitoring, prediction, forecasting and warning systems, attempting at reducing factors that aggravate hazards, vulnerability and risk analysis, development of proper guidelines and standards, enactment of legislation and building byelaws and transfer of technology, etc further go on to reduce the wrath of disasters.

VASUDEVA network is formed with the intention of creating a bridge between the NGOs and the Government sector as also within the NGOs working in the field of disaster management

Disaster mitigation strategies aimed at reducing the scale of destruction need to focus on the section of the population that is vulnerable and at a greater risk of being exposed to the adverse impact of disasters. Socio-economic, cultural practices etc have made them weak and have put them in a disadvantaged position. Women, children, aged and the disabled are termed as the dependent population though facts are much different than what are projected otherwise.

Some factors influencing the vulnerability of people and social structures are suggested below:

- Lack of access to resources (material/ economic vulnerability)
- Disintegration of social patterns (social vulnerability)
- Degradation of the environment and inability to protect it (ecological vulnerability)
- Lack of strong national and local institutional structures (organizational vulnerability)
- Lack of access to information and knowledge (educational vulnerability)
- Lack of public awareness (attitudinal and motivational vulnerability)

- Limited access to political power and representation (political vulnerability)
- Certain beliefs and customs (cultural vulnerability)
- Weak buildings or weak individuals (physical vulnerability)

The amount of information available on natural disasters and their effects is extensive and easily available to specialists in planning, architecture, engineering and science working in the field. Yet it is always problematic while instituting mitigation measures, partly because the mitigation measures often ignore the people and their needs when planning and settling priorities, while considering implementation, or assume that people form one homogeneous group with the same needs, abilities and aspirations.

Institutionalising the National Prayer Day would help in generating awareness amongst all role players in disaster management, it would also promote social harmony so essential for the country's progress

Certain groups of people, types of physical assets and economic activities can be particularly vulnerable or susceptible to damage.

Research study conducted presents a social perspective to disaster mitigation strategies and goes on to assess the vulnerable status of women, children, aged and the disabled. It takes into account not only their weak disadvantaged position but also the measures that could be adopted at prevention, preparedness, relief and reconstruction stages of disaster management that would be beneficial in downscaling the losses suffered following a disaster.

Most of the time measures and efforts taken by them go unnoticed such as the coping strategies adopted by women in disaster situations. These need to be brought to light, which would improve their position.

Role of NGOs

The HPC carried out a nationwide NGO consultation in which more than 600 NGOs participated through six consultation meets. The consultations were coordinated by nodal NGOs which acted as regional coordinators.

In these consultations, the lack of a well-coordinated network between the NGO sector and the Government and also between the NGOs themselves was repeatedly pointed out. The general perception was that lack of coordination among the NGOs was responsible for lack of information about most of the exemplary work done by NGOs at the grass roots level, and duplication of efforts in some areas and near total absence in other areas were rampant. It was felt that better coordination would result in a wider reach and a more comprehensive approach to disaster management.

An effort was made by the HPC to address this problem by organising a nationwide network of NGOs with an acronym VASUDEVA – *Voluntary Agencies for Sustainable Universal Development and Emergency Voluntary Action.*

VASUDEVA network is formed with the intention of creating a bridge between the NGOs and the Government sector as also within the NGOs working in the field of disaster management. In order to activate this network, NCDM was identified as the Convenor, while the nodal NGOs which had convened the regional consultations, were identified as respective Convenors for the regional networks of the country.

Five elements to sustain VASUDEVA were recognized to be donation, grant, cooperation, skill application and offering services. One of the principles of VASUDEVA was that development must be such that it protects from calamities, not such that it becomes a calamity itself.

VASUDEVA was thus envisaged to ultimately become a people's movement for disaster management. A quarterly Newsletter proposed to be published by NCDM would act as a forum of communication for this

network as also for dissemination of news relating to other disaster management efforts in the country.

The role of international NGOs was also discussed by the HPC and the importance of having mechanisms to facilitate the coordinated work of international NGOs with local agencies was felt.

Indian Red Cross Society

In India, we have Red Cross Society at the national, state and district level. This is a movement for providing relief to the people when they are in dire need of it. Since this is an offshoot of an international movement, it is a completely non-political organization. It is the image of the Red Cross that makes it one of the most acceptable institutions in the area of providing relief to the people in distress.

Till 1995, the Red Cross was working primarily as a relief organization. From 1996 onwards, the International Federation of Red Cross shifted its focus from relief to disaster preparedness and started developing community-based disaster preparedness plans. This is a unique feature of the training programmes being organized by the Red Cross. The 5-day training programmes consist of:

1. Field visit
2. Making the trainees aware of the terminology related to various items as well as technology in use by various agencies
3. Role of Red Cross in disaster which includes rescue, relief and meeting challenges related to health hazards

The Red Cross is basically concerned with relief distribution including first-aid and transporting/shifting the victims of disaster to hospital or other safer places. The other agencies like NCC, NSS and BSG should also know the potential of Red Cross.

The need is to do the following to make the activities of these organizations more effective:

1. Interact with these agencies to strengthen their training component;
2. Networking of these agencies so that they have a coordinated action plan whenever such emergencies arise; and
3. It should be possible to have the rotation of officers from each of these agencies to act as a Coordinator and all the four agencies could have a common committee that could be consulted by HPC.

State level officers were also interviewed. On the basis of it, the following types of programmes are suggested to keep them in readiness:

1. Short courses
2. Celebration of disaster day, disaster week, etc.
3. Maintaining bulletin boards
4. Organizing Disaster Management Clubs
5. Mock exercises to the volunteers
6. Enabling the volunteers to develop competencies in mapping and planning at school and local level

Causative factors for deficiency in the civil Defence were recognised to be lack of immediate utility, lack of awareness, legal infirmities, financial crunch, lack of training facilities and lack of proper recognition.

Media

The Press Council of India celebrates the annual Press Day on November 16 each year. The Press Day on November 16, 2000 was observed with the theme of *"Role of Media in Disaster Management – Preparing People to Cope with Disasters."* A National Seminar was organised at Vigyan Bhawan, New Delhi, which was inaugurated by the President of India. In his inaugural address, the Hon'ble President emphasised the need for disseminating preparedness aspects of disaster management among all sections of society and making special provisions for the more vulnerable sections of the community viz. women and children.

The HPC recommends that 3rd December every year be observed as National Prayer Day during which all religious groups in the country would pray at their respective places of worship for "Alleviation of Human Misery." 3rd December commemorates the day of infamous Bhopal Gas tragedy. Institutionalising the National Prayer Day would help in generating awareness amongst all role players in disaster management, it would also promote social harmony so essential for the country's progress. National Prayer Day was organised during the 1999 and 2000 and there was an overwhelming response from all sections of society and all the religious groups.

The role of the electronic media has during recent times emerged as a major component of disaster management, as amply demonstrated in the aftermath of the Gujarat earthquake in January 2001. Special emphasis was laid on the role of electronic media and information technology by the HPC and it was felt that this sector needs to be integrated with not only the disaster response but overall disaster management strategy. At the same time, role of the print media cannot be taken on a lower level of importance, as this continues to be the medium of mass media in many parts of the Indian society still unreachable by the electronic media. Besides this fact, it was also acknowledged that print media has a major role to play in the pre-disaster prevention, mitigation and preparedness activities through appropriate community awareness generation.

Fire Services

In a larger context of urbanization and industrialization calamities play a match box role of igniting more dangerous and uncontrollable disasters like fires. During the Kobe Earthquake a large number of buildings that could resist seismic forces were largely damaged due to post disaster fires. As provided by the Constitution of India, Fire Services to the Community is a State subject and under section 243 W are placed under the control of the Local Bodies.

The service provides coverage to only 30% of the community, which is grossly inadequate for our population. Managing fires is more technical than perceived. It needs comprehensive study in risk evaluation of each single area, preparation of risk mapping plans for each zone, study of preparedness level in terms of especial equipment and training of personnel, fool proof communication system and periodic mock drills.

Unlike what is generally understood, the role of Fire Services is not just limited to being a fire fighting Service but it also plays the role of a disaster preventive agency specially in urban areas. It can provide basic Search and Rescue service and can also coordinate in event of a disaster situation with other agencies like the police and health services.

Recent recommendations with regard to Fire Services have been:

- The appointment of a National Fire Service Commission to suggest the reorganization of Fire Services to cope with the challenges posed by the technological advancements during peacetime and war situations.
- Formulation of a National Policy on Fire Preparedness in Rural and Urban Areas.
- The provision of a comprehensive legislative backup to the fire services to enforce fire regulations.
- The risk mapping of cities and industrial towns and the norms for fire protection levels in such areas.
- Review of training standards and equipment requirements.
- Planning of Fire Safety programmes for the Public.
- Planning of fire prevention and protection in slums and shanty towns.

- To review provisions of the model Fire Service Bill.

Police and Para-Military Forces

The HPC recognized the critical role played by the Police and the Para-Military Forces in disaster situations. Police is mobilized to reach the site of disaster immediately with a view to carry out relief and rescue operations in coordination with agencies. It is also the responsibility of the police to maintain security and law and order at disaster locations where there might be chaos and miscreants may take advantage of the situation. Police personnel deployed for such relief operations prevent occurrence of cognizable offences including all offences against property, human body and public tranquility. The police communication system is made available for transmission and receipt of messages in connection with disasters. The police also regulates movement of victims, rescue and relief, medical assistance, and supplies. The role of para-military forces is similarly important as they may be called upon for additional assistance in situations requiring it. The CISF has an important role, particularly in disasters involving industrial units or locations.

Civil Defence and Home-Guards

The Civil Defence organization was established with a view to protect interests of the civilian community in times of war. The Civil Defence Act of 1968 formally established the structure of the organization. The Center is only a guiding agency while the State is responsible for raising, training and maintenance of the corps.

It is primarily a voluntary organization, whose resources are mobilized at the time of need through an activation procedure. Civil Defence organization requirements are based on the vulnerability analysis by the States themselves and are equipped accordingly. Their primary work areas include; communication, rescue and casualty, depot, transportation and supply service, salvage and corpse disposal along with basic welfare services.

Civil Defence has been modeled with the main objective to save life, to minimize damage to property, and maintain the continuity of production.

The state of Civil Defense preparedness in the country was analyzed and found to be needing substantial support and augmentation. Twenty-four of the States/ UTs have not raised Civil Defense in 102 out of 225 categorized towns/cities. Deputy Collectors, who are mainly responsible for organizing the Civil Defense Services, show vacancies of 45 out of the 133 authorized. Civil Defense control rooms, which are the nerve centers of all activities, show a deficiency of 127 out of an authorized 299.

Causative factors for deficiency were recognised to be lack of immediate utility, lack of awareness, legal infirmities, financial crunch, lack of training facilities and lack of proper recognition.

The organization conceptually has a strong structure with capabilities to act in cooperation with the people, police and defence services. It however needs to be reviewed in terms of building its capacity further and its outreach in disaster situations.

Armed Forces

The catastrophic impact of disasters can be reduced only if there is coordination and cooperation from all sections of the society belonging to a varied sector. The Indian Armed Forces are one of the most dedicated and professional organisations with a rich tradition of being involved in the socio-developmental roles of nation building. Their services should be utilised as a last resort and be called upon to intervene and take on specific tasks only when the situation is beyond the coping capability of civil administration as it involves high costs.

It is mandatory in a disaster situation that there is a high degree of cooperation and coordination between various agencies involved in disaster management. Since many a times the Armed Forces are required to provide assistance in the relief operations, it is required that they be involved in disaster planning and preparation. The resources and capabilities at the disposal of the armed forces can be extremely useful in a crises situation and therefore, the district and state plans should incorporate the role expected of them so that the procedure for deploying them is smooth and quick.

Their role in providing the Emergency Support Functions such Communications, Search and Rescue operations, health and medical facilities to the victims, transportation, power, food and civil supplies, public works and engineering and information and planning at the time of disasters is extremely beneficial. Since various agencies operating in the field of disaster management rely on the armed forces for timely assistance it is but needed that disaster specific training be provided to the personnel and incorporated into their training programmes. (Refer Volume 7.10).

Ex-Servicemen

Every year nearly 60,000 defence personnel including approximately 3,000 officers join the ranks of ex-servicemen in our country. Majority of them retire at a young age between 32 to 50 years to enable a youthful profile of the Armed Forces. Their total number is estimated at about 5.5 million out of which over 1.5 million are registered. *They constitute a national asset - a vast human reserve that is disciplined, trained and developed to exacting standards. This potential force needs to be brought into the national disaster management structure and assigned an appropriate role in the overall response mechanism.* The HPC recommends that this be carried out at the stage of preparation of State, District and local level disaster management plans.

PSUs and Private Sector

The HPC recognized the valuable role played by various Public Sector Undertakings and Corporate Groups in the aftermath of the recent major disasters including the Orissa Super Cyclone and the Gujarat Earthquake. PSUs are in a position to extend specialized support in their area of operation expeditiously, and this needs to be built into the disaster response plans, particularly at State level. The role of the private sector is still an emerging one, and though a major role was played by a number of corporate organization in recent disaster situations, not much has been documented or is available in a consolidated form in this area. The HPC does realise the potential of this sector and feels the need for its inclusion in the plans, particularly at local levels.

8

Planning Process

A new way of thinking needs radical inputs of creative concepts and implementation strategies for its realization. The categorization of disasters as L1, L2, L3, and the concepts of Trigger Mechanism and L0 activities have the potential to help foolproof the planning process with the end goal of minimizing disaster effects.

Vulnerability Based Planning

The planning process has been modulated at three levels: National, State and District. While a National Response Plan has been prepared, it was felt through deliberations that a model State plan is not feasible since each State needs to develop its own plan, including the components of prevention, mitigation, rescue, relief and rehabilitation, based on its unique contextual needs. Model district plans were prepared to serve as guidelines for similar exercises to be taken up by each district.

The planning process, for all levels, is based on the principle that response, and level of preparedness required, are dependent on the extent of vulnerability and the level of capacity to deal with situations.

Disasters are graded at three levels:

L1: A District Level disaster, within the capabilities of the District Administration to deal with

L2: A State Level disaster, within the capabilities of the State Government to deal with

L3: A National Level disaster, requiring major direct intervention of the Central Government

In addition to the disaster situations, the following `peace-time' situation has also been identified:

L0: A `no-disaster' situation. This is the level at which surveillance, preparedness and mitigation activities must be focused on.

Trigger Mechanism

The concept of Trigger Mechanism has been incorporated by the HPC as an emergency quick response mechanism, which would spontaneously set the vehicle of management into motion on the road to disaster mitigation process.

The Trigger Mechanism has been envisaged as a preparedness plan whereby the receipt of a signal of an impending disaster would simultaneously energise and activate the mechanism for response and mitigation without loss of crucial time. This would entail all the participating managers to know in advance the task assigned to them and the manner of response. Identification of available resources, including manpower, material and equipment and adequate delegation of financial and administrative powers are prerequisites to successful operation of the Trigger Mechanism.

The Trigger Mechanism is in essence, the Standard Operating Procedure (SOP) in which the implementation of the efforts on ground is well laid down. Activities like evacuation, search and rescue, temporary shelter, food, drinking water, clothing, health and sanitation, communications, accessibility and public information, which are the very components of disaster management, would follow on the activation of the Trigger Mechanism. These activities are common in all types of disasters and require sub-division and preparation of sub-action plans by each specified authority. Each sub-group has been requested to work out the trigger mechanism relevant to their group of disasters.

The Trigger Mechanism requires the disaster managers to:

- Evolve an effective signal/warning mechanism.
- Identify activities and their levels.
- Identify sub-activities under each activity/level of activity.
- Specify authorities for each level of activity and sub-activity.
- Determine the response time for each activity.
- Work out individual plans of each specified authority to achieve the activation as per the response time.
- Have Quick Response Teams for each specified authority.
- Have alternative plans and contingency measures
- Provide appropriate administrative and financial delegations to make the response mechanism functionally viable.
- Undergo preparedness drills.

To understand the concept of Trigger Mechanism and incorporate it in the plans to be prepared by each sub-group, a committee has been set up under the chairmanship of Shri M.K Shukla, Director General, Civil Defence, which includes all five Convenors of Sub-Groups, experts from ATIs and NCDM and the Member Secretary, HPC. The sub-committee met on July 21, 2000 and deliberated at length on the concept of Trigger Mechanism and the ways in which it might be integrated into the planning process. The committee has decided that few presentations on the Standard Operating Procedures (SOP's) from Ministry of Defence, para-military forces, police, fire services, Ministry of

Railways etc might be useful in further clarifying the Trigger Mechanism.

L0 ACTIVITIES

L0 is the `no-disaster' phase. Activities during this phase will focus on surveillance, mitigation and preparedness. These have to be monitored and ensured at the level of the Disaster Management Authority. Disaster Management Plans have to be asked for and feedback given to all agencies and higher authorities.

A Disaster Management Unit within the nodal authority will operate as a peacetime disaster control room. It will carry out L0 activities and stay in readiness to be upgraded to a higher L level control room at very short notice. The unit will also monitor the development, mitigation and preparedness activities level for disaster management compliance. It will ensure timely rehearsals, mock drills and reviews of the Disaster Management Plan. It will make provision for and ensure conduct of trainings to various role-players at different levels. It will ensure that certain vital components of the Plan, such as the list of contact numbers, always stay updated.

Vigil will be kept on environmental compliance issues, trends of building construction, infrastructure and area development to ensure compliance with local disaster prevention principles. The unit will also monitor lower L level occurrences in any areas within its jurisdiction, and maintain vigil for contingent need to upgrade to a higher L level.

One of the major activities during the L0 phase will be to keep a vigil on developing emergency situations in neighbouring jurisdictions from the point of view of:

1. Preparation for the contingency that the emergency spreads requiring activation of the response mechanism in the jurisdiction.
2. Preparation for possible need of extending relief co-operation to the neighbouring jurisdiction, for which a contingency action plan may be prepared and kept in readiness.

MINIMUM STANDARDS AND EQUITY IN RELIEF

Disaster situations constitute a major threat to development and worsen poverty levels, expand numbers of vulnerable groups, weaken institutions and the labour market, aggravate quantity and quality of employment and have other socio-economic political, psychological and gender impacts.

When addressing the relief requirements of disaster victims, focus should be placed on the special needs of the vulnerable population that is, children, women, aged and the disabled.

A successful relief intervention program is based on the ability to respond immediately to the needs of the victims of disaster.

The report on the provision of the minimum standards of relief emphasizes that not only is it essential to tackle the immediate negative effects of crises but to create conditions for the successful subsequent development process that is sustainable and hence, strengthening the economic, social, institutional structures and mechanisms of society to enable them to achieve higher levels of standard of living and overall human and social development.

Providing for the food requirements of the displaced and dispossessed people through relief programmes such as FFW, etc., would provide food in the hands of the people who need it and also lead to the improvement of community infrastructure that would serve everyone in the long run.

Minimum standards of relief laid out by the SPHERE project are a valuable effort and need to be reviewed and adapted for applicability to the Indian context.

Minimum standard of relief not only addresses the food requirements of the victims but also provides for the health and immediate first aid facilities, looks at the water and sanitation needs, shelter requirements, and providing food that confines with the nutritional standards as laid down by the WHO and other such agencies.

When addressing the relief requirements of the disaster victims, focus should be placed on the special needs of the vulnerable population that is, children, women, aged and the disabled. At the same time equity of relief distribution amongst beneficiary groups must be maintained.

These groups have certain special needs and requirements as warranted by their vulnerable situation, which get compounded in disaster situation. They are socio-economically and culturally in a weak position and largely immobile, so much so that many a times relief assistance and supplies do not reach them further aggravating their miseries.

Therefore, Monitoring and Evaluation of the functioning of the various poverty alleviation programmes initiated by the various government departments becomes critical. Some of them are oriented to improving employment opportunities whereas others such as ICDS programme initiated by the Ministry of Health and Family Welfare and NSPE by the Department of Education have an inbuilt component of improving upon the nutritional status of women/mothers and children in addition to improving the education status among them.

In a disaster situation, time is a critical element and most often, relief agencies confront problems due to the arrival of unsolicited relief supplies that take up the attention and resources at the expense of other articles of prime necessity. At such times, transportation and time are limited, and technical information on the supplies is missing.

Through the adoption of the SUMA model, launched as a collective effort of Latin American Countries in order to improve the administration of supplies in the aftermath of disasters, the problems such as above are sidelined with the assistance of: capable personnel, versatile materials with easy to use electronic tools in order for the supplies to be classified, taken inventory of, and prioritized from the moment of arrival.

Needs of Special Groups

Vulnerable Women

Women are particularly vulnerable because they have fewer resources in their own right and under their own control. They have no permanent place in decision - making systems and they suffer traditional, routine and gratuitous gender-biased oppression. By virtue of their lower economic, social, and political status, women tend to be more vulnerable to disasters. Within women, certain groups are particularly vulnerable, such as pregnant and lactating women, aged and widowed women who need special attention and care during disaster situations.

Women's high rate of poverty as well as cultural constraints on their activities in some societies means they are more likely to suffer losses of life and property in the face of natural disasters. Their role in ensuring household food security, and their dependence on natural resources to do this, reinforces the impact of disasters. For example drought and slow flooding, leaves women to fend for themselves and assume even greater responsibility for caring for their family.

In post disaster situations women are often more vulnerable than men. Their care giving roles expand dramatically after a disaster and experience shows their access to resources for recovery is constrained.

Children

Disasters most often strike quickly and without warning, frightening adults and traumatising children more so when they are unaware of what needs to be done. Children are more vulnerable in disaster situations especially if they are young, malnourished, belonging to low-income households and/or alone in the house when disaster strikes. In such a situation, children may become anxious, confused or frightened. Adults will need to cope with the disaster in a way that will help children avoid developing a permanent sense of loss. It is important to give children all the guidance that will help them reduce their fears.

Disabled and Aged

Annually, natural disasters occur through floods, cyclones, earthquakes, landslides and hurricanes, and some may be serious enough to be declared as a national calamity. There are an increasing number of people affected by disasters who are suddenly deprived of their normal social, economic, and cultural environment. When disaster strikes, human relationships and support mechanisms get disrupted and transformed beyond recognition. Armed conflicts, ethnic or communal violence, floods and earthquakes create distress and anxiety in extreme forms and frequently cause disabilities ranging from the physical to the mental. Disability advocates, working with and/or on behalf of the seven disability categories admitted by the Indian Disability Act, maintain that the real problems of people with disabilities are neither properly understood nor adequately responded to by governmental, non-governmental, and international agencies. The mechanisms for disaster management, disaster preparedness, and relevant administrative structures are grossly inadequate.

The proportion of the disabled population is high among the aged and hence they have been taken together. However, this is not to assume that all aged are disabled and all disabled people are aged. However, by and large their needs and requirements in a given situation are the same.

Many older persons, often with little or no opportunity to recover on their own, tend to be seriously impacted by these calamitous events and suffer physical or mental impairments that limit their ability to respond or to seek help. Largely categorized as the dependant population with not very many working years ahead of them, older persons are less likely to recover from the economic impact of a natural disaster and in the event of physical and mental impairments which may limit their ability to recover.

The Development of National/ State/District Plans

The deliberations carried out by the High Powered Committee included a review of all existing measures. The multiplicity of disasters and the agencies/ministries involved in their management necessitated preparation of a National Response Plan and Model plans at State Level to provide an overall policy framework and consistency in the planning process.

It was also felt that model plans should reflect some of the emerging paradigms in disaster management, principal of which is the increasing emphasis on prevention and preparedness as means to reduce risks.

A crucial input required for the disaster planning process is of time. The speed at which the concerned government reacts to a disaster situation decides the impact and the effectiveness of the intervention for the disaster affected community. Accordingly, it has been recommended that the Plans clearly identify the actions to be taken up in the 24 hours and actions that need to be carried out in 48 hours.

A crucial input required for the disaster planning process is of time. The speed at which the concerned government reacts to a disaster situation decides the impact and the effectiveness of the intervention for the disaster affected community.

Introduction of Common Concepts and norms to be consistently followed in Disaster Management Planning at National, State, District Levels:

- Disaster Management Cycle in the country.
- Definition of the terms: PREVENTION, PREPAREDNESS, RELIEF & RECOVERY, REHABILITATION
- Trigger Mechanism - Defining : L0 to L3 levels
- Applicability of L0 to L3 levels: Declaration etc.
- Proposed structure of National, State and Disaster Management Plans according to the L0 to L3 levels
- Alerts
- Planning assumptions
- Primary and Secondary Agencies
- Emergency Support Functions
- Situation Reports
- Quick Response Teams
- SOPs
- Standards and Norms to be followed at all levels of planning (SPHERE)

Preparation of a National Disaster Response Plan

Through the course of the HPC it was felt that it would have been ideal for the National Response Plan to be formulated after completion of the HPC report and its acceptance. However, due to constraints of the terms of reference, the exercise for formulation of the National Disaster Response Plan was taken up in parallel. The Plan thus presents a scheme of response systems that have been suggested on the basis of issues that emerged through the course of the HPC deliberations. It is recommended that follow-up action will have to be taken to develop these systems to arrive at a comprehensive and complete response plan. The follow-up action will have to be taken throughout the Government of India and any other concerned organizations by taking up efforts to make the NDRP operational. This action will need to be time bound and may be taken up under the supervision of the Working Group.

The National Disaster Response Plan primarily explains processes and mechanisms that are brought into action after the Declaration of L3 in case of any disaster. It also defines the approach of the HPC towards management of disasters and the role of the National Government.

The National Disaster Response Plan contains step-wise progress of activities in the following phases of disaster:

- Pre-disaster Warning
- Disasters where warnings can be given
- Disasters where effective warning cannot be given
- De-warning
- CRC meeting with empowered group of ministers
- Quick response

It also provides a list of Checklists, Handbooks and Minimum Standards to be maintained that will be required by personnel carrying out the disaster response.

The NDRP has also recommended a structure of the Emergency Operation Centers.

The Plan provides guidelines on the following aspects of the National Emergency Operation Centre (EOC):

- Aim of the Emergency operation centre
- Emergency operations
- Communications and warning;
- Requesting additional resources during the disaster phase from neighboring states of the affected area and

- Location of EOC
- Flow of information in the EOC
- Activation Steps of the EOC in case of a disaster
- Back up EOC.

As recommended by the HPC, the plan also identifies the essential communication links.

Essential Communication Links at the Centre EOC

- Crisis state EOC
- Crisis state SRC
- Other state EOCs
- All concerned ministries

For efficient functioning and coordination of the central agencies during a disaster situation, the plan also recommends fourteen Emergency Support Functions. Each ESF will be comprised of a primary agency (which will be required to coordinate the overall operations) and a number of support agencies that are essential to complete given tasks during disasters. (Refer National Disaster Response Plan Document).

Development of State Planning Guiding Principles

The HPC constituted five theme-specific sub groups of Model State Plans for five different groups of disasters. These committees were given the mandate to prepare model State Disaster Management Plans for the group of disasters that has been assigned to each committee.

The sub groups have been assigned the following type of disasters: (i) Climate and Water related disasters (ii) Geological Hazards (iii) Chemical, Industrial and Nuclear Hazards (iv) Accident related disasters and (v) Biological disasters.

Based on the initial findings of the reports prepared by the sub groups and subsequent deliberations, it was felt that it is not possible to develop a model plan to be complied with by all states, given the variation in the contextual attributes of the different states in the country. The HPC secretariat has hence prepared a set of Guiding Principles for a Model State Plan. (Refer Annexure 9: State Disaster Management Plans - Guiding Principles). The HPC recommendations once accepted, an exercise would have to be taken up with each State to develop State specific plans in accordance to individual state attributes.

The need for preparing 'Guiding Principles' was felt as each State would need to prepare a plan that is best suited according to its own vulnerabilities and capacities. However, Plans across the country need to be consistent and follow similar norms, procedures, and standards. For this very reason, a set of guiding principles has been prepared.

The salient features of the State Plan Guiding Principles are as follows:

(i) The Plan has been structured along the L0, L1, L2, L3 activities. It recognizes the fact that while State intervenes only if the disaster has reached L2 level, it needs to be active and alert for other level of emergencies as well. For L1 level, it needs to monitor activities carried out by the district. For L3 activities, in addition to upgrading its own facilities considering the magnitude of disaster, the State would also need to provide regular updates on ground situation to the Central Government.

(ii) Declaration of L0/L1/L3/L4 is based on Alerts issued by the respective

departments and on First Information Reports sent by the concerned District Collector.

(iii) Under the response section, the Guiding Principles advocate marking responsibilities to organizations/departments/ individuals in their primary or secondary role.

(iv) An important provision made in the document is identification of immediate response actions (first 24 hours following the disaster) and the first 48 hour response actions. The response section also includes important aspects of quick response especially in terms of resource mobilization, donation management, impact assessment and information dissemination.

(v) The recovery and rehabilitation section focuses on all essential aspects such as shelter, infrastructure and livelihoods and how could they be ultimately be mainstreamed into normal development activities already active under DRDA and related departments.

(vi) The Guiding Principles also recommend preparation of a database that enlists vulnerability of the State to different types of disasters based on scientific data and records available at state and national level. Due recognition is also accorded to promotion of indigenous knowledge and wisdom that are found to be strongly prevalent in most areas with recurrent disasters.

(vii) Under the resources section, the report recommends creation of an annual summary of resources since the same are subject to frequent change. The resource section would include an annual review of events related to disaster management, including training, identification of personnel in the government, non-government and corporate, identification of material and personnel for carrying out special functions in post disaster phases.

The basis of the Guiding Principles is that planning can be done for disaster management in advance. It is recognized that certain activities will need to be planned at the time when action is required, but these also can be anticipated to the extent possible, and guidance laid down in advance to facilitate this process in the smoothest and most efficient manner when the need arises. The need to plan during the disaster phase should be limited to the extent possible. The systems of the Election Commission and the Indian Army are examples in the case, wherein all imaginable contingencies have been taken into account and clear and detailed guidelines laid out so that implementers can go about doing their tasks in a totally unambiguous manner. The manner in which FEMA responded to the air strikes in New York and Washington in September 2001 is another example in the case, which amply demonstrates the advantages of having a pre determined plan of action that is detailed and clear. In-spite of heavy damages to the emergency services themselves, the work of rescue and relief went about in a totally coordinated and efficient manner.

Consultations on Preparation of District Disaster Management Plan.

HPC constituted a special committee to prepare a model District Disaster Management Plan. During the course of Plan preparation, the committee organised a number of sensitisation workshop for District Collectors of the vulnerable districts of the country.

The Committee has prepared a model District Disaster Management Plan with the following salient sections:

(i) A section on assigning responsibility to organisations and individuals for carrying out specific actions of projected items. This includes setting forth line of authority and organisational relationships. Also included is the identification of personnel, equipment, facilities, supplies and other resources.

(ii) A section to identify and record basic information on the district viz. Demography, topography, communication links etc.

(iii) Procedures and organisational arrangements for Hazard identification and Vulnerability Analysis at District levels.

(iv) Identification of mitigative measures for long term management of the risk to reduce the adverse fall out of the physical events on the physical and social infrastructure.

(v) Identification of response functions that might be required during the response phase to protect the life and property of people.

(vi) Arrangements for organising short term and long term recovery of the affected people.

(vii) Developing interface with the media, NGOs, relief and donor agencies and other stake holders.

It has been proposed that while preparing District Disaster Management Plan, the structure of the Plan should permit easy and quick retrieval of relevant information on which the authority/ individual may to have to act upon. An outline was prepared for use in developing District Disaster Management Plans (Refer Annexure 10: District Disaster Management Plan - Outline).

The sub-committee has also identified support documents which would accompany the District Disaster Management Plan. The support documents could include:

1. Fundamentals (a) Emergency Management Concepts and Principles. (b) Approaches to Emergency Management
2. Risk Management
3. Mitigation Planning (Hazard Specific)
4. Provision of Essential Services (a) Emergency Shelter Management with catering. (b) Emergency health care (c) Restoration of Essential Requisites - Drinking Water, Electric Supply, Telecommunication, Road & Rapid Communication
5. Warning System with respect to specified disasters
6. Evacuation Planning
7. Organization of relief camps
8. Security Management
9. Community Emergency Planning
10. Search and Rescue
11. Land-use Planning Guidelines
12. Resource Coordination and Relief Management
13. Planning for Community Support
14. Disaster Specific Preparedness Manual
15. Disaster Specific Response Manual
16. Medical Aspects of Specified Hazards
17. Damage and Needs Assessment
18. Rehabilitation

The Center for Research in Rural and Industrial Development (CRRID),

Chandigarh, an ICCSR funded institution, was commissioned to prepare Model District Disaster Management Plans for five districts each in the States of Punjab, Haryana, Himachal Pradesh and Jammu & Kashmir. However this task is likely to take some time.

Apart from National, State and District plans, HPC has suggested Village level plans for all vulnerable areas. More emphasis should be given on community participation in disaster management.

Sourcebook on District Disaster Management Plan

It is an acknowledged fact that the hard-core activity of disaster management takes place at the district level and thus, realizing the urgency and importance of the district plans, a "Sourcebook on District Disaster Management" was prepared by Lal Bahadur Shastri National Academy of Administration, Musoorie in consultation with the HPC. The Sourcebook endeavoured to provide a framework for the Disaster Managers and the district administration in its efforts to mitigate the impact of disasters. The Sourcebook was published and circulated to all District Magistrates in the country as one of the first actions by the HPC to initiate the process to take up a holistic view to developing district level disaster preparedness. Towards the end of its tenure, the HPC felt that in view of the emergence of new thought during the course of the work of the HPC, the Source Book now needs appropriate revision. This may be carried out by the NCDM, and the Source Book subsequently disseminated widely to all appropriate role-players in all States and Districts, including administrators, disaster managers, police and health officials.

The Committee constituted by HPC to prepare a Model District Disaster Management Plan has been regularly deliberating on its mandate. In addition to plan preparation, this Committee has also organised sensitisation workshops for District Collectors of the vulnerable districts in the country. These workshops aimed at informing the participants about the format of the Model Plan and the methodology for preparing the same to enable them to plan for their respective districts. These workshops were organised on November 9-10, 2000 at Bhopal and on December 1-2, 2000 at IIPA, New Delhi. Another concluding workshop was held IIPA, New Delhi that discussed the plans so far prepared by the Collectors who attended the first workshop. The HPC took a view that once the recommendations of the HPC are accepted, the exercise of preparation of District level Disaster Management Plans will have to be taken up along with State level plan preparation on the basis of individual states, under the supervision of the Working Group.

One of the concepts that emerged from the deliberations was of a 'Continuing Scenario Building Exercise'. This envisaged that before the annual updating of the Plan, every district should carry out a worst scenario building exercise in order to keep the plan updation realistic and effective.

Disaster Management Plans at local levels

The HPC went beyond its mandate of working on National, State and District level plans, and also considered the need to have Disaster Management Plans at lower levels than these, including the following:

- Community level (Panchayat, Urban Local Body, Neighbourhood)
- Institutions (Industries, Offices, Educational Institutions, etc.)
- Families
- Individuals

National Disaster Information System

The primary support feature of any proposed national disaster response mechanism needs to be an efficient National Disaster Information System that would not only support coordination of emergency response operations, but also provide the information flow infrastructure for support activities during pre disaster situations.

Emergency Operations Centre - EOC

The Emergency Operations Centre provides a secure location to coordinate actions and make critical decisions at the time of emergency and disaster situations. It would include the following components:

1. EOC Operations room is the main room where all disaster management operations are planned, managed and executed and would have the following components: LAN networked computers, servers, digitized maps, emergency response plans, etc.
2. EOC Analysis room is meant for the analysing the information received from the EOC operations room by the GIS experts, statisticians and data analysts so as to come up with a revised disaster management plan that could ensure speedy relief and recovery of the affected areas.
3. Emergency Information Centre (EIC) is meant for the collection and dissemination of the disaster related information to the media and the general public. And would be equipped with strong telephone network with some computers.
4. EOC Communications would have radio communication on UHF, VHF, Low Band, HF, and Amateur radio frequencies.
5. EOC reference Library will contain research material to support the staff and personnel at the EOC particularly in the analysis room.
6. Functional area work cells - The WAN (Wide Area Network) connected room will be in contact with various centers of distribution of relief material such as back up transport systems, food and other materials, shelters in the area under the EOC, medical aid centers and list of hospitals and doctors, through its special cells that deal with those functions.

   (Refer Annexure 6: EOC-proposed layout).

Emergency Support Functions - ESFs

Emergency Support Functions are how Emergency Management accomplishes many of the tasks of responding to an emergency. These ESFs form an integral part of the Emergency operation centers and each ESF should coordinate its activities from the allocated EOC. Extension teams and workers of each ESF will be required to coordinate the response procedures at the affected site. During the period immediately following a major disaster or emergency requiring central response, primary agencies when directed by NCCM will take actions to identify requirements and mobilise and deploy resources to the affected area to assist the state in its response actions under fourteen ESFs (Emergency Support Functions). Each ESF is headed by a Primary Agency, which has been selected based on its authorities, resource and capabilities to support the functional area.

The ESF will coordinate directly with their functional counterpart State agencies to provide the assistance required by the State. Request for assistance will be channeled from the District level through the designated State agencies for action. Based on the State identified response requirements, appropriate central response

assistance will be provided by an ESF to the State or at the State's request, directly to an affected area. (Refer National Disaster Response Plan Document)

Primary and Secondary Agencies

The designated Primary Agency, acting as the Central Agency will be assisted by one or more support agencies (secondary agencies) and will be responsible for managing the activities of the ESF (Emergency support Functions)and ensuring that the mission is accomplished. The primary and secondary agencies have the authority to execute response operations to directly support the state needs.

List of Emergency Support Functions

ESF No. 1 – Communication

ESF No. 2 – Public Health and Sanitation

ESF No. 3 – Power

ESF No. 4 – Transport

ESF No. 5 – Donation

ESF No. 6 – Search and Rescue

ESF No. 7 – Public Works and Engineering

ESF No. 8 – Food

ESF No. 9 – Information and Planning

ESF No. 10 – Relief Supplies

ESF No. 11 – Drinking water

ESF No. 12 – Shelter

ESF No. 13 – Media

ESF No. 14 – Helplines

List of Responsible Organizations

Ministry of Agriculture	MoA
Ministry of Defense	MoD
Ministry of Surface Transport	MoST
Ministry of Power	MoP
Ministry of Health and Family Welfare	MoHFW
Ministry of Water Resources	MoWR
Ministry of Animal Husbandry	MoAH
Ministry of Urban Development and Poverty Alleviation	MoUAPA
Ministry of Planning and Programme Implementation	MoPPI
Ministry of Home Affairs	MoHA
Ministry of Rural Development	MoRD
Ministry of Information Technology	MoIT
Ministry of Information and Broadcasting	MoIB
Ministry of Communication	MoC
Ministry of Heavy Industries	MoHI
Ministry of Social Justice and Empowerment	MoSJE
Ministry of Civil Aviation	MoCA
Ministry of Non-Conventional Energy Resources	MoNCR
Ministry of Petroleum and Natural Gas	MoPNG
Ministry of Finance	MoF
Ministry of External Affairs	MoEA
Ministry of Commerce and Industry	MoCI
Ministry of Science and Technology	MoScT
Ministry of Labour	MoL
Ministry of Consumer Affairs and Public Distribution	MoCAPD
Voluntary Agencies	VA

Knowledge Network

With recurring disasters and mounting post disaster relief, rehabilitation and reconstruction costs, a shift needs to be made towards pre-disaster planning, preparedness and mitigation. For keeping pace with the rapidity of change, there is a need for new technology and innovations in our ideas for which clarity of purpose, funds, commitment in pursuit of research and development is needed.

By tapping the enormous S&T potential within our country, through forging partnerships between R&D institutions, Universities, the Industry and other players, by effective national and international networking of knowledge on all spheres of disasters and their mitigation and management:

1. Best practices could be spotlighted and publicized
2. Policy papers could be written
3. Action Planning manuals could be written
4. Public awareness could be achieved
5. Training modules could be prepared
6. Vulnerability against disasters could be reduced
7. Networks can also be used for emergency communications for effective response

The initiative of establishing a disaster knowledge network is central to the national disaster mitigation agenda. What India needs is a network of networks in which it is to be ensured that knowledge information is adequately filtered and authenticated, and gets immediately connected with a great learning exercise. The network is expected to involve all major academic institutions as well as centres of research and development, including centres that function as part of larger institutions such as the DRDO. It is expected to provide a network of networks within India, with appropriate overseas linkages to effectively address the problem of disaster reduction on a national scale through active participation of the knowledge institutions of the country.

The network should contain data and information on institutions, skills, core competencies, technologies and technical services and is seen as the most effective means of promoting partnerships and disaster reduction. Integration of the system with a GDIN (Global Disaster Information Network) also needs to be carried out in order to gain from the trends of global cooperation in emergency management.

9

Financial Arrangements

Finance Commissions in India have been cogent in their recommendations for financing disaster situations. However disaster funding is not only inadequate but also discrete in its passage to the people in need. Channels of financing disasters have to be further smoothened. HPC on its part has recommended the formation of a district level Mitigation Fund with a view to ease immediate access.

Calamity Relief Fund (CRF)

The basic responsibility for undertaking rescue, relief and rehabilitation measures in the event of natural disasters is that of the concerned State Governments. The role of the Central Government is supportive. The Department of Agriculture & Cooperation (DAC) is the nodal Department in Government of India for natural disaster management.

The policy and arrangements for meeting relief expenditure are, by and large based on the recommendations of successive Finance Commissions. Earlier, margin money was allocated to each State for meeting immediate needs of expenditure on relief measures. The quantum of margin money was calculated by averaging non-plan expenditure (excluding advance plan assistance and expenditure of a plan nature) on relief measures.

The margin money so provided for each of the States was duly taken into account while working out the forecast of expenditure for each of the states on the basis of which the Finance Commission based its

recommendations for the devolution of resources for the period covered by them.

The policy and arrangements for meeting relief expenditure are, by and large based on the recommendations of successive Finance Commissions.

In accordance with the 1966 instructions on the subject when the State Government estimated that the expenditure on relief measures would exceed the quantum on margin money available in the State, it was required to present a memorandum for Central assistance. An inter-ministerial Central Team was deputed to assess the quantum of central assistance to be provided to the state for undertaking relief measures. A High Level Committee on Relief (HLCR) having representatives of all the concerned ministries considered the recommendations of the central teams and ceilings of expenditure on various items of relief expenditure were fixed on the basis of which additional central assistance was extended to the various states.

These instructions were modified in 1974 in accordance with the recommendations of the Sixth Finance Commission (1974-1979). The Finance Commission felt so alarmed by the increase in calamities relief expenditure (Rs. 318 crore in 1972-73) that it recommended that all additional central assistance over and above the margin money should be within the overall assistance for the plan as a whole. The Seventh Finance Commission (1979-84) made only a small deviation to the effect that extra central assistance was to be limited, over and above the margin money, to 5% of the Annual Plan outlay in that year, with the added provision that it was to be adjusted in subsequent years.

The Eighth Finance Commission (1984-89) continued this arrangement but recommended changes in respect of the quantum of margin money and the manner of its funding. The margin money for all the states was increased from Rs. 110.55 crore to Rs. 240.75 crore. Half the margin money was taken into 'account in the forecasts' of State's budgets as determined by the Finance Commissions and the remaining half was to be provided by the Center after the States exhausted the funds available with them. Additional central assistance beyond this margin money could be provided where the calamity was of a 'rare severity' after the visit of the Central Team and consideration of its report by HLCR. (The same arrangement was continued for the year 1989-90 though the allocation was increased to Rs. 339,crore)

The country experienced one of the worst droughts in this century during 1987-88 as it swept across 267 districts and affected more than 166 million people. At its peak level, over 60 lakh persons were provided with employment. The Central Government came to the rescue of the concerned States in a big way and the ceilings of expenditure fixed by the Government of India during the period, 1984-89 were Rs. 522. 89, Rs. 1066.32, Rs. 1023.89, Rs. 1658.92 and Rs. 1084.29 crore against the (margin money of) Rs. 240 crore fixed by the Eighth Finance Commission.

Finance Commissions

Ninth Finance Commission (1990-95)

While making its final recommendations, the Commission took the following other cogent factors into account:

First: The existing system of assessing the damage and the mechanism of giving Central assistance lead to delays whereas speedy response should be a basic feature of the scheme.

Second: The Catalogue of demands presented by the States are inflated in character because of a feeling that these would be cut down by the Government of India in any case and also because of the compulsion of public opinion in the State.

Third: The scheme should be so designed

as to ensure against profligacy and wastefulness. The big increase in expenditure in the recent past could not be explained purely in terms of the growing severity of the natural calamities.

Fourth: The money already provided in advance should be more or less sufficient for the purpose of relief expenditure except where there is a calamity of rare nature.

Taking these factors into account and the need for greater autonomy, accountability and responsibility, the Commission took the average of ceilings of expenditure approved by the Government of India during the 10 years period ending 1988-89 and worked out an aggregate annual CRF of Rs. 804 crore for all the states. It was provided that Centre would be required to pay 75% (Rs. 603 crore) of the CRF for all the state.

Some of the other important recommendations of the Ninth Finance Commission were as follows:

- Creation of a separate Relief Fund (quite apart from the Public Account of the state) for each State;
- Formation of a State Level Committee under the state Chief Secretary to operate this fund;
- Co-ordination and monitoring by the Union Ministry of Agriculture (Dept. of Agriculture and Cooperation - DAC) and
- Handling of calamities of rare severity by the Center involving additional central assistance over and above the CRF.

The major beneficiaries from the CRF are Rajasthan, U.P. Andhra Pradesh and Gujarat getting over 10% of the total amount and next to it are Orissa and Maharashtra.

In the case of Union Territories, procedure to be followed was the same as in respect of States except that the source of the fund was to be the Central Government in Home Ministry.

Tenth Finance Commission (TFC) (1995-2000)

While the Tenth Finance Commission recommended the continuation of CRF scheme, it also recommended the creation of a National Fund for Calamity Relief (NFCR). Based on earlier experience, it was inter-alia provided that:

- While a seperate Fund should be created as provided earlier, there should also be flexibility of choice with regard to the avenues of investment subject to ensuring security and liquidity and the question of holding the fund entirely in a nationalized bank should also be considered while issuing the necessary instructions (by the Finance Ministry).
- The Agriculture Ministry was required to issue guidelines for being followed by the State Level Committees in respect of all matters connected with the financing of the relief expenditure.
- The norms of expenditure under each head for the different items of work were to be laid down by the Agricuture Ministry after due consultation;
- The State Accountant Generals should then be instructed to see that only expenditure on the items approved by the Agriculture Ministry is booked under the Head “Natural Calamities” and,
- The Ministry of Agriculture is also required to monitor whether the states were adhering to the norms prescribed by it.

The share of Government of India towards Calamity Relief Fund is released in four equal installments at the beginning of each quarter. During the period of Ninth Finance Commission’s recommendation (1990-95) there was no separate earmarked corpus available with the Government of India for dealing with ‘calamities of rare severity’. By and large, no additional central assistance as

such was given to the States, though in addition to 'advance share' of CRF, the expedient of certain adjustments and enhancements under various schemes such as JRY etc. was resorted to.

National Fund for Calamity Relief

For dealing with calamities of 'rare severity' requiring central intervention, the TFC suggested creation of a National Fund for Calamity Relief (NFCR). According to the commission's recommendations, which were accepted, the size of the fund was to be Rs. 700 crore, to be built up over the period 1995-2000, with an initial corpus of Rs. 200 crore to which the Centre would contribute Rs. 150 crore and the States Rs. 50 crore in the proportion of 75:25. In addition, for each of the five years from 1995-96 to 1999-2000 the contributions of the Centre and the States was to be Rs. 75 crore and Rs. 25 crore respectively. The contributions by both the Centre and the States was to be made annually in the beginning of the Financial Year. The fund was to be managed by a National Calamity Relief Fund Committee (NCRC) which is a subcommittee of the National Development Council headed by the Union Agriculture Minister and consisting of Deputy Chairman Planning Commission, two Union Ministers and five Chief Ministers nominated by the Prime Minister annually by rotation.

While this Fund was meant for calamities of the rarest variety, it transpires that the States have continued to ask for Central assistance for all types of calamities. It seems that in order to give expression to the concerns of the Central Government, the Government of India has been promising liberal additional assistance in a large number of cases, whether it is the earthquake at Jabalpur or the Cyclone in Andhra Pradesh and the National Fund for Calamity Relief meant for a five year period 1995-2000 stands, exhausted in the first two years. A part of the problem arose because the term calamity of 'rare severity' was never defined which continued to haunt the functioning of NCRC forcing it to strain its resources over and above those earmarked for this purpose.

A much heavier responsibility falls on the shoulders of State Governments because of the autonomy and freedom in decision-making given to the committees headed by the respective Chief Secretaries. The overall monitoring role of the Agriculture Ministry has if any thing, increased and it is specifically required that the norms of expenditure suggested by the State Level Committee were not specifically out of tune with the norms generally followed.

The average annual expenditure of Rs. 1260.86 crore as Calamity Relief Fund is quite sizeable and apart from gratuitous relief in situation of distress, a large amount of the expenditure is necessarily on improving the existing infrastructure relating to areas concerned say in respect of drinking water supply in a 'drought' affected areas. An important issue which needs to be borne in mind is that all such expenditure must be undertaken within the context of an overall long-term development strategy – a paradigm of relief-cum-development.

Eleventh Finance Commission (2000-2005)

The Eleventh Finance Commission paid detailed attention to the issue of disaster management and in its chapter on Calamity Relief, came out with a number of path-breaking recommendations:

The scheme of Calamity Relief Fund (CRF) be continued with contributions from the Centre and the States in the ratio of 75:25.

- The CRF should be used for meeting the expenditure for providing immediate relief to the victims of cyclone, drought, earthquake, fire, flood and hailstorm.
- Expenditure on restoration of infrastructure and other capital assets,

except those which are intrinsically connected with relief operations and connectivity with the affected area and population should be met from the plan funds on priority.

- Medium and long-term measures be devised by the concerned Ministries of the Government of India, the State Governments and the Planning Commission to reduce, and if possible, eliminate, the occurrences of these calamities by undertaking developmental works.
- The CRF should be kept out of the Public Account of the State and should be invested in a manner approved by the Ministry of Finance. If for some reasons, it is not possible to keep the Fund in a nationalized bank or invest in a manner approved by the Ministry of Finance, it may be kept in the Public Account of the State, on which interest should be payable by the State Government at a rate which is not less than the market rate of interest as indicated by the Reserve Bank of India.
- The balance in the Fund at the end of the five-year plan period may be made available to the State for being used as a resource for the next plan.
- The State level Committee constituted under the existing scheme may continue to function and take all decisions related to the financing of relief expenditure subject to general guidelines issued by the Ministry of Agriculture.
- The Union Ministry of Agriculture will continue to be the nodal Ministry for coordinating relief works, and for arranging physical and financial support including assistance of the Union Ministries of Defence, Railways etc.
- A committee of Experts should be constituted to review the list of items approved for incurring expenditure from the CRF drawn up by the earlier committee. The Committee should have representatives from the State Governments. Apart from the general list of items applicable to all States, State specific list may also be drawn up in consultation with the representative of the concerned State Governments. A representative of the State Government, not already represented in the Committee, may be co-opted for this limited purpose.
- The existing arrangement for fixing the norms of expenditure of each approved item may continue. In case the norm is exceeded, the additional expenditure may be met from the budget of the State Government and not from the CRF.
- The release of the funds from the Centre to the CRF of each State may be done in two installments, viz. on 1st of May and 1st of November each year. The installment due on 1st of May should be released only after receiving from the State Government a certificate indicating that the amount received during the preceding financial year has been credited to the CRF, accompanied by a statement giving the updated expenditure and the balance amount available in the CRF. The statement itself should be treated as a utilization certificate.
- The Accountants General of the States should ensure that only the expenditure on approved items as per norms is met out of the CRF.
- The scheme of NFCR should be discontinued, in view of the difficulty in evolving an unambiguous definition of calamity of rare nature, and the difficulty in providing adequate financial assistance to the States from the limited amount available in the Fund.
- A National Centre for Calamity Management (NCCM) under the Ministry of Agriculture be established

to monitor all types of natural calamities, including calamities of rare severity, without any specific reference from the Central or the State Governments. This Centre should be empowered to make recommendations to the Central Government as to whether a calamity is of such severe nature that would call for financial assistance to the affected State over and above what is available in the CRF or other plan/non-plan sources.

- Every State should prepare an Annual Report on natural calamities relating to the preceding financial year, and submit it to the Union Ministry of Agriculture by the 30th September every year.

Every State should prepare an Annual Report on natural calamities relating to the preceding financial year, and submit it to the Union Ministry of Agriculture by 30th September every year.

- Any financial assistance provided by the Central Government to the States in this regard, should be recouped by levy of a special surcharge on Central taxes. Collections from such surcharge/cess should be kept in a separate fund created in the public account of the Central Government, to which it should contribute Rs. 500 crore as the initial core amount. Outgo from this fund should be recouped by levy of the surcharge. This fund is to be known as the National Calamity Contingency Fund (NCCF).
- The National Centre should also develop expertise for providing training to the States manpower on a regular basis, keep an inventory of physical resources available at various places for meeting the calamities, and undertake monitoring and documentation.
- Every State should develop an inter-disciplinary cadre under the Relief Commissioner comprising 200 to 300 persons who could be deployed for relief works on the occurrence of a natural calamity within the State or in any other part of the country.
- Every State should prepare an Annual Report on natural calamities relating to the preceding financial year, and submit it to the Union Ministry of Agriculture by 30th September every year. The Centre's contribution to the CRF of a State, due on 1st of November, will be released only after this report has been received.
- The Union Ministry of Agriculture should bring out a Report on the Natural Calamities and their Management, by 31st December every year.

District Level Funds

Other important aspects relate to the provisions of making available ten percent of the development funds for disaster preparedness, and of institutionalising a District Relief Fund at the District level, based on the principles of the CRF so that there be a ready availability of funds. Various modalities were considered, including fifty percent contribution coming from the public, and rest be matching grant from the State CRF. The District level Relief Committee under the chairmanship of the District Collector would evolve the guidelines and norms for expenditure from the district level funds, at least for the fifty percent contribution by the public. However, in view of the fact that the Eleventh Finance Commission has not recommended creation of District level CRF or contribution thereto from State CRF, it was felt that the fund could be entirely created out of public contribution and donations. To take account of disaster management component in the development process, instruments to ensure preparedness and mitigation action are required, for which the concept of ten percent allocation from plan funds at all levels to be earmarked for disaster preparedness and mitigation is proposed. This also emerged from the workshop of the SIRDs at NIRD, Hyderabad and was resolved therein. It is hoped that this will bring in a culture of mainstreaming disaster management in the development process.

Consultations carried out under the HPC, including the NGO consultations, have gone a step further and suggested a village level fund to be institutionalized at the level of the Panchayat, which would be a contributory fund with contributions from the community being matched by the State. The issue of allocation of ten percent of development plan funds for disaster management and setting up of district level funds requires immediate action. Mechanisms for local level funds may be examined further for their viability.

One of the concerns the HPC raised in context of financial arrangements is the fact that the CRF and NCCF cover only six natural disasters as per the recommendations of the Finance Commission. The HPC feels that there is a strong need for evolving appropriate instruments for coverage of financial support for the remaining types of disasters.

Financial Discipline

It is important to know that this is not the 'be all and end all' of funding, funds are available under Plan Schemes, various schemes of Government of India, say for drinking water, employment generation, inputs for agriculture and flood control measures etc., Then there are facilities for rescheduling of short term loans taken for agriculture purposes upon certification by the District/State Administration. Central Governments assets/infrastructure are to be repaired/rectified by the respective Ministry/ Dept. of Govt. of India. Besides this, at the occurrence of a calamity of great magnitude funds flow from donors, both local and international for relief and rehabilitation and in few cases for long- term preparedness/ preventive measures. Funds for the latter purposes are also available from multilateral funding agencies like the World Bank.

Based on the recommendations of the Finance Commission, the Govt. of India on the recommendation of an inter-ministerial committee fixed the norms of assistance for each of the eligible item for which assistance could be given as well as the quantum of such assistance. These norms have been communicated to the State Governments who were required to adopt the same and if they found them unacceptable, they were to communicate their views to Government of India, but not many states did so. In actual practice, some of the states have been allocating funds at scales much higher than those determined by Government of India thus exhausting the CRF much earlier on the one hand and that too on a calamity which otherwise would have either gone unnoticed or the state would have met it from its own resources as used to be the case before 1990.

It has been observed that while Government of India remits its share of the Calamity Relief Fund every quarter, the State sits over it and only when the calamity occurs, the machinery at the State Headquarters starts churning, taking its own time in making funds available to the District Administration thus causing delay in rendering assistance when it is most needed.

What is really required is proper financial discipline. When the Finance Commission has made certain recommendations, which are accepted by Government of India, there should be no room for tampering with them. This can be achieved if the funds available under different heads from different schemes/ Ministries are seen as a resource in totality along with the CRF. The norms of assistance fixed by the Government of India need to be adhered to. States should also ponder and decide to have a self-imposed limit on when, where and how much to assist. Public money is a trust, to be fully ustilized when needed and it is no one's case that assistance should be dealt in a niggardly fashion.

There is a need for defining calamity of rare severity or laying down broader criteria,

*There is a need for defining **calamity of rare severity** or laying down broader criteria, adherence to which could be insisted upon for ensuring equity as well as transparency.*

adherence to which could be insisted upon for ensuring equity as well as transparency.

The funds from NFCR (National Fund for Calamity Relief) as prescribed by the Tenth Finance Commission, and now the NCCF as prescribed by the Eleventh Finance are meant for a calamity of rare severity, to be drawn upon in exceptional circumstances and that too if not manageable from within the CRF. This criterion was rigorously followed during the period 1990-1995 when there was no separate national fund as such and nothing was given over and above the CRF, though the country had two major earthquakes at Latur and Uttarkashi and a disastrous cyclone in Andhra Pradesh in 1991. However, within the substantial funds now available from the NFCR since 1995, and now the NCCF, the States have been regularly besieging the Centre for additional assistance for calamities-big and small, even though not warranted by the situation at hand. In this context, there is a need for defining calamity of rare severity or laying down broader criteria, adherence to which could be insisted upon for ensuring equity as well as transparency. The categorization of L1-L3 as proposed by the HPC is a move in this direction.

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Recommendations

HPC in its vision for a system of Disaster Management in India deliberated over innumerable issues and has come forth with a clear set of recommendations. It not only outlines the work that needs to be done but also the roles and responsibilities for activities that need to be undertaken on an immediate, medium and long term basis for the specific tasks.

General

Framework

Considering the mammoth work done by the High Powered Committee in terms of the scope of its Terms of Reference and also the large number of disasters as diverse as natural to manmade to biological in order to evolve a framework for writing the recommendations of its work is a challenge in itself. Various formats and framework for the recommendations were considered like following the sequence of the terms of reference and key considerations, making recommendations with relation to national, state, district and local community or disaster-wise including an indication of the nodal organisation responsible for its implementation. Timeframe in which recommendations can be implemented is another aspect, which needs to be indicated including the implementations of recommendations which will be a continuous process spread over a number of years. After considering various options, it was thought best to put the recommendations in the sequence of a

disaster cycle and in a manner that captures the essence of the work of HPC, i.e., building Cultures of Preparedness, Quick Response, Strategic Thinking and Prevention. Therefore, in keeping with this approach, the recommendations have been put in the following framework:

1. General
2. Constitutional & Legal Framework
3. Organisational Structures/ Institutional Mechanisms
4. Culture of Preparedness
5. Culture of Quick Response
6. Culture of Strategic Thinking
7. Culture of Prevention
8. Implementation of the Recommendations
9. Responsibility & Time Frame

Vision

To create a disaster free India, through the confluence of cultures of Preparedness, Quick Response, Strategic Thinking and Prevention.

Mission Statement

To raise through sustained collective wisdom and effort, and by every possible means, the level of concern for the environment, the synergy of national capacities and the intensity of peoples participation to such a commanding height that disasters are averted, and ensuing losses are minimal, and infrequent.

Constitutional and Legal Framework

There is no mention of disaster management as a subject/item in any one of the lists (Central, State or concurrent) under Schedule 7 of the Constitution. Keeping in view the importance that the field of disaster management has come to acquire in recent times with enhanced level of public awareness about the obligation of the government, the committee recommends that this issue needs to be debated in appropriate forum so that a conscious view is taken about appropriate mention of disaster management in one of the lists. (A subject not specifically mentioned in any of the three lists would ordinarily have to be dealt by the Union government under entry 97 of the Union list. By this interpretation as of now the subject would deem to be an entry under the Union List and therefore Union Government would be entitled to pass a suitable legislation. However, by practice and convention the primary responsibility for the management of any disaster is borne by the State Government. In view of the above dichotomy and the importance which is being currently attached to disaster management, nationally as well as internationally, it is felt that a conscious view needs to be taken to make an appropriate mention of the subject of disaster management in one of the lists).

Disaster Management Act

In addition to the constitutional framework, a need was felt to have a suitable legislation to provide appropriate legal framework at the national and/or state level. Keeping this in view the committee recommended in its interim report I and II the drafts of a National Act for Calamity Management and a Model State Disaster Management Act as these drafts would facilitate and help generate informed discussion on the subject. After the issue relating to the constitutional amendment has been settled the necessary action would be required for the enactment of central and/or State Act.

Regulations

Subject to the enactment of the suitable legislation it will be necessary to evolve detailed regulations to help in the enforcement of the law. Certain regulations/ codes/laws relating to various aspects of disaster management exist e.g. coastal

regulations, building codes, chemical accidents, fire safety. However the implementation and enforcement of these remain weak in the country. Making the laws stringent to act as a deterrent, it is felt that these codes/regulations/laws need to be reviewed wherever necessary and suitable mechanisms evolved for stringent enforcement.

Organisational Structures/ Institutional Mechanisms

Organisational

Cataclysmic events sometimes assume the nature of a national crisis involving the mobilization of practically the entire government at the highest level. The committee feels that an institutional mechanism needs to be created at the highest level by setting up a Cabinet Committee On Disaster Management that would help continued and sustained focus in this area at the highest level of the government. (It may be recalled that a High Powered Task force under Defence Minister was constituted after the Orissa Super Cyclone and an Empowered Group under the Home Minister was constituted in the wake of the Gujarat Earthquake.)

The All-Party National Committee under the Chairmanship of the Prime Minister and the Working Group set up under the guidance of the Vice Chairman needs to be institutionalised 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 the appropriate strategies for implementation of broad policy guidelines of the Cabinet Committee on Disaster Management (CCDM) as well as the National Committee. It would have the advantage of political, governmental and NGO representation apart from expert input. It is also suggested that the All-Party National Committee be re-christened as National Council on Disaster Management.

Taking note of the global trend that progressively countries world wide and international agencies are "shifting focus from managing natural calamities to all hazard management" i.e. the same institutional structure deals with natural catastrophes as well as "Complex" man-made emergencies, since in the aftermath, the humanitarian dimension is the same. It is felt that a separate institutional mechanism needs to be evolved at the national level. It is recommended that a separate Ministry of Disaster Management be set up for a sustained and focused effort in the area of disaster preparedness, mitigation and management. This Ministry will deal with natural as well as manmade disasters. However its role would be essentially concerned with networking and co-ordination of national resources while the concerned ministries will continue to discharge their responsibilities and finances in accordance with the respective disaster management plans and work in close cooperation with the nodal ministry.

The primary responsibility of managing a disaster lies with the State government, it is necessary therefore to strengthen institutional mechanisms at the state levels which presently are very weak; focused only on relief. In the wake of recent disasters new structures and mechanisms have been evolved in the States of Orissa (Orissa State Disaster Management Authority), Gujarat (Gujarat State Disaster Management Authority) and Uttaranchal where a separate Department of Disaster Management has been established which is presently combined with the Department of Health and Medical Care. Weighing various options the Committee is of the view that on the lines of the pattern at the national level a separate Department of Disaster Management and Mitigation be established. However, it is also felt that the different States may deliberate on this issue in the context of their own situation and take steps to strengthen the

institutional mechanisms so as to be able to deal with all hazards to which they are vulnerable and include all aspects of disaster management.

Many State Governments have Disaster Mitigation and Management Centres such as Centre for Disaster Mitigation and Management in Chennai and Disaster Management Institute in Bhopal. Many State Governments may be well on their way to establishing Disaster Mitigation and Management Centres, as is being done by the Uttaranchal Government. The HPC is strongly of the view that creation and strengthening of network of such Centres will reinforce the disaster management apparatus of the country. The Disaster Mitigation and Management Centres should endeavour to take all such investigations, studies and tasks as identified according to the felt needs and national and state priorities. Both Central and State Governments should turn their first attention to strengthening of existing institutions and Centres by way of capacity building, modernization, staffing and funding. Before the new Centres are opened, it should be ensured that they will be adequately funded so that they pro-actively perform rather than passively respond, as is commonly seen in our resource starved situation.

National Institute for Disaster Management to be established as a centre of excellence in the area of creation of knowledge and its dissemination including training and capacity building

Taking note of the fact that across the globe in most of the countries the national investment strategies are shifting emphasis to regular yearly investment in disaster preparedness and mitigation so that the communities invest in risk reduction on a continuing basis, it is felt that a change in the nomenclature of concerned organisations/department/functionaries will help bring about the necessary change in approach and focus. It is therefore recommended that nomenclature such as Relief Commissioner may change to Commissioner/Secretary In-Charge of Disaster Management and like wise wherever necessary and appropriate.

In order to facilitate, liase and co-ordinate with various agencies and organisations at the national and international levels the resident Commissioner of each State posted in Delhi be also designated as Ex-officio Special Commissioner for Disaster Management.

In view of the fact that action really takes place at the district, which is the cutting edge of the administration, it is necessary to strengthen the set up and support system for the District Magistrate who provides the overall leadership. Therefore it is suggested that the district relief committees that presently exist be reconstituted as District Disaster Management Committee.

Institutional

National Centre for Calamity Management (NCCM) as suggested by Eleventh Finance Commission and its structure as evolved by HPC needs to be set up at the earliest.

Disasters, especially natural disasters permeate every aspect of our lives. Building community leadership and a chain of trained community cadres through participatory approach can help harness the resilience and resourcefulness of the community to cope. Human resource development in this context assumes national importance. A network of training institutions led by a national level disaster management institute with symbiotic linkages with other National and State level institutions like National Civil defence College, National Fire Service College, ATIs, Disaster Management Institutes, National Institute of Rural development, State Institutes of Rural Development, Indian Institute of Technology, Indian Institutes of Management etc. will need to be forged and developed. Strengthening of the infrastructure and capacity building of these institutions in the area of Disaster Mitigation will help synergise the national efforts.

A National Institute for Disaster Management to be established as a centre of excellence in the area of creation of knowledge and its dissemination including training and capacity building. The institute will have a full-fledged campus with all infrastructures and resources to full fill its role as a centre of excellence. A full-fledged Emergency Operation Centre will also be established at the institute which would serve an alternate/backup of the National EOC during times of disasters and act as an instrument for hands on training during normal times.

All the State level ATI and/or SIRD should have a full-fledged department of disaster management and also be responsible for establishing the alternate State EOC. Full-fledged EOC with clear conceptualised roles and all necessary infrastructure and support to exist at the district level. To address the need for capacity building at the district level, institutional mechanisms for training should be established. This facility can be created in one or more of the several institutions in existence at the district level such as District Institute of Education and Training (DIET) and Teachers Training Institutes (TTI), Polytechnics etc.

Funding and Infrastructure Support

Reconstitute the Calamity Relief Fund (CRF) provided by Tenth Finance Commission - Rs 11,007.59 crores for years 2000-2005 as funds earmarked for state level capacity building for disaster management and to act as a buffer for handling district level (L1) and state level (L2) emergencies without support from Central Government. State Disaster Management Ministry at the Centre will have full sway over decisions pertaining to this fund and its application. Expenditure on restoration of infrastructure and other capital assets except those that are intrinsically connected with relief operations and connectivity with the affected area and population should be met from the plan funds on priority. The CRF should be kept out of the Public Account of the State and should be invested in a manner approved by the Ministry of Finance. A committee of Experts should be constituted to review the list of items approved for incurring expenditure from the CRF, and make recommendations for adoption by the Central Government. State specific and District specific norms may also be developed in consultation with appropriate authorities.

Funds at National Level for Handling L3 level Disasters:

- A National Disaster Response (Rescue/ Relief/ Rehabilitation and Reconstruction) Fund, i.e., Fund A. This will function as a repository of all receipts from international funding, private/ corporate donations, and all cess on income taxes levied to finance post disaster response to all mega-disasters or National Level Emergencies and capacity building including human resource development.
- A National Disaster Prevention Mitigation and Preparedness Fund, i.e., Fund B. Essentially will function as a subset of Fund 'A' in as much as 20% of all inflows into Fund 'A' will automatically flow into Fund 'B'. Fund 'B' will finance disaster prevention, mitigation and preparedness related activities relating to national, State or First Responder level capacity building including human resource development. To begin with this fund may be constituted with an initial corpus of Rs. 500 crores.

An important resolution of the committee is that at least 10% of the plan funds at the national, state and district levels must be earmarked and apportioned for schemes, which specifically address prevention, reduction, preparedness and mitigation of disasters.

A district level CRF raised out of people's contribution locally by the District Magistrate and other people need to be institutionalised. In this regard all the places of worship in the country could have a donation box separately for Calamity Relief. All such funds collected are to be passed on to the district CRF from time to time. In order to address district level needs and priorities, it is necessary that the District Disaster Management Committees evolve the norms for expenditure from district level funds.

Code of conduct

The humanitarian imperative must come first and foremost, all other considerations whether political, religious or other must remain outside the domain of disaster management. There should be full co-operation between the various government, voluntary agencies and relief workers with a commitment to perform to the best of their abilities and they should refrain from public criticism of each other.

Culture of Preparedness

Mapping Mission

The HPC constituted an expert group that went into various issues related to mapping requirements for disaster management. Digitisation of maps in the scale of 1:50,000 is permitted to be done only by a select few agencies and for restricted areas prior permission is needed from Ministry of Defence. Survey of India could be the nodal agency. Based on their report the following recommendations are made which are to be implemented in a planned manner, in a time bound, phased, manner:

1. Precision GIS/Digital Maps of all states/districts and all urban centres with Spatial and Non-Spatial data be made available, at appropriate scales.
2. Drawing of a blueprint of action, showing identified activities, agencies, resources and funds for carrying out the necessary exercise.
3. Survey of India maps to be suitably supplemented for information relating to specific and individual disasters as well as for planning of developmental programmes.
4. For disaster management the existing maps of 1: 50,000 and 1:25,000 to be used until supplemented by detailed preventive planning by large-scale maps of 1:10,000 scale.
5. Production of topographic maps, especially for hazardous locations on a priority basis to serve as an essential input to production of hazard maps.
6. Seismic Micro-zonation of all major cities and urban centres, with priority assigned to the seven metros with detailed assessment of buildings and infrastructure for all cities in Zone IV and V.
7. Hazard Specific Zonation Maps for all identified hazards e.g. earthquakes, floods, cyclones and landslide based maps, eventually leading to production of large scale multi-hazard maps.

Remote Sensing

In general remote sensing, GIS and GPS provide database which can be interpreted to aid production of hazard maps, which have immense value in any kind of activities related to disasters. For a quantitative base for disaster related operations, the following activities should be built into our management system:

(i) Organise integrated spatial and non-spatial databases using GIS tools in a systematic manner. Integration or synthesis of spatial and non-spatial information within the framework of a coherent data model and a linkage

between the different data sets would have to be done. This would involve diverse information from variety of sources, requires effective matching of similar entities and demands information consistency across the data sets.

(ii) Generation of spatial outputs, supported by tables/charts to help in developmental planning and decision-making.

(iii) Conventional forecasting to be integrated with state of the art technologies namely remote sensing, Data Collection Platforms and Geographical Information System.

(iv) Development activities proposed should use maximum possible information from remote sensing. Frequent monitoring and evaluation should also be carried out.

(v) Operational use of high technology (satellite/aerospace data) for real time data acquisition and monitoring for predicting disaster damage scenarios is needed.

Information Database

A robust and sound information database is the backbone of any system and it facilitates any strategic planning, even disaster response with a prioritisation of activities and optimisation of resources. It is therefore felt that access to such information is primary and the following efforts should be made, as a part of the Disaster Knowledge Network initiative to be spread all over the country.

(i) A database of all area/region giving the land use, demographic, socio-economic data, infrastructure (like road, rail network, hospital etc.), geography, etc maintained at national, state and local levels.

(ii) Resource Inventories of governmental and non-governmental systems, personnel and equipment should be made and networked.

(iii) There is a need in disaster management to have access to current information on the climate, weather and man-made structures as a source of data to aid in the planning, warning and assessment of disasters. To date, such information has been compiled by many organisations and stored in multiple formats and media making it difficult to bring the data together on one platform to support disaster management operations.

(iv) Historical documentation of previous disasters should include location of disasters, history, causes, mitigation, details, financial etc. available and accessible for future planning.

Resource Inventories of governmental and non-governmental systems, personnel and equipment should be made and networked.

Planning

The most important component of preparedness is planning for all contingencies. The plans have to be linked with different support departments, linking district plans to state plans and state plans to national plan, i.e., horizontal and vertical integration. Recognising this, the committee recommends the following measures to be taken:

1. It is felt that each Ministry, Department and organisation at national level should formulate comprehensive disaster management plans that should link to the national plan. These must be kept ready, practiced and updated periodically, preferably once a year.

2. Each State to develop integrated "all hazard" disaster management plans on priority, which too must be practiced and updated periodically.

3. Even at the District level District Disaster Management Plans should be prepared linked to the state and

national plans, practiced and updated from time to time.

4. Community, family and individual level plans to be prepared for disaster management developing individual kits for survival that can be kept handy.

To integrate disaster management on the same platform, common concepts and norms to be consistently followed in disaster planning at National, State, District Level. The following concepts are envisioned as primary by the HPC:

Each State to develop integrated "all hazard" disaster management plans on priority, which too must be practiced and updated periodically.

1. L0 activities to become the backbone of all planning processes.
2. The system of such a planning to be based on a thorough analysis of the parameters defined for various stages (L0, L1, L2, and L3) for different disasters.
3. Trigger Mechanism should be used as a primary means of activation of disaster response.
4. Standard Operating Procedures have to be developed and tied up at all functional levels.
5. An Incident command system to be the basis of field operations management. The Emergency Support Functions (ESF's) need to be deliberated for holistic response at all levels and their team formulations to be accordingly focussed taking into account contingencies.
6. An "All Hazards "approach keeping in view the entire cycle of disaster management for all natural and man-made disasters needs to be considered.
7. Vulnerability Assessment to be the basic component for developing a method for integrating risk reduction into local development planning process. The committee is of the view that Risk identification should be the basis of action planning to integrate risk reduction measures with sustainable development.
8. Equity interests of all stakeholder groups should be taken into account with consideration of special needs of the more vulnerable groups.
9. Infrastructure, maintenance and safety review should be built into the disaster management plans.
10. Implementation and Monitoring at all stages to be worked out and integrated with the planning process.

Forecasting, Warning and Alert systems

The technology context of the day helps us to forewarn the possibility of a range of disasters much before they actually strike that can initiate preparatory response and trigger the decision making process. The HPC, therefore, strongly feels the need to strengthen such a structure; and thus give fillip to the forecasting and early warning.

- Specific agencies, where not existing, to be nominated/designated for forecasting and monitoring of specific types of disasters identified by HPC to improve the quality and accuracy of the forecasts and increase the warning time of the forecast to make it available for optimum reservoirs operation to moderate flood peaks.
- There is a need to improve communication links, forecasting, control rooms, by modernising the existing facilities.
- It is essential to modernise the computerised weather forecasting system of IMD by introducing very fine resolution numerical models for tropical cyclone predictions. This may require ocean-atmosphere coupled models with suitable parameterisation schemes to comprehend intense precipitation, strong winds and storm

surges well in advance. This would essentially need upgrading of the computing facility in IMD.

- The rain-gauge network is too coarse to provide the variations of rainfall within districts. An adequate network of rain gauges shall cover the entire country, especially the known hazardous areas and locatios. Rainfall analysis based forcasting is simple and less expensive and therefore needs to be encouraged. Space borne measurements have to be integrated with computed aridity anomaly based on field measurements.
- R&D on prediction and forecasting of landslides should be encouraged, specially for early warning against reactivation of old landslides, repetitive landslides, and those occurring in the areas known to be hazardous.
- Forecasting of drought and its impact on agriculture needs to be reviewed. Efforts being made in various institutions in the country may 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 network of automatic weather stations and satellite data.
- There is a need to augment the observing systems including Doppler Radar not only over the cyclone prone coastal areas but also over highly populated areas.
- A is need for deployment of ocean observing systems for detection and monitoring of tropical cyclone formation and movement.
- Deployment and networking of adequate number of Doppler Radars (replacing conventional 10 and additional 10) would facilitate improvement in analysis and prediction of cyclones.
- There is a need to improve design of tide-gauge to capture storm surges and augmentation of their network along east and west coasts of India.
- Forecasting and warning works for rivers within states should be assessed on an individual basis.
- There is a definite need to strengthen the network of micro-seismic monitoring. Round the clock earthquake monitoring through strong motion seismographs and v-sat based digital telemetry systems be encouraged to generate, and disseminate, earthquake related information in real time.
- At the same time a need to strengthen surface observational network including high wind speed recording instruments.
- A network of automatic weather stations should be established.
- Microwave imagers have been found useful especially the high frequency sensors. There is a need to fly such sensors on board Indian polar orbiting satellites and their data should be analysed on real-time basis.

There is a need to improve communication links, forecasting, control rooms, by modernising the existing facilities.

Structural Measures

Certain area of activities need concrete initiatives in planning for disasters. They have been identified as structural measure by the HPC for imperative inclusion towards prevention:

1. Provision for temporary shelters for human dwellings and animals in the event of a disaster has to be made in terms of appropriate design, material and cost effective construction technology.

2. Storage facilities at a suitable scale need to be undertaken for food, fodder and other essential relief materials.

3. The building of cyclone shelters should be carried out in terms of the need in number, appropriate design and sound principles of construction.

4. Existing road, aviation and other communication linkages have to be reviewed in terms of capacities and reach for prompt mobilization of men and material.

Drills should be a primary training ground for emergency management.

5. Flood Fighting through building temporary dykes along the river, dowel bunds on the banks needs to be considered at all local and regional levels.

6. *Retrofitting of buildings, building foundations and structures as a component of disaster management should be adopted as a policy of the Government of India as well as the State Governments*. A small expert group may be constituted to recommend an action plan for taking up retrofitting work in a prioritised manner in high-risk areas. Guidelines are also necessary for establishing need for retrofitting.

Human Resource Development is an important aspect of capacity building recognised by the HPC whereby the various role players in disaster management are included. The training institutes must focus on the following:

(i) Systems, measures and initiatives that need to be taken for ensuring intensive training and retraining for building up of human resources especially to improve disaster awareness, safety and capabilities.

(ii) Capacity must be built to handle specific disaster event, and training programs are essential for each of the concerned agencies of the specific disaster. Training of trainers at all levels must receive special attention.

(iii) The need is of trained professionals in the field of development and mitigation, be it training of technicians, masons and artisans in disaster resistant construction or the post disaster component of medical first response and search and rescue.

Updating, Rehearsals, Mock drills, Simulations

"An ounce of Practice is far better than tons of precepts and a forest of instructions." It is recommended by the HPC that an annual updating is carried out in the last week of April and rehearsal of the plans during first week of May. Drills should be a primary training ground for emergency management. This is with reference to Mock drills that are to be carried out involving all agencies to maintain the efficacy of contingency exercise in times of actual requirement. A 'Continuing Scenario Building' initiative needs to be taken up, wherein at the level of each district, an exercise to build a worst scenario is taken up before the annual updating of the disaster management plan, so as to keep the plans realistically equipped to address all possible contingencies.

Police and Para Military Force

The trained manpower available with country has to be further strengthened to help channelize them better for disaster management. Police is primary to response in case of emergencies and therefore there is a need to identify them better for the purpose of disaster management.

- The police organisations should have trained and equipped disaster rescue teams as part of the local plans.
- A coordinating agency amongst the para military forces be nominated for disaster management.
- Certain Paramilitary forces having resources like medical, air transport, temporary shelters etc earmarked in designated areas of their presence in

partnership with other governmental or non-governmental organisations.

- Separate budgetary provision to be made for disaster management related training, equipping and storing for these services.

Fire Service

When it comes to the first response on site for emergencies the Fire Services of the country play a vital role. For the services it is recommended that:

(i) A National Fire Service Commission be appointed to suggest the reorganisation of Fire Services to cope with the challenges posed by the technological advancements during peacetime and war situations.

(ii) Formulation of a National Policy on Fire Preparedness in Rural and Urban Areas.

(iii) The provision of a comprehensive legislative backup to the fire services to enforce fire regulations.

(iv) The risk mapping of cities and industrial towns and the norms for fire protection levels in such areas.

(v) Review of Training standards and Equipment requirements.

(vi) Planning of Fire Safety programmes for the Public.

(vii) Planning or fire prevention and protection in slums and shanty towns.

(viii) To review provisions of the model Fire Service Bill.

Civil Defence and Home Guards

The Central Government, under section 3(1)(z), may make rules regarding utilisation of Civil Defence Corps in disaster response so that they remain in a state of continuous preparedness. *A comprehensive role for all these services should be formalised in a harmonised structure for disaster management*. All these services should be integrated into the state disaster management plan and work under the concerned state department for disaster management. The State Disaster Management Act, being enacted should include the Civil Defence as one of the agencies for relief and rehabilitation. The Department of Science and Technology, Ministry of Family Welfare and Ministry of Environment and Forests are the nodal Ministries for management of nuclear, biological and chemical accidents respectively. These Ministries are already creating and upgrading the capabilities of the States in respect of these disasters, and these organisations can be specially trained for response to these disasters.

State Governments may be permitted to accept donations for Civil defence from corporate sectors. The Chief Wardens of Civil Defence in every town should be accorded appropriate status in civil administration hierarchy especially with regard to their role and importance in disaster management. Their services when utilised should be properly recognised. To have a multi disciplinary unit, which will come into motion for activating and following up various functions and responsibilities, entrusted to DGCD under the Union War Book during war, and to manage disasters. Separate budgetary provision to be made for disaster management related training, equipping and storing for these services. CD, Home Guards and Fire Services should be placed under the administrative and operational control of the State level Management Agency. Provision for the following components should be made:

(i) Control Room be set up

(ii) Develop Management Information System to network with concerned Central, ministries/departments, state government and NGOs.

(iii) Operational component of 'Trained and Equipped First Responders' for rescue of disaster victims be created.

(iv) Creation of Immediate and Temporary Shelter Service.

Armed Forces have invariably played an important role in all major disasters in the country. The following could be implemented:

(i) The Armed Forces should have a dedicated component of personnel and equipment at the battalion level for disaster management.

(ii) The five army commands may have fully equipped centres in the five command regions at appropriate locations that may have heavy equipment necessary to carry out relief and rescue activities in the region at short notice.

(iii) Use of Territorial Army to be incorporated in disaster management plans. In highly disaster prone states, it could be considered raising specialised Disaster Management Battalions similar to Ecological Battalions.

(iv) Border Road Organisation, where available be suitably incorporated in disaster management plans.

(v) A Military Coordinating Officer should be part of the disaster management team at the national and state level.

(vi) The potential of ex-servicemen available throughout the country be tapped for disaster management. They should be employed for creating disaster task force at the local level.

(viii) Armed Forces should be resorted to in an appropriate manner. *The employment of Armed Forces should be limited for short duration,* about 15 days, with a provision of extending the period with approval of the Ministry of Defence.

Youth Movement

NCC, Boy Scouts and the Girls Guides, National Service Scheme and such *organised youth should include Disaster Management as one of their main activities.* They could be incorporated into the local level relief and awareness programmes. NYKS, Youth Clubs and Mahila Mandals at the grass-root level to be organised for creating a mass movement for disaster preparedness.

Culture of Quick Response

Response mechanism are to be worked out in detail for each type of situation. Some of the relevant issues are:

(i) Inter-Agency Disaster Response for Government of India based on prepared inter-agency drills for each of the different kinds of disasters. This would give rapid assessment report, periodic review of the disaster and recommend national level intervention.

(ii) The qualitative requirements for the assessment teams and assistance teams to be defined for each type of response visualised.

(iii) The HPC felt that collaboration between SAARC and other countries especially neighbouring countries with respect to flood management, cyclone and monsoon forecasting would go a long way in managing disasters holistically, especially in terms of pooling of resources and expertise. Vegetation in general, is crucial to the whole process of conservation of rainwater. A common SAARC approach through their forest policies therefore is essential.

(iv) Drought Response requirements (e.g. programs) may be extensive and prolonged, thus involving major commitment and expenditure of resources.

(v) Biologically related Disasters: Surveillance and rapid response activities by the State Health Authorities. Develop infrastructure for

BSL3 and BSL4 laboratory support within the country. Develop and evaluate new diagnostic tools.

(vi) Revision of existing system of response mechanism in the wake of natural and man made disasters at all levels of government and introduction of steps to minimise the response time through effective communication and measures to ensure adequacy of relief operations.

The concept of Trigger Mechanism has been incorporated by the HPC as an emergency quick response mechanism, which would spontaneously set the vehicle of management into motion on the road to disaster mitigation process. The Trigger Mechanism has been envisaged as a preparedness plan whereby the receipt of a signal of an impending disaster would simultaneously energise and activate the mechanism for response and mitigation without loss of crucial time. L1, L2, L3 levels of each type of disaster have to be predetermined, to layout procedures to trigger basic response without formal orders from anywhere. There is a need for defining calamity of rare severity or laying down broader criteria, adherence to which could be insisted upon for ensuring equity as well as transparency. The categorisation of L1-L3 as proposed by the HPC is a move in this direction.

Early warning

(i) The early warning systems for different disasters should be in place so that the concerned administrative machinery and the communities can initiate appropriate actions, to minimise loss of life and property.

(ii) These should be based on the parameters developed for the trigger mechanism and give an indication of the level or magnitude of the mobilisation required by the responders.

Networking/Coordination

(i) There is need for more timely and reliable assessment of the location, area and extent of damage (damage scenarios) to aid in response and recovery activities. An integrated system adequately equipped with the necessary infrastructure and expertise to constantly monitor the risk profile on all possible disasters and maintaining a database will become relevant. Proper coordination mechanisms should be incorporated for following:

- Different level of government
- Different departments
- Government, private sector and NGOs
- International agencies
- Regional countries

International Mobile Satellite Organisation is an internationally renowned co-operative, which provides world wide mobile satellite communication for maritime aeronautical and land mobile users. Currently IMD is using this system for issuing Global Maritime Distress Safety System. We recommend that the *State Government should install International Mobile Satellite Receiving Terminals at selected locations in coastal areas.*

SOPs, Formats, Check List, Manuals

(i) Prescribe SOPs, formats and Field Manuals for Disaster Management officials, US&R Teams, DMAT teams, NBC teams, EOCs, etc.

(ii) During a disaster of rare severity, selected senior experienced officers could be deputed in limited geographic area for overall control. Incident Command System be utilised at the site of the disaster.

(iii) A "Sourcebook on District Disaster Management" has been finalised by Lal Bahadur Shastri National Academy of Administration, Mussoorie in consultation with could be used as a basis for developing the manuals.

(iv) Guidelines be developed for relief from donors and international agencies.

State-of-the art control rooms/EOC

(i) Set up a network of EOCs in National and State capitals and headquarters of disaster prone or vulnerable districts. The EOCs will function as the nerve centres of an integrated command and control structure which will give primacy to the Incident Commander. They will be the convergence points for all inter-agency coordination and will be equipped with the state of art communications network - VHF/ UHF network at taluka village level and VSAT links; DSL - lines; broadband access to streaming audio-video network for video-conferencing and complete computer support at district, state and national level.

(ii) State Government shall immediately set up a control room at the State Capital manned round the clock by competent experienced officials. State Government should issue a manual clearly laying down duties and responsibilities of each official designation-wise for each type of accident.

(iii) Each EOC should have an alternate EOC that should be appropriately located.

(iv) The Emergency Operations Centre provides a secure location to coordinate actions and make critical decisions at the time of emergency and disaster situations. It would include the following components:

(v) EOC Operations room - this is the main room where all disaster management operations are planned, managed and executed and would have components like LAN networked computers, servers, digitised maps, emergency response plans etc.

(vi) EOC Analysis room is meant for the analysing the information received from the EOC operations room by the GIS experts, statisticians and data analysts so as to come up with a revised disaster management plan that could ensure speedy relief and recovery of the affected areas.

(vii) Emergency Information Centre (EIC) is mean for the collection and dissemination of the disaster related information to the media and the general public. And would be equipped with strong telephone network with some computers.

(viii) EOC Communications would have radio communication on UHF, VHF, Low Band, HF, and Amateur radio frequencies.

(ix) EOC reference Library will contain research material to support the staff and personnel at the EOC particularly in the analysis room.

(x) Functional area work cells - The WAN (Wide Area Network) connected room will be in contact with various centres of distribution of relief material such as back up transport systems, food and other materials, shelters in the area under the EOC, medical aid centres and list and list of hospitals and doctors, through its special cells that deal with those functions.

(xi) Armed forces should also be included in any knowledge network to make use of their experience in handling disasters and their command, control and communication facilities.

(xii) District control room/Shadow control rooms, State Control room/Shadow Control room need to be set up.

ESFs

(i) ESFs form integral part of the Emergency operation centres and each ESF should coordinate its activities from the allocated EOC.

(ii) Extension teams and workers of each ESF will be required to coordinate the response procedures at the affected site. Primary agencies when directed by NCCM will take actions to identify requirements and mobilise and deploy resources.

(iii) The identified ESFs should have a plan for mobilization, management and monitoring of their designated activities.

Communication

(i) Plans at national, state and district level should incorporate use of all communication means like web, telephone, radio (UHF, VHF, HF), fax, etc.

(ii) State-of-the-Art communication equipment to be provided at the National and State EOC's which are compatible.

(iii) Ham Radios to be used as a back up emergency communication system in the eventuality of a disaster and integrated with the district/ community response plan.

(iv) Communication links: VHF at each Tehsil/taluka; V-Sat at each District Headquarters; HAM (Help all Mankind) radio promotion programme needs to be taken up.

(v) Promoting amateur radio clubs in schools and colleges to extend Ham radios in remote areas needs to be taken up seriously.

(vi) Communication at the EOCs to be duplicated. Alternatives through messengers on foot and vehicles should be maintained.

(vii) The community level communication should be given due emphasise so that people can be in touch with concerned relatives.

(viii) It has been observed that during disasters conventional tele-communication links get disrupted. The department of Tele-communication and State Government should take necessary action to ensure satellite telephonic facilities.

Teams

(i) Every State should develop an inter-disciplinary cadre under the Relief Commissioner comprising 200 to 300 persons who could be deployed for relief works on the occurrence of a natural calamity within the State or in any other part of the country.

(ii) Search & Rescue Teams, Disaster Medical Assistance Teams, Disaster Mortuary Assistance Team. Specialized Emergency Operations teams and medical Assistance teams to be instituted at the State and District levels.

(iii) Setting up 20-30 quick-response US&R Teams by strengthening and reorienting the Fire Services and Civil Defence Structures in all Metros, State Capitals and very vulnerable populous urban centres.

(iv) Setting up of 5-6 DMATs or Disaster Medical Assistance Teams and an equal number of fully equipped Mobile Hospital Units with operation theatres, pathological labs, intensive care units, X-ray equipment and standard FEMA prescribed or equivalent equipment cache.

Specialized Emergency Operations teams and Medical Assistance teams to be instituted at the State and District levels.

(v) Setting Specialised Emergency Operations teams for NBC disasters, viz. Nuclear Emergency Teams, Biological Emergency Teams and Chemical Emergency Teams.

(vi) The police authorities shall arrange the medical examination, post-mortem teams.

(vii) Development of Rapid Damage Assessment Methodology and Constitution of Trained Teams for the purpose.

Incident Command System

It is a very effective method whereby the most experienced and knowledgeable person at a disaster site is designated as "Incident Commander" and charged with the responsibility of on scene inter-agency co-ordination and management of the incident. This is a very effective device to overcome constraints imposed by inter-se seniority and it obliterates departmental hierarchies and selects the best man intellectually equipped to ensure high quality of decision process.

Equipment Cache

US&R Teams and DMATs can each be equipped with a standard cache. This has to specifically developed for each type of disaster and geographical region. Proper storage and maintenance of the equipment needs to be ensured. Some important stocks could be maintained on a regional basis for quick relief.

Delivery of Relief

An appropriate organisational set up at the state level to cope with the incoming relief and rescue measures is an urgent necessity, so that in disaster situations of colossal magnitudes, no time is lost in directing the incoming relief and rescue measures to the exact locations where they are required. Such a set up could be formulated on the lines of the one presented by the SUMA model launched as the collective efforts of the Latin American Countries in order to improve the administration of supplies in the aftermath of a disaster situation. It provides a solution to the Problems with the arrival of unsolicited supplies thus enabling speedier distribution of relief material and assistance as the situation warrants. Equity in relief should be ensured by appropriate community level involvement.

Quality and Minimum Standards of Relief

Minimum standard of relief not only addresses the food requirements of the victimised but also provides for the health and immediate first aid facilities, looks at the water and sanitation needs, shelter requirements, and providing food that should be developed on the guidelines of SPHERE etc. When addressing the relief requirements of the disaster victims, focus should be placed on the special needs of the vulnerable population that is, children, women, aged and the disabled. The State and District authorities of vulnerable states should prepare socio-cultural needs in relief supplies.

Health and Medical

Disaster Management Plans at all levels should have Medical assistant teams, mobile hospitals, epidemic prevention measures, trauma counselling etc. Nursing & paramedics should be specially incorporated in the medical plans. Disaster specific medical plan would incorporate the special needs

Help Lines

Establish information centres at pre-designated locations for giving details of the disasters and answering public queries etc. Telephone numbers of all such information centres should be given wide publicity in electronic media. Tracing mechanism be a part of the response plan.

Human Rights

The rights of the victim in access to appropriate relief and dignified treatment also needs to be considered by the relief agencies. Normally it is seen that the Human Rights of the people are not paid heed to. In view of this it is recommended that codes for Human Rights be developed and incorporated into the response plans to sawe the concept of "Protection of Human Rights". Organisations not to act as charity distributors but encourage people to stand on their own feet, instead of converting the poorest of the poor into beggars of relief.

Culture of Strategic Thinking

Linking Development to Disaster Reduction

Integration of development plans with disaster-mitigation is the key for successful disaster management. The construction of roads, railway lines, bridges, etc should be tuned to the analysis of hazard, vulnerability and risk in a given situation. All development projects (Engineering and non-engineering) including irrigation and industrial projects should be targeted towards disaster-mitigation. *Environmental protection, afforestation programme, pollution control, construction of earthquake-resistant structures, etc should have high priority within the plans.*

Disaster Knowledge Network

A National Disaster Knowledge Network be established to cover natural, manmade and biological disasters in all their varied dimensions. The proposed Disaster Knowledge Network should be a network of networks, tuned to the felt needs of a multitude of users like disaster managers, decision makers, affected communities and media. It should also serve as an interactive platform, and in fact a huge black board in cyberspace for all players, major and minor. In this respect:

(i) High Powered Committee has identified Centre for Disaster Mitigation and Management, Anna University to coordinate the activity. Central Road Research Institute, New Delhi; Indian Institute of Chemical Technology, Hyderabad and Indian Council for Medical Research were identified as nodal agencies, respectively, for natural, manmade and biological disasters. The task can be achieved in a phased manner.

(ii) The Disaster Knowledge Network should exhibit a deep concern for the users and the information should be so packaged that it becomes available in right form to right people at right place, in right time. There ought to be an intimate connection between Disaster Knowledge Network and the Great Learning Exercise. This would require constant interaction between the managers of Knowledge Network and Knowledge based institutions. Indian Disaster Knowledge Network should eventually be linked with other International Networks like, for example, the Commonwealth Knowledge Network and the Global Disaster Information Network.

(iii) The enormous Science and Technology potential within our country needs to be tapped by forging partnerships between R&D institutions, Universities, the Industry and other government and non-government players where by the best practices could be spotlighted and publicised, policy papers could be written, action planning manuals could be written and training modules could be prepared.

(iv) Initiative be taken for National and International networking of knowledge on all spheres of disasters and their mitigation and management to create a network of networks in

which it is ensured that knowledge information is adequately filtered and authenticated and gets immediately connected to relief, rescue and to the great learning exercise.

(v) It is advisable to direct research and educational institutions to develop a compendium of the achievements of their breakthroughs for mitigation and prevention for the circulation and benefit of the concerned organisations. The R&D and educational institutions may be directed to conduct the studies addressing the problems faced by the industry in a time bound manner.

(vi) To keeping pace with the rapidity of change, there is a need for new technology and innovations in our ideas for which clarity of purpose, funds, commitment in pursuit of research and development is needed. A significant improvement in R&D infrastructure, activities and in addition to the manpower in teaching training at research institutions in the various areas of disaster mitigation and management are required. The networking concept has to be one of building partnerships. To complement each other's efforts for achieving an efficient overall disaster management system. The basic premise is that all role players are important, and can contribute to the cause.

(vii) India has a tradition of wisdom in coping mechanisms for disaster prevention and mitigation. There is a need to study these and develop a compendium of such knowledge which is found dispersed from Kashmir to Kanyakumari and North East to the West.

Global Information Network

Efficient disaster mitigation and management demand global thinking and local action. Exchange of information, experience and expertise in the area of participatory approaches, risk assessment and reduction should be through a global network established where lessons learnt, preventive models and innovative ideas for involvement of various agencies should have a common platform for building a local base. Introducing integrated mechanisms evolved through long and varied experience gained while coordinating effectively between the stakeholders, delivery systems, socio-political decision making models in different countries. Facilitating scientific, social and economic research and technological applications through programmes of joint R&D, training, human resource development for risk management and effective reduction of vulnerabilities would be part of this effort.

International Co-operation

International cooperation in Science and Technology of Disasters is being pursued by the Departments of Science and Technology of the Government of India. International cooperation encouraging voluntary contributions in terms human resource sharing and financial support from governments, international organisations, UN agencies, and other sources deserves added care. Bilateral or multilateral assistance programmes in the framework of mutually agreed protocols for cooperation in tackling disasters, should be accorded high priority both in pre-disaster and post-disaster situations. Enhancing the activities of cooperation between international organisations, programmes of United Nations, inter-governmental organisations, non-governmental organisations and the private sector for efficient use of existing resources. Define responsibilities for assisting and receiving organisations in the areas of humanitarian response and relief operations, enhancing awareness, establishing and strengthening sustainable institutional mechanisms. International disaster assistance

programmes not to be limited to geographic area of the calamity but also have a component to build nation wide resilience.

The following should take place as soon as possible:

(i) Prepare a Protocol & Detailed Operation Procedures for timely receipt of International Humanitarian Response & Relief Assistance.

(ii) Prepare an Inventory of International Response Resources that could be deployed in event of a disaster in India.

(iii) A booklet detailing the protocols, the resources available and the principles to be followed in the sourcing of international assistance.

(iv) National and international delegates be identified and asked to attend a national ways and means symposium where the booklet will be formally released and a program for its distribution will be determined, along with a program for supporting activities.

(v) Mobilise national & international resources for implementing Pilot Programs based on identified needs.

(vi) Task a small multi-disciplinary team to monitor the above process and report on its progress after 12 months.

Committee for Coordination of International Cooperation is recommended to be set up with following considerations:

(i) A clear corpus of resources be identified by the key international players which could be used for meeting the overall needs (including R&D needs) in disaster situations, on a continuous basis.

(ii) An inventory of resources, material and expertise has to be maintained for defining the functions of role players of various agencies to give a quick specific response in disaster situations.

(iii) The Trigger Mechanism is a vital at the international level for an immediate and coordinated response to disasters with concerned agencies to move into action for rescue, recovery and reconstruction is required. The global early warning systems need to be tapped.

(iv) Nodal points for the Government of India, State Governments and International agencies with all their details have to established and updated regularly to contact them on the first news of such disasters.

(v) An inter-agency group led by the NCCM/NIDM/NCDM has to be put in place to ensure the cooperation and coordination of all the key national disaster mitigation and management centers and international players for not only an effective post disaster response but also in the efforts aimed at the mitigation, prevention and preparedness for disasters.

National Disaster Mitigation Strategy to include:

(i) Create policy supports at national, state and local levels.

(ii) Improve public awareness and human resource development.

(iii) Strengthen institutional infrastructure as the first priority. Add new centers, institutions and instruments as per the needs.

(iv) Develop and facilitate improvement of engineering interventions and improve regulatory mechanisms for effective response.

(v) Strengthening of R&D and technology transfer. Create specific infrastructure for Nuclear, Chemical and Biological threats.

(vi) National level and nation wide learning from experience of the disasters in other states in the country.

(vii) Create financial supports for disaster prevention and mitigation.

(viii) Formulate better environmental methods and introduce instruments for stricter implementation of pollution laws.

(ix) An India Earthquake Safety Initiative needs to be taken up on the lines of the GESI (Global Earthquake Safety Initiative), studied as part of select global practices. The initiative should scientifically assess the earthquake risk to all cities in India falling under high seismic risk zone. Similar initiatives should be encouraged for other types of disasters.

(x) Preparation of inundation maps under a postulated failure can be made a statutory requirement.

(xi) A comprehensive greening program at the district level to prevent drought and to cope with it when ever it occurs. Can States adopt schemes like the Employment guarantees Scheme (EGS) of Maharashtra, where on the first signal of distress the district collector is able to intervene to check the situation well in time?

(xii) The dam safety program should be consisting of evaluation of hydrologic, subsurface, hydraulic, and stability conditions. It is important that dam safety to be periodically checked and resultant rectification be done.

(xiii) Safe evacuation before floods, cyclones and impending dam bursts needs to be devised.

(xiv) Safety of important installations like bridges, dams, nuclear powerplants etc. needs to be ensured.

(xv) Provision for periodical technical audit to check deviations from the planned activities like in case of mines etc.

(xvi) Integrating preventive measures in all planning and developmental activities.

(xvii) Create a mitigation fund for meeting the expenditure at all concerned organisational levels.

(xviii) Evolving a scheme of reward and punishment for prevention, safeguarding and mitigation activities.

Information technology - disaster information systems would require measures and programmes to harness the state of art Information Technology for effective communication network. Networking mechanism by Government/NGOs would also improve advance-warning systems against disasters. All the details to be placed on a dedicated web-site with provisions of continuous updating.

Creation of intelligent, integrated & comprehensive data base as a subset of the Disaster Knowledge Network that would include:

(i) Creating a National Register of resource persons and institutions for disaster management.

(ii) Generate standardised formats for assessment, relief and compensations.

(iii) Generate location specific data, which can provide a reliable decision support to emergency managers.

(iv) The Source Book on District Disaster Management Plan be updated by NCDM and then widely circulated and discussed.

(v) A comprehensive compendium on the details of the existing ground situation in mines, forests and others relevant departments be prepared to assess for future strategy.

- A composite vulnerability/risk index for the mega cities and highly disaster prone states to be developed.

Mass Movement: A Community based Approach

Creating awareness among the community through disaster education and training and information dissemination about disasters and empowering them to cope with hazards are all mitigation strategies. In the present circumstances adhering to the building bye-laws and standards could be crucial and therefore the peoples consciousness towards the same needs to be evolved. However each mass movement requires different and sites specific strategy. Involvement of Mahila Manadals, Aanganwadi workers, CBOs, Panchayats and other grass root organisations could play a significant role. Local cultural groups need to be mobilised to educate people on how to cope with disasters.

Media

An appropriate publicity management plan/ media publicity Plan for disaster management will be very useful in imparting timely and correct information to the public. The role of this growing sector needs to be tapped for disseminating preparedness aspects of disaster management among all sections of society and making special provisions for the more vulnerable sections of the community viz. women and children. Media should play a responsible role not only in terms of awareness but also in terms of accurate and informed reporting of events. The media could establish dedicated channels during the aftermath of a calamity to provide specific information about the local people and conditions.

Culture of Prevention

Proactive Measures

(i) Proactive Measures for disaster preparedness and mitigation should be - administrative, financial, legislative and techno-legal.

(ii) Capacity Building in Disaster Management has to be at Policy, Institutional and Individual level.

(iii) Raising and recruitment of professionals to build up expertise for mitigation and management.

(iv) Enforcement of Protection and Preventive measures.

(v) Generate a proper understanding of risk among different stakeholders, training and confidence building among the professionals and masons with appropriate development planning strategies.

(vi) Rehabilitation to be viewed as a long term, phased activity. Mid term rehabilitation vision is focused on reconstruction of infrastructure and livelihoods, while long term programs are geared to address the issues of prevention, mitigation and preparedness.

(vii) Demonstration and discussion of selective practices with target groups like ameliorative agro-forestry techniques even properties of pesticides, methods of weed control etc.

(viii) Licensing of engineers & architects: Circulation of brochures on micro-zone specific engineering prescriptions for new construction

(ix) Retrofitting of existing structures, buildings and related infrastructures and lifelines against all vulnerabilities.

NGOs should assist to evolve model Panchayat-level sustainable development and disaster management plans.

Educational Sector

(i) The school and college curricula to include Disaster education and awareness. Schools should take up such programs through slogan writing, art competitions and essay writing competitions.

(ii) Disaster management and disaster resistant development practices need to be incorporated as an integral part of higher level education at the college level and particularly at the institutions and centers of engineering, architecture, development planning and disaster mitigation and management.

(iii) All technical colleges, medical colleges, paramedic and nursing training institutions should have a module on disaster management. A committee of experts may be constituted to identify the syllabus for the same.

(iv) Specific course related to disaster management could be introduced at the post graduate and research level.

(v) There is a need to build up the young to understand their community and its problems to involve them in problem-solving through community participation. To develop among them a sense of social and civic responsibility and build capacity to meet emergencies.

(vi) It was recognised that the NCDM has been organising periodic disaster management education camps in colleges and universities across the country, but the need was felt to strengthen the system and institutionalise it by carrying an in-depth appraisal and creating nation wide networking of disaster training institutes.

Strengthening existing Infrastructure

(i) Communication links like telephone/ wireless/road/rail/boat for improving the flood management in the country

(ii) Potable Drinking Water and Sanitary Arrangements for improving the flood management in the country

(iii) Biologically related Disasters: Availability of safe drinking water.

(iv) Stockpile antimicrobial agents and biologicals.

Public Participation and Awareness

(i) Decade of National Decade for Disaster Reduction (NDDR) be utilised for community awareness, preparedness and mitigation efforts.

(ii) The HPC recommends that 3rd December every year be observed as National Prayer Day during which all religious groups in the country would pray at their respective places of worship for "Alleviation of Human Misery."

(iii) Capacity Building needs to include development of appropriate tools that can be used to convey as well as elicit useful information pertaining to disasters from the citizens' at large and vulnerable sections in particular.

(iv) Preparation and circulation of area specific or city specific fact sheets with emergency preparedness check lists, family disaster plans, family disaster supply kits etc.

(v) Do's and don'ts for the public need to be developed using various methods and mediums of video, TV, radio or print: on different types of disasters, how to prevent, how to combat one and finally what not to do should be made in local language and telecast.

(vi) The Village Task Force to be trained in emergency evacuation and relief

within the village. The people elect the Task Force themselves and during disasters it serves as the nodal body at village level which has to mobilise resources for the community and disseminate necessary information passed on by the outside agencies.

(vii) Building community leadership and a chain of trained community cadres through a participatory approach can help harness the resilience and resourcefulness of the community to cope together with disasters and mitigate their effects.

NGOs

Five elements to sustain VASUDEVA are donation, grant, co-operation, skill, application and offering services. Resources will have to be located in advance, for focussed application during a crisis, to avoid delay in relief activities. The tasks performed by and the role of Non-government organisations is extremely beneficial for down scaling the impact of disasters. However there is a need to define roles, NGOs are better equipped to handle accident relief and post - disaster rehabilitation work rather than actual real time rescue. Generate a co-ordination model within the NGOs and with the government towards a comprehensive approach to disaster management. The concept of VASUDEVA as given by the HPC could be popularised and expanded. It would be better if they concentrate on and further build up on this inherent strength of theirs and chalk out their own strategy with regard to the particular area of assistance they specialise in.

NGOs should be involved in Civil Defence and other organisations for disaster management by supplementing and not supplanting these services. They can be utilised for Ambulance service, medical including nursing/para-medics and provision of medicines, rehabilitation activities like arrangement of food, shelter and clothing; Communication; and Awareness of people. Efforts be made by Voluntary Agencies to evolve a district level federation of NGOs to work for building voluntary community organisations (VCO) to promote self reliance, and building peoples capacity to cope with disasters. NGOs should assist to evolve model Panchayat-level sustainable development and disaster management plans.

PRIs/ULBs to be involved in the formulation and implementation of the disaster management plan and subsequently look into the short term, medium term and long term development plans. For effective implementation of the disaster mitigation strategies, training and awareness needs to be provided to the members of the local bodies as well as the gram panchayats, thereby setting up a trained task force that would be immediately activated should a disaster strike. They should be provided with training to handle modern communication equipment such as fax, wireless, etc.

Corporate Sector

There is a need to identify the infrastructure, equipment, expertise and other resources of large private and public sector units and its incorporation into the local, state and national disaster management plans There should be draft contracts prepared for supply of equipment and relief material which could be activated on occurrence of calamities. Corporate sector should take up components of disaster management activities as part of their social marketing. A silent disaster is the phenomena of massive rural-urban migration. The corporate sector can play a vital role in this context. They can help create markets for the produce of our cottage and village industries to generate gainful rural employment by extending this facility through their own marketing networks.

Insurance

Insurance brings quality in the infrastructure and consciousness and a culture of safety by insisting to follow building codes, norms, guidelines, quality materials in construction etc. It would enforce safety standard by bringing accountability. Hazardous areas to be announced, notified and publicly displayed so that people would be motivated not to settle in those areas and Insurance be made mandatory in disaster prone areas. Premiums can be charged on the basis of higher the risk high the premium lesser the risk lesser the premium. Since many areas fall under multi hazard, there should be multi hazard insurance provisions. Insurance against all natural disasters to be made available including thunder and lightning etc. Gramin, Cattle and Crop insurance are limited, ad-hoc and scattered in scale which needs to be strengthened. Incentives to be provided to those insurers who have quickly followed building codes and other prescribed guidelines prevailing in the area. Insurance companies for efficiency should have their own experts and supervisors. Insurance companies are limited in the rural areas hence other existing institutions and their services like Panchayats, local bodies, cooperative banks, post offices could be used by insurance agency. To bring the culture of safety and insurance a year may be declared as Year of Insurance and Government may provide suitable incentives to cover the people in uncovered areas and the District Administration and other developmental agencies to take up on a mission mode. Migrant labourers can be caught in the disasters and being from other States they are not given any compensation, this difficulty should go. Government may also make provisions to incorporate in identity cards, the insurance policy number etc to create awareness and also facilitate insurance oriented information. The land-less, shelter-less and other assetless and under privileged people have to be insured by the Government on a tapering basis. There are Policies for personal, property as well as disaster oriented schemes. Comprehensive Insurance Policy for covering all types of man made accidents must be brought into place. In due course as a policy, the provision of compensation should be taken over by insurance.

Disaster mitigation and management plan must necessarily be anchored to frontline research and development in a holistic mode

Training

(i) The LBSNAA, the state ATIs and the NCDM are emerging as parts of a nation wide structure for Disaster Management, which would need further strengthening. All training for civil services, police, armed forces, professional bodies and others should have a disaster management component. The training facilities at various training institutes in the country to be upgraded for modernization, capacity building, staffing, and finally, including tuning and shaping of their disaster management plans and programmes.

(ii) District Magistrate in district is the Controller of Civil Defence Corps in categorised Civil Defence Towns. Police is invariably included in the first responder to disasters. It is necessary that the IAS and IPS officers during training under go a short capsule course in National Civil Defence College, Nagpur so that they are aware of the role, function and importance of Civil Defence. Each State should have a combined Home Guards and Civil Defence training institute.

(iii) Workshops be organised at a suitable location to discuss and evolve the necessary actions and planning for various types of disasters. The experts in the workshop should be made to interact with the officials of the

relevant departments and listen to their views and versions to arrive at the suggestions for future actions.

(iv) A network of training institutions led by a national level disaster management institute with symbiotic linkages with other National and State level institutions will need to be forged and developed. National level training institutions - NCDC, NFSC, NIRD, ICSSR, CSIR, CDMM, Universities.

(v) The R&D and educational institutions may be directed to conduct the studies addressing the problems faced by the hazardous industry and specific department.

R&D, S&T

The entire disaster mitigation and management game plan must necessarily be anchored to frontline research and development in a holistic mode. India is proud of its scientific and technological manpower. It's impressive scientific infrastructure is envy of many other countries. We do need the following:

(i) R&D leading to continuous flow of high quality basic information, including multi- hazard maps upon which a sound disaster response plan could be built.

(ii) R&D leading to prediction and forecasting of hazardous events including introduction of early warning systems.

(iii) R&D leading to technological innovation and development of new, time and cost effective technologies to meet the diverse demands of the entire disaster cycle. Simple and effective search and rescue equipment suited to different types of disasters deserve priority.

(iv) R&D on cost effective shelter designs in different geo-climatic situations, including construction of instant shelters.

(v) The reconstruction and rehabilitation programmes depend on adequate supply of building materials. Research and Development work on recycling of debris, new cost effective techniques of investigation of distressed structures, technology for retrofitting etc should be encouraged.

(vi) Individual disasters teach us a lot. By inter relating disasters belonging to the same family we can learn much more. R& D on mechanisms of occurrences of disasters and correspondence between the predicted and actual disaster scenarios must be encouraged.

Allocation of resources, technical expertise and support has to put together by each of the agencies involved who would make a detailed implementation plan.

Besides the above, certain specific recommendations include:

(i) Systematic monitoring of El Nino and global warming should be continued.

b. As a permanent Member of World Meteorological Organisation (WMO), India should continue to pursue efforts to facilitate a most effective tropical cyclone warning system for the region.

(ii) South Asia Association for Regional Cooperation (SAARC) Meteorological Research Institute may strive to achieve its stated objectives of joint research on various aspects on monsoon meteorology.

(iii) Promote and encourage R&D for all frontier areas related to disasters like biological, space applications, information technology, nuclear radiation. (e) Specific disaster management training at various levels - managerial, state responder, community based etc.

(iv) The disaster management personnel should be trained in use of emergency communication and disaster warning

systems so as to act efficiently in managing the mitigation works.

(v) Upgradation of skills of professionals by providing state of the art training and establishing public health laboratory training programme. State Government shall ensure that adequate training is imparted to all such officials for correctly carrying out their designated duties.

(vi) The US&R Teams to be trained, equipped and given periodic/surprise exercise to ensure adherence to the minimum prescribed response time.

Implementation of the Recommendations

Monitoring by Working Group of the All Party National Committee

The HPC has arrived at the recommendations after a wide consultation with the experts and the implementers and a consensus already seems to be built up, hence these would be readily accepted. However, the allocation of resources, technical expertise and support has to put together by each of the agencies involved who would make a detailed implementation plan. These would be implemented by the various Ministries, departments, Agencies and organisations at the National level along with their respective disaster management plans. Similarly, actions would be undertaken at the State, district and panchayat level. These recommendations of the HPC, as accepted by the Government, needs to be followed up and implemented in a structured and time bound manner by the concerned Ministries, departments, agencies, corporations and organisations. The HPC views the setting up of the All Party National Committee on Disaster Management under the Prime Minister as a very positive development as it would help in bringing about a political consensus for the implementation of the recommendations especially the one related to constitutional provisions, and legal framework.

The All Party National Committee on Disaster Management has an important role in building up a political will and consensus for the disaster management and mitigation effort in the country so that all sections of the society and the Government act in unison towards the vision of a disaster free India. Hence, this National Committee should be a standing body with all aspects of disaster management in the country under its preview. The HPC stands converted into the working group of this National Committee to assist in co-ordination and implementation of the follow up actions. The Working Group under the National committee may be entrusted with steering, monitoring and supervising the follow up actions and implementation of the recommendations at the National level along with those at various States, districts and panchayats.

Time frame for Implementation:

The Working Group would be required to submit a quarterly status reports on the progress of the implementation to the National Committee. A checklist giving the time frame and nodal agencies has been given separately.

Funding Mechanism

It is recommended that a certain percentage of the funds for disaster management is earmarked by all ministries and organisations for implementation of these recommendations.

RESPONSIBILITY & TIME FRAME FOR RECOMMENDATIONS OF HPC

Note: The responsibility of ministry, department or organisation recommended and not yet established would be that of the existing one

S. No.	ITEM OF RECOMMENDATIONS	NODAL ORGANISATION				TIME FRAME (YEARS)		
		NATIONAL	STATE	DISTRICT	OTHER	0 – 1	1 – 5	BY 2020
I.	CONSTITUTIONAL & LEGAL FRAMEWORK							
1.	Disaster management aspect in the Constitution	MoDM			All	✓	✓	
2.	Disaster Management Act	MoDM	Relief Commissioner			✓	✓	
3.	Regulations	All	All	All	All	✓	✓	✓
II.	ORGANISATIONAL STRUCTURES/ INSTITUTIONAL MECHANISMS							
4.	Committee on Disaster Management	MoA				✓		
5.	Working Group	MoA				✓		
6.	National Council on Disaster Management.	MoA				✓	✓	
7.	Ministry of Disaster Management	MoA				✓	✓	
8.	Department of Disaster Management and Mitigation		State Government			✓		
9.	State Disaster Mitigation & Management Centre		State Government			✓	✓	
10.	Commissioner/Secretary In-Charge of Disaster Management		State Government			✓		
11.	Resident Commissioner as Ex-officio Special Commissioner for Disaster Management		State Government			✓		
12.	District Disaster Management Committee.			District Administr-ation	Local NGOs	✓		
13.	National Centre for Calamity Management	MoDM				✓		
14.	Network of training institutions	MoDM, NIDM	DMMC		Universities	✓	✓	
15.	NIDM with alternate EOC	MoDM				✓		
16.	Full Department of Disaster Management at ATI with alternate State EOC.		DMMC			✓	✓	
17.	EOC's at the district level.		DoDM	District Administr-ation	NGOs, Corporates	✓		
18.	Reconstitute the CRF	MoF				✓		
19.	Two new funds at national level for handling L3 level disasters:	MoF				✓		
20.	10% of the plan funds earmarked for disaster management.	Planning Commission	State Government	All		✓		

S. No.	ITEM OF RECOMMENDATIONS	NODAL ORGANISATION				TIME FRAME (YEARS)		
		NATIONAL	STATE	DISTRICT	OTHER	0 – 1	1 – 5	BY 2020
21.	A district level CRF			District Administra-tion	Religious bodies, NGOs	✓		
22.	District Disaster Management Committees			District Administra-tion	NGOs, Corporates	✓		
III.	CULTURE OF PREPAREDNESS							
23.	Mapping Mission	Survey of India				✓	✓	✓
24.	Remote Sensing	Survey of India				✓	✓	✓
25.	Information Database	NCDM	ATI	EOC		✓	✓	✓
26.	State Disaster Management Plans linked to the National Plan	MoDM	DoDM			✓	✓	✓
27.	State to Develop Integrated "All Hazard" Disaster Management Plans		DoDM			✓		
28.	District Disaster Management Plans linked to State plans.		DoDM, EOC	EOC	NGOs	✓		
29.	Community, family and individual level plans & survival kits	NCDM	ATI	Training Institutes	PRI, ULB, NGOs	✓		
30.	Forecasting, warning and alert systems	MoDM	DoDM	EOC	NGOs	✓	✓	
31.	Modernise forecasting control rooms and improve communication links	Agencies concerned	Agencies concerned			✓	✓	✓
32.	Structural measures		State Govern-ment	District Administra-tion	PRI, ULB		✓	
33.	Human Resource Development	NCCM	ATI	Training Institutes	PRI, ULB, NGOs		✓	
34.	Updating, Rehearsals, Mock drills, Simulations	EOC	EOC	EOC	PRI, ULB, NGOs	✓		
35.	Police & Para Military Force	MHA	Forces			✓		
36.	Fire Service		Fire Service	Fire Service			✓	
37.	Civil Defence & Home Guards	MHA	MHA				✓	
38.	Armed Forces	MOD					✓	
39.	Youth movement	MoYS	Youth Ministry	District Administra-tion	Concerned agencies	✓		
IV.	CULTURE OF QUICK RESPONSE							
40.	Response mechanism	All	All	All	All	✓		
41.	Trigger mechanism	NCDM	ATI			✓		
42.	Networking/ Coordination	All	All	All	All	✓		

S. No.	ITEM OF RECOMMENDATIONS	NODAL ORGANISATION				TIME FRAME (YEARS)		
		NATIONAL	STATE	DISTRICT	OTHER	0 – 1	1 – 5	BY 2020
43.	SOPs, Formats, Check List, Manuals	All	All	All	All			
44.	State of art control rooms / EOC	MoDM	DoDM	District Administration				
45.	Functioning of ESFs	MoDM	DoDM	District Administration	PRI, ULB, NGOs, corporates			
46.	Communication equipment and links	MoDM	DoDM	District Administration				
47.	State inter-disciplinary teams for relief works	MoDM	DoDM	District Administration				
48.	Teams at State and District levels.	Ministry concerned	Department concerned	ESF	PRI, ULB, NGOs, corporates			
49.	US&R Teams DMATs	ESF	ESF	ESF				
50.	NBC disasters Teams.	ESF	ESF					
51.	Incident command system		DoDM					
52.	Equipment cache	ESF	ESF	ESF	PRI, ULB, NGOs, corporates			
53.	Delivery of relief	ESF	ESF	ESF	PRI, ULB, NGOs, corporates			
54.	Quality and minimum standards of relief	MoDM	DoDM	District Administration	NGOs			
55.	Health & Medical	MoH	MoH	District Health Authorities	NGOs, Nursing homes			
56.	Help Lines	ESF	ESF	ESF	PRI, ULB, NGOs, corporates			
7.	CULTURE OF STRATEGIC THINKING							
57.	Linking Development to Disaster Reduction	All	All	All	All			
58.	Global Disaster Network	Networking of Knowledge Based Institutions						
59.	Information Networking	All	All	All	All			
60.	International Co-operation	MoDM, NIDM						
61.	National Disaster Mitigation Strategy	MoDM						
62.	Information Technology – Disaster Information Systems	DoST, MoDM	EOC	EOC	Research institutes			

S. No.	ITEM OF RECOMMENDATIONS	NODAL ORGANISATION				TIME FRAME (YEARS)		
		NATIONAL	STATE	DISTRICT	OTHER	0 – 1	1 – 5	BY 2020
63.	Creation of intelligent, integrated & comprehensive data base	NCCM, NIDM	ATI, EOC	EOC	NGO	✓	✓	✓
64.	Mass movement: a community based approach	NCCM	ATI	District Training Institutes	NGO	✓	✓	✓
65.	Media	MoIB	Local State Media	Local District Media	Media	✓	✓	✓
VI.	CULTURE OF PREVENTION							
66.	Proactive Measures - Capacity Building	NIDM	DoDM	District administration	NGO	✓	✓	✓
67.	Educational Sector	MoHRD, Universities	Universities, Technical Institutes	Training Institutes, Colleges	Education Institutes	✓	✓	✓
68.	Public Participation and Awareness	MoDM, NIDM	DoDM	District administration	NGO	✓	✓	✓
69.	NGOs - popularise VASUDEVA	MoDM, NIDM	DoDM	District administration	NGO	✓	✓	✓
70.	PRIs/ ULBs involve in disaster management plan	MoDM	DoDM	District administration	PRI/ULB	✓	✓	✓
71.	Corporate Sector	MoDM, MoI	DoDM	District administration	Corporates	✓	✓	✓
72.	Training	NIDM, DOPT	ATI	Training institutes	Education institutes	✓	✓	✓
VII.	IMPLEMENTATION OF THE RECOMMENDATIONS							
73.	Monitoring by Working Group	APNCDM				✓	✓	✓

ANNEXURES

Annexure 1

Order for Constitution of HPC



No. 1-49/98-NDM
Government of India
Ministry of Agriculture
Department of Agriculture & Co-operation

Krishi Bhavan, New Delhi

Dated: 20th August, 1999

Order

Subject: Constitution of a High Powered Committee for preparation of Disaster Management Plans

1. India, due to its locational and geographical features and the behaviour of monsoon is exposed to various natural disasters like droughts, floods, cyclones, earthquakes, land-slides, avalanches, hailstorms and pest attacks which are experienced almost every year. These disasters not only cause substantial loss of human life and property but also reduce the pace of sustained economic development and often lead to heavy drain on available resources which are diverted from developmental programmes.

2. Preparing for disaster situations and, if possible, preventing them, is now widely acknowledged as an integral part of effective disaster management strategy. The State Governments, which are primarily responsible for disaster management, are required to ensure that priority is accorded to the preparedness and mitigation measures, in addition to improvement in emergency response. There is a need to have uniformity in response mechanism including scale of assistance, as far as possible, in various parts of the country. There is also a need to strengthen organisational structure of Disaster Management at various levels. Besides, the Code/Manuals/ Disaster Plans of the States require updating based on the experience gained and technological developments becoming available from time to time. There is a need to give more stress on programmes of public awareness, community participation & human resource development. Measures should also be taken to ensure that relief reaches the real victims.

3. In order to achieve the above objectives, it has been decided to constitute a High Powered Committee.

4. Accordingly, a High Powered Committee is hereby constituted with the following composition:-

(i)	Shri J. C. Pant, Ex-Secretary to the Govt. of India	Chairman
(ii)	Shri Bhagat Singh Addl. Secretary and Central Relief Commissioner	Member
(iii)	Director General, IMD	Member
(iv)	Director, Wadia Institute of Himalayan Geology Dehradun.	Member
(v)	Prof. A.S. Arya Emeritus Professor, University of Roorkee Roorkee (U.P.)	Member
(vi)	Shri Ramesh Chandra Former Chairman, Central Water Commission, New Delhi	Member
(vii)	Shri N. Vinod Menon, Prof. Disaster Management Yashwant Rao Chavan Academy of Development Administration, Pune	Member
(viii)	Dr. V. K. Sharma Prof. National Centre for Disaster Management, IIPA, New Delhi	Member
(ix)	Relief Commissioner of Assam	Member
(x)	Relief Commissioner of Maharashtra	Member
(xi)	Relief Commissioner of Uttar Pradesh	Member
(xii)	Shri Anil Sinha Joint Secretary (NDM) and Addl. Central Relief Commissioner	Member Secretary

5. Terms of Reference

The terms of reference of this Committee would be as under:-

(i) To review existing arrangements for preparedness and mitigation of natural disasters and recommend measures for strengthening the organisational structures;

(ii) To formulate a comprehensive model plan for Natural Disaster Management at the National, State and district level.

6. In making its recommendations, the Committee shall have regard, among other considerations to:

a) measures for efficient forecasting and warming systems;

b) the existing system of response mechanism in the wake of natural disasters at all levels of government and steps to minimise the response time through effective communication and measures to ensure adequacy of relief operations;

c) the development programmes related to mitigation of disaster management in different areas, and priorities and strategies for inclusion of disaster reduction components in the on-going plans/ non- plan schemes;

d) measures for intensive training for building up human resources development to improve awareness and capabilities for successful disaster management;

e) programmes of public awareness for building up society's resilience to natural disasters;

f) measures-administrative, financial, legislative as well as techno-legal to make the system of natural disaster management including disaster preparedness and mitigation more effective and pro-active;

g) measures and programmes to harness state-of-the-art Information Technology to set-up an effective and modern communication network;

h) mechanism for networking/ coordinating mitigation and preparedness efforts by various agencies/institutions, governmental and non-governmental, in the country;

i) mechanism for periodically, updating the State Government's manuals, codes, disaster management plans for different disasters, items of relief and norms of assistance;

j) existing house building practices/ codes adopted in different areas and mechanisms for hazard zonation surveys;

k) structural measures for disaster mitigation and preparedness such as improving the design of small check dams/ earthen dams, raising and relocation of flood prone villages, renovation and desilting of ponds, improved emergency draining systems and details of modalities and preparatory drills well before the flood season and

j) any other matter incidental or related to the subject of natural disaster mitigation and preparedness in the country.

7. The High-Powered Committee shall have the powers to appoint any Sub-Group and co-opt any member or associate any expert as special invitee including representatives of Ministries of Defence, Home Affairs, Information and Broadcasting and Science and Technology, as may be necessary.

8. The committee would submit its recommendations within a period of one year.

9. The committee will lay down its own procedure and methodology of work.

10. The secretarial assistance and related services to the Committee would be provided by the NCDM, IIPA, New Delhi.

11. Sitting fee for the days for attending to work of the Committee will be paid to the Chairman and the non-official members at the @ Rs. 500/- per day.

12. The payment of TA/DA to official/ non official members of the Committee would be governed by the provisions of SR-190.

Sd./-

(K. Arya)

Joint Secretary to Government of India

Annexure 2

Order for Enhancement of Terms of Reference



No. 1-49/98-NDM
Government of India
Ministry of Agriculture
Department of Agriculture & Cooperation

Krishi Bhavan, New Delhi
Dated the 17th April, 2000

Order

Subject: Constitution of High Powered Committee for preparation of Disaster Management Plans.

1. A High Powered Committee (HPC) under the Chairmanship of Shri J. C. Pant, Former Secretary to the Government of India has been constituted vide Department of Agriculture & Cooperation order of even number dated 20th August, 1999 to review existing arrangements for preparedness and mitigation of natural disasters, recommend measures for strengthening organisational structures and to formulate a comprehensive model plan for Natural Disaster Management at the National, State and District Level. A proposal to expand the ambit of the HPC to include manmade disasters, was under the consideration of Government.

2. It has now been decided, with the approval of the Prime Minister, to enlarge the terms of reference of the High Powered Committee to include both natural as well as manmade disasters. It has further been decided to include representatives from concerned ministries dealing with industrial, nuclear, biological, chemical disasters, etc. in the Committee.

3. Accordingly, the terms of reference contained in para 5 of order dated 20th August, 1999, stand modified as follows with immediate effect:-

(i) To review existing arrangements for preparedness and mitigation of natural and manmade disasters including industrial, nuclear, biological and chemical disasters.

(ii) Recommend measures for strengthening organisational structures, and

(iii) Recommend a comprehensive model plan for management of these disasters at National, State and District level.

4. The following members are also nominated to the HPC in addition to the members mentioned in para 4 of the order dated 20th August, 1999, namely:-

(i) Shri K. V. Venkatachary,
Study Director,
Disaster Management Systems,
ISRO Headquarters,
Bangalore

(ii) Shri R. M. Premkumar,
Additional Secretary
Department of Atomic Energy,
Anushakti Bhavan,
Chattrapati Shivaji Maharaj Marg, Mumbai-400001

(iii) Shri V. Rajagopalan,
Joint Secretary,
Ministry of Environment and Forest, Paryavaran Bhavan,
CGO Complex, Lodi Road,
New Delhi

(iv) Shri B. S. Lalli,
Joint Secretary,
Ministry of Defence,
South Block, New Delhi

(v) Shri Sanat Kaul,
Joint Secretary,
Ministry of Civil Aviation,
Rajiv Gandhi Bhavan,
New Delhi

(vi) Shri M. K. Shukla,
Director General, Civil Defence
Ministry of Home Affairs,
New Delhi

(vii) Dr. Ira Ray
Additional DG,
Directorate General of Health Services,
Nirman Bhavan, New Delhi

(viii) Shri Indra Ghosh
Executive Director (Safety),
Railway Board,

New Delhi

(ix) Shri N. S. Samant,
Deputy Secretary,
Department of Chemicals & Petrochemicals,
Shastri Bhavan, New Delhi

5. The words "natural disasters" wherever they occur in the order dated 20th August, 1999 will be read as "natural and manmade disasters".



(Anil Sinha)

Joint Secretary to the Government of India

Note: The HPC subsequently co-opted following as members : Shri M. C. Gupta, Director, IIPA; Shri T. N. Srivastava, IAS (Retd.); Shri Naved Masood, Joint Secy. NDM Division, MoA; Dr. R. K. Bhandari, Director, CDMM, Chennai; Shri T. N. Gupta, Advisor & Ex.Director, BMTPC and Shri Gireesh B Pradhan, Director General, YASHADA.

DISTRIBUTION

(1) Chairman and all members of the HPC

(2) Secretary, Ministries/Departments of Environment and Forests, Atomic Energy, Chemicals and Petrochemicals, Civil Aviation, Railways, Home Affairs and Defence.

(3) Cabinet Secretariat (Shri Ravi Mittal, Deputy Secretary), Rashtrapati Bhavan, New Delhi

(4) PMO

(5) Secretary (A&C)/AS(BS)/ JS (NDM)/NCDM

(6) All concerned Ministries /Departments/Organisations

(7) Master Folder

Annexure 3

Members of the High Powered Committee on Disaster Management

Members of the High Powered Committee for preparation of Disaster Management Plans

1. Shri J.C. Pant
Former Secy to the Govt. of India,
'SHRADHA Kunj'
159, Vasant Vihar
Dehradun

2. Shri Y.Harishankar
Secretary (Security),
Cabinet Secretariat
Rashtrapati Bhawan,
New Delhi

3. Shri M. C. Gupta
Director
IIPA, New Delhi-110 002

4. Shri T. N. Srivastava
I.A.S. (Retd.)
Former Member Secretary
11th Finance Commission
B-22, Char Imli,
Bhopal
Madhya Pradesh

5. Shri S K Purkayastha
Additional Secretary and
Central Relief Commissioner,
Deptt of Agriculture and Cooperation
MoA, Krishi Bhavan, New Delhi

6. Shri R. R. Kelkar
Director General,
Indian Meteorological Department,
Mausam Bhavan,
Lodhi Road
New Delhi

7. Shri Bhagat Singh
Principal Secy & Financial Commissioner
Govt of Punjab, Deptt of Revenue
Punjab Secretariat,
Chandigarh

8. Dr N.S. Virdi
Director,
Wadia Institute of Himalayan Geology,
33, General Mahadev Singh Road,
Dehradun-248 001

9. Prof. A. S. Arya
Professor Emeritus,
72/6 Civil Lines,
Roorkee-247 667

10. Shri Ramesh Chandra
Former Chairman,
Central Water Commission,
C-42, Retreat Apartment,
20 I. P. Extension, Patparganj,
Delhi-110 092

11. Shri G.B.Pradhan
Director General
Yashwant Rao Chavan Academy of Development Administration,
Pune-411007

12. Dr. V. K. Sharma
Professor, National Centre for Disaster Management,
Indian Institute of Public Administration
I. P. Estate, New Delhi-2

13. Shri Alok Perti
Secretary,
Department of Relief & Rehabilitation,
Govt. of Assam,
Dispur (Guwahati) –780006

14. Shri R.K.Bhargava
Secretary, Revenue and Forest
Department, Govt. of Maharashtra
Mumbai-400 032

15. Shri R. C. Dwivedi
Relief Commissioner,
Govt. of Uttar Pradesh,
Lucknow –226 001

16. Shri K. V. Venkatachary
Study Director,
Disaster Management Systems,
ISRO Headquarters,
Antariksha Bhawan
Bangalore

17. Shri R. M. Premkumar
Additional Secretary,
Department of Atomic Energy
Anushakti Bhavan,
Chattrapati Shivaji Maharaj Marg,
Mumbai-400001

18. Shri V. Rajagopalan
Joint Secretary,
Ministry of Environment and Forest,
Paryavaran Bhavan,
CGO Complex, Lodi Road,
New Delhi

19. Shri B. S. Lalli
Joint Secretary,
Ministry of Defence,
South Block, New Delhi

20. Shri Sanat Kaul
Joint Secretary,
Ministry of Civil Aviation,
Rajiv Gandhi Bhavan,
New Delhi

21. Shri Diwakar Prasad,
Director General, Civil Defence,
Ministry of Home Affairs,
New Delhi

22. Dr. Ira Ray
Additional DG,
Directorate General of Health Services,
Nirman Bhavan, New Delhi

23. Shri Indra Ghosh
Executive Director (Safety),
Railway Board, Rail Bhawan
New Delhi

24. Shri N. S. Samant
Director
Department of Chemicals & Petrochemicals,
Shastri Bhavan, New Delhi

25. Shri Naved Masood
Joint Secretary (NDM) and
Addl. Central Relief Commissioner,
Department of Agriculture & Cooperation,
Krishi Bhawan
New Delhi

26. Dr. R. K. Bhandari
Director
CDMM, Anna University
Chennai-25

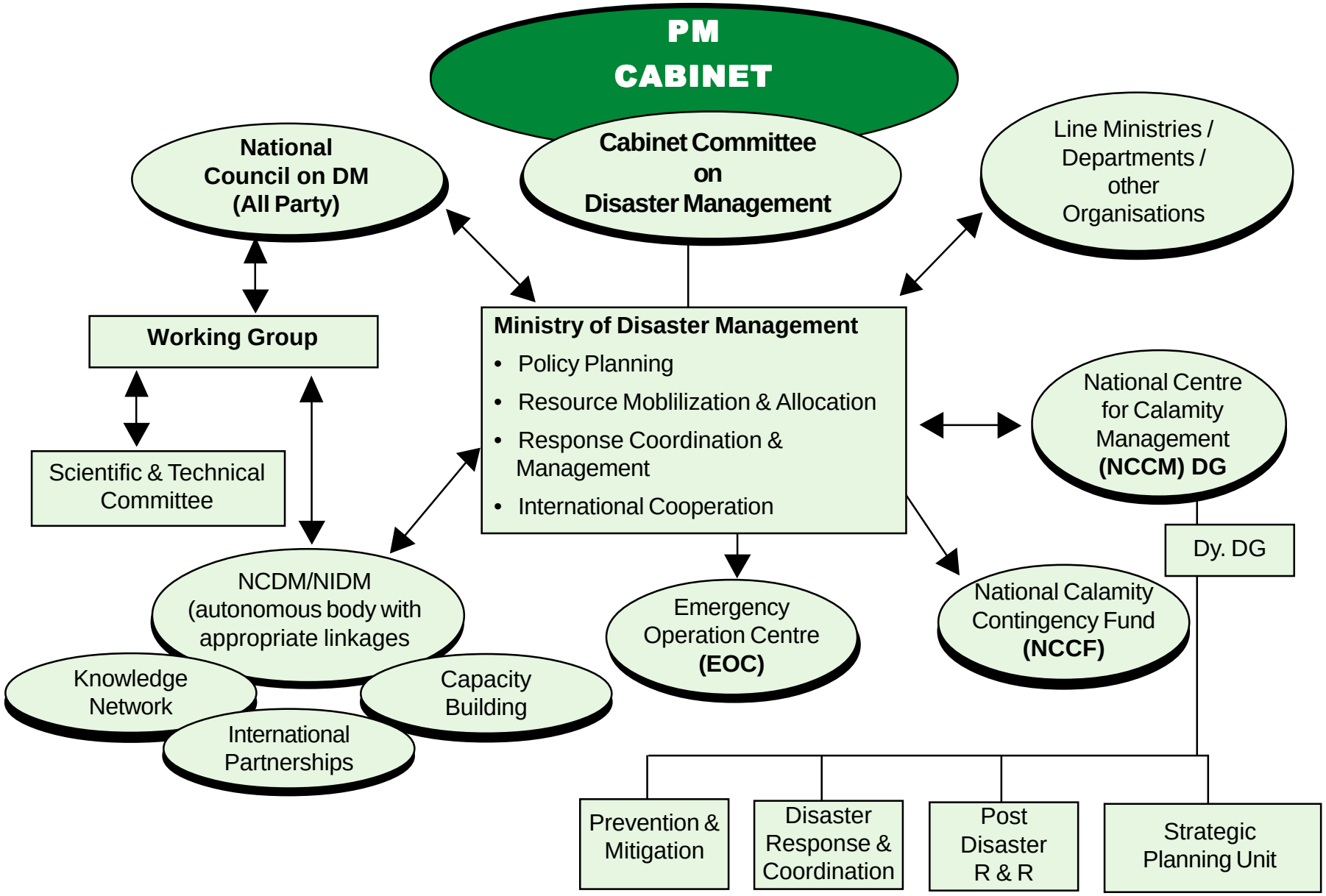
27. Shri T. N. Gupta
Advisor, MoUDPA &
Ex. Director, BMTPC
G-Wing
Nirman Bhawan
New Delhi

28 Shri Anil Sinha
Head
National Centre for Disaster Management
IIPA, IP Estate, Ring Road
New Delhi-110002

Annexure 4

Structure of National Disaster Management System

NATIONAL DISASTER MANAGEMENT SYSTEM



Annexure 5

National Calamity management Act

National Calamity Management Act

An Act to ensure the efficiency and effective management of natural and other calamities, to achieve a greater co-ordination and responsiveness in respect of prevention and mitigation of disaster arising out of such calamities and to provide for better relief and rehabilitation of the victims of such disasters and for matters connected therewith or incidental thereto.

Be it enacted by the Parliament in the 51st year of the Republic of India as follows:-

CHAPTER - I

PRELIMINARY

1. Short title extent and commencement

(i) The Act may be called the "National Calamity Management Act, 2000"

(ii) It extends to the whole of India

(iii) It shall come into force on such date as the Government of India may, by notification in the official Gazette, appoint in this behalf.

2. Definitions

(i) "Act" means the National Calamity Management Act, 2000.

(ii) "CRC" means the Central Relief Commissioner, the officer not below the rank of an Additional Secretary to the Government of India so designated by the Government of India and includes an Additional Central Relief Commissioner, Officer not below the rank of a Joint Secretary to the Government of India, so

designated by the Government of India.

(iii) "Calamity" means a catastrophe or a mishap, a grave occurrence which causes loss of life, human suffering, damage to and destruction of property and/or degradation of environment and/or which disrupts the normal functioning of the people/ communities and it includes the calamities specified in ***Schedule-I.***

(iv) "DG" means the Director General of the National Centre for Calamity Management, the officer not below the rank of Joint Secretary to the Government of India appointed as the Administrative Head of the National Centre for Calamity Management (NCCM).

(v) "DRC" means the District Relief Commissioner, the officer so designated by the State Government.

(vi) The "Government" means the Government of India.

(vii) "Management of Calamities" includes measures relating to prevention, reduction, Mitigation, response, providing rescue, relief and/or rehabilitation.

(viii) NCCF means National Calamity Contingency Fund constituted for the purpose of carrying out objectives of this Act.

(ix) NCCM means the National Centre for Calamity Management constituted by Government of India.

(x) "Notification" means a notification published in the official gazette.

(xi) "Prescribed" means prescribed by the Rules made under the Act.

(xii) "Public servant" shall have the same meaning assigned to that term in Section 21 of the Indian Penal Code.

(xiii) "SRC" means the State Relief Commissioner, the officer not below the rank of Secretary to the State Government so designated by the State Government.

(xiv) STAC means the Scientific and Technical Advisory Committee constituted by the Government of India.

The "State Government" means the Government of a State or a Union Territory.

CHAPTER - II

AUTHORITIES: THEIR POWERS AND FUNCTIONS

1. Principal authorities for calamity management

The principal authorities for the purpose of carrying out the objects of this Act and operatinalising its provisions shall be as specified below:-

(i) The Government of India represented by Ministry of Agriculture.

(ii) The State Government and authorities under the State Government including State Relief Commissioner, District Relief Commissioner etc.

(iii) National Centre for Calamity Management to be constituted by the Government of India.

(iv) Scientific and Technical Advisory Committee to be constituted by Government of India.

(v) Central Relief Commissioner (CRC) and/or Additional Central Relief Commissioner.

2. Powers and Responsibilities of the Government of India

(i) Subject to the provisions of this Act the Government of India shall have the power to take all such measures as it deems fit and expedient for the purpose of preventing and managing calamities including those specified in *Schedule-1*.

(ii) The Government of India shall constitute a National Centre for Calamity Management (NCCM) for the purpose of efficient and effective management of all kinds of disasters arising out of calamities.

(iii) The Government of India shall appoint Director General of the National Centre for Calamity Management (NCCM) who would be the officer not below the rank of Joint Secretary to the Government of India. The Government of India may also appoint such other officer or officers for effectively discharging the powers conferred and the duties entrusted to the NCCM.

(iv) The Government of India shall constitute a Scientific and Technical Advisory Committee for the purpose of advising the National Centre for Calamity Management in the matters relating to the Calamity Management

(v) The Government of India shall appoint one Central Relief Commissioner who would be the officer not below the rank of the Additional Secretary to the Government of India and may also appoint the Additional Central Relief Commissioner who would be not below the rank of the Joint Secretary to the Government of India.

(vi) It shall be the duty of the Government of India to render all necessary help and assistance to the State Government as requested and deemed appropriate for effective management of the Calamities and for prevention and mitigation of the Disasters arising out of such calamities and to provide for required relief and rehabilitation to the victims of such calamities or for matters related therewith or incidental thereto.

(vii) Notwithstanding anything contained in any other law but subject to the provisions of this Act, the Government of India may in exercise of its powers and performance of its functions under this Act, issue directions in writing to any person, officer, or authority including State Government in appropriate cases and such person, officer, or authority shall be bound to comply with such directions.

3. Powers and functions of the State Government

(i) Subject to the provisions of this Act and subject to the general control and supervision by the Government of India the State Government shall have the power to take all such measures, as it deems necessary or expedient for the purpose of preventing and managing calamities.

(ii) In particular and without prejudice to the generality of the provisions of sub section (i), such measures may include measures with respect to all or any of the following matters, namely,

a) co-ordination of actions taken by officers, officials and other

authorities and NGOs under this Act or rules made thereunder or under any other law for the time being in force which is relatable to the objects of this Act.

b) Planning and execution of a Statewide programme for management of disasters caused by calamities.

c) Laying down procedures and safeguards for management of calamities.

d) Collection and dissemination of information in respect of matters relating to calamities including propagation of vital information affecting the public.

e) Preparation of manuals, codes, or guidelines relating to management of calamities.

(iii) The State Government may constitute a Standing Technical Committee for the purpose of facilitating procurement related to calamity management and assuring the quality of material, equipments and services to be procured in connection therewith.

(iv) The State Government shall appoint a State Relief Commissioner who shall be an officer not below the rank of the Secretary to that Government and may appoint an Additional State Relief Commissioner or such other officer or officers to assist the State Relief Commissioner in discharging his functions for the purpose of calamity management.

(v) The State Government shall also appoint the District Relief Commissioner at the District level and officer so appointed shall be responsible for performing all functions relating to calamity management within his territorial jurisdiction.

(vi) The State Government may empower the State Relief Commissioner and other officers and authorities to exercise such powers and to perform such functions as might be required for more effectively carrying out the objectives of this Act.

(vii) It shall be the duty of the State Government to notify the disaster prone areas for the general information of the public and also for the purpose of implementation of the provision of the Act or Rules made thereunder.

(viii) The State Government shall draw up a plan for calamity management in advance and ensure that the concerned officials and local inhabitants are given adequate training for the successful execution of the plan.

(ix) The State Government shall declare an area where a calamity has occurred to be a calamity affected area and then it would be the bounden duty of all concerned authorities to take necessary actions required for carrying out the objectives of the Act.

(x) Not withstanding anything contained in any other law but subject to the provisions of this Act, the State Government, may in exercise of its powers and performance of its functions under this Act, issue directions in writing to any person, officer, or authority and such person, officer, or authority shall be bound to comply with such directions.

4. Duties and functions of the Central Relief Commissioner

(i) The Central Relief Commissioner shall be placed Incharge of and be responsible for relief operations in calamity affected areas and the relief operation in such areas shall be carried on under his supervision and control.

(ii) The Central Relief Commissioner shall have the power to issue directions or orders to the State Relief Commissioners/District Relief Commissioners appointed by the State Government:-

a) to draw up calamity management plans in respect of their territorial jurisdictions for prevention, preparedness, mitigation, response, warning, emergency operations, rescue, evacuation, relief, recovery and rehabilitation

b) to organise training programmes and exercises.

c) to issue timely warnings to state and local officials and also to the people likely to be affected by any calamity regarding risks and hazards.

d) to utilize the services or facilities of government organisations, Central or State; local Bodies, including Panchayat and Gram Sabha.

e) to seek support/assistance from any Institution, organisation, authority, both Government as well as Non-Government.

f) to provide public health and safety information including dissemination of such information.

g) to adopt health and safety measures.

h) to arrange for distribution of medicine, food and other consumable supplies and emergency assistance.

i) to strive earnestly to save lives and to protect properties.

j) to strive earnestly to protect and improve the natural environment including forest, flora and fauna.

k) to endeavour earnestly to assure atleast a minimum standard of relief and rehabilitation as may be prescribed in this behalf.

l) to ensure that medicines are stored at convenient places so that at times of crisis they could be reached to the needy at a short notice.

5. Powers of Central Relief Commissioner, State Relief Commissioner and District Relief Commissioner

(i) Notwithstanding anything contained in any other Act it shall be lawful for the Central Relief Commissioner/State Relief Commissioner and District Relief Commissioner to issue such guidelines/instructions or orders or directions to all departments and authorities including the Police, Para-military Forces, Fire Services, Homeguards and Civil Defence as might be considered necessary by him for the purpose of effectively carrying out the objectives of this Act, and it shall be duty of such persons and authorities to carry out such guidelines, instructions, orders or directions.

(ii) The Central Relief Commissioner or the State Relief Commissioner or the

District Relief Commissioner, if he considers it necessary, he may require any officer in command of any group of persons belonging to the armed forces to render such assistance as might be required. Every such officer of the armed forces shall obey such requisition and would extend every possible help and assistance for effective management of the calamities.

(iii) It shall also be lawful for the Central Relief Commissioner or State Relief Commissioner or any of their nominees, duly authorised in this behalf :

(a) to requisition the services of any adult private individual and to assign to him such responsibility, consistent with his age and ability, as may be deemed fit and proper, for the purpose of carrying out the objectives of this Act and translating its provisions into action.

(b) to requisition men and material from any Government organisation, department, corporations, companies, public sector undertakings, and the like, functioning within his jurisdiction, with a view to operationalise the Act and the persons in charge of such organisations, departments corporations, companies, public sector undertaking, shall be bound to comply with the requisition made in this behalf.

(iv) Whoever being called upon in writing by the Central Relief Commissioner and State Relief Commissioner/ District Relief Commissioner to comply with such requisition, without reasonable excuse, refuses or neglects to do so, shall be deemed to have committed an offence, punishable u/s 187 of the Indian Penal Code.

(v) It shall be lawful for the Central Relief Commissioner or State Relief Commissioner or District Relief Commissioner or for any other person authorised by general or special orders to enter into or upon any building or land with or without assistants or workmen in order to make any inquiry, inspection, measurement, valuation or survey or to execute any work, which is authorised by the Act, or to see whether the provisions of the Act were complied with.

(vi) It shall be lawful for any person, authorised by or under the Act to make any entry into any place, to open or cause to be opened, any door, gate or other barrier in saving lives and/or properties, if he considers the opening thereof necessary for the purpose of such entry; and, if the owner or occupier is absent, or being present, refuses to open such door, gate or barrier for purposes specified below:

(a) Removal of Debris

(b) Conduct of search and rescue operations

(c) Providing Emergency shelter

(d) Provisioning of food, medicine and other essential needs

(e) Requisitioning transport from private parties or which is available nearby

(f) Constructing temporary bridges

(g) Demolition of unsafe structure which may endanger the public

(h) Warning of further risk and hazards.

(i) Dissemination of information including do's and don'ts

(j) Rendering technical advice to the district and to the local Government

(k) Reduction of all immediate threats to life and public health and safety.

(vii) (a) It shall be the responsibility of the Central Relief Commissioner or State Relief Commissioner and/or District Relief Commissioner to make adequate arrangements for evacuation of the inhabitants before the occurrence of calamity and for the purpose, they shall be competent to give appropriate direction for evacuation.

(b) In the event of such direction being disobeyed, it shall be lawful for the Central Relief Commissioner/State Relief Commissioner/District Relief Commissioner or such authority as may be empowered in his behalf to use such amount of force as may be necessary for effecting the evacuation of inhabitants before the occurrence of calamity.

(c) Wilfull violation of such directions shall constitute an offence under the Act.

(viii) It shall be lawful for any of the principal authorities namely Government of India, Central Relief Commissioner, National Centre for Calamity Management, State Government, State Relief Commissioner and District Relief Commissioner to use or caused to be used by Doordarshan, Cable TVs, All India Radio, FM Radios for broadcasting news and disseminating information regarding intensity of disaster likely to be caused by any of the calamities.

8. National Centre for Calamity Managment

(i) The Government of India shall constitute a National Centre for Calamity Management which would consist of:-

(a) Director General of the National Centre for Calamity Management to be appointed by Government of India as the Administrative head of the National Centre for Calamity Management and he would be an officer not below the rank of the Joint Secretary to the Government of India; and

(b) any such other officer or officers as may be appointed by Government of India to aid and assist the Director General.

(ii) The principal office of the National Centre for Calamity Management would be located in New Delhi as an attached office of the Ministry of Agriculture and would function under the over all control and supervision of the Ministry of Agriculture. It may have such other branch or branches as might be necessary for the purpose of carrying out different functions and responsibilities.

9. Powers and functions of the National Centre for Calamity Management (NCCM)

The National Centre for Calamity Management shall be the nodal agency for Calamity Management in respect of the calamities including those specified in Schedule-1 and the Management of Calamities as provided for in the Act shall be effected through National Centre for Calamity Management. It would have the powers to take all or any of the following measures as it deems necessary and expedient for the purpose of management of calamities:-

(i) to organise, prepare and carry out a programme, scheme or action-plan of disaster preparedness, mitigation and management utilizing the services of appropriate institutions, agencies working in the concerned area;

(ii) to provide, on the advice of Scientific and Technical Advisory Committee, necessary financial and technical support to the States for development of comprehensive plans and programmes leading to risk reduction, vulnerability and risk assessment. Preparation of such plans and/or programmes will include, undertaking rapid damage assessment, evaluations of the nature and extent of damage to building and infrastructure and documenting the lessons after each major event causing loss to life and property;

(iii) to advise the State Governments for suitably modifying their Building Bye-laws, Land Use Planning, Master Planning and Town Planning Acts in order to enforce the provisions of National Building Code and Indian Standards and sound development planning and construction practices in the construction of buildings and infrastructure;

(iv) to advise the State Governments and local bodies to develop necessary legal instruments to regulate the services of various professionals responsible for development, planning, design and construction of buildings and infrastructure so that the professionals are made accountable for the professional misconduct and negligence which may cause severe damage and destruction of buildings and structures designed and constructed by them or under their supervision;

(v) to ensure through the intervention of Central and State Governments and local bodies that all buildings and infrastructure constructed with the public funds, shall conform to the requirements prescribed by the Regulations providing for Disaster Resistance features.

(vi) to provide adequate technical and financial support for programmes for capacity building so that plans and designs for new constructions are prepared by the professionals incorporating safe construction practices and in accordance with the Indian Standards.

(vii) to organize training for different stake-holders in order to improve the skills of professionals for guiding and advising the owners of buildings to undertake retrofitting and strengthening of the existing properties to reduce their vulnerability and improve performance against the natural

hazards that may strike the region in future; and

(viii) to take such other measure or measures as might be deemed necessary or expedient for the purpose of effectively carrying out its powers and functions.

10. Scientific and technical advisory committee

1. The Government of India shall constitute a Scientific and Technical Advisory Committee to advice the National Centre for Calamity Management and it would have such number of technical and other experts as the Government of India may determine.

2. The Committee would cause all relevant data relating to Calamity Management to be procured and would provide all scientific and technical advice and assistance to the concerned authorities dealing with calamity management.

Chapter - III

National Calamity Contingency Fund

10.(i) There shall be a National Calamity Contingency Fund in the nature of an imprest which shall remain at the disposal of the President of India to enable advances to be made by him out of this fund for meeting the urgent and unforeseen expenditure for the purpose of calamity management and for more effectively carrying out the objectives of this Act.

(ii) The corpus of this fund would be a sum of Rs. 500 crores which would remain as an imprest money. The corpus may be increased by Government of India from time to time. The annual expenditure on account of Calamity Management to be incurred out of this fund would be recouped at the beginning of every Financial Year by levy of surcharge on the receipts to the Public Account of the Union.

Chapter – IV

Liabilities And Legal Proceedings

11. Offences

(i) Willful violation of any duty imposed by the Act or Rules made under shall be deemed to be an offence.

(ii) Such offence shall be punishable with imprisonment of one year or with fine of Rs. 5000/- or with both.

(iii) Every offence under the Act shall be cognizable and non-bailable within the meaning of the Code of Criminal Procedure, 1973 (2 of 1974)

12. Penalty for contravent-ions of the provisions of the act and the rules, orders and directions

(i) Whoever fails to comply with or contravenes of any of the provisions of this Act or the rules made thereunder or orders or directions issued in this behalf shall in respect of each such failure or contravention shall be guilty of an offence against this Act.

(ii) Such offence shall be punishable with imprisonment of either description, simple, or rigorous, for a term which may extend to six months or with fine which may extend to Rs. 5000/- or with both.

(iii) Notwithstanding anything contain in the court of criminal procedure code,

1973 no court inferior to that of Metropolitan Magistrate or a Judicial Magistrate of First Class, shall try any offence under this Act.

13. Offences committed by the government department/agency

(i) Where an offence under this Act has been committed by any department of Government, the Head of the Department or Office shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly, provided that, nothing contained in this section shall render such Head liable to punishment if he proves that the offence was committed without his knowledge or that he exercised due diligence to prevent this commission of such offence.

(ii) Notwithstanding anything contained in sub section 1, where an offence under this Act has been committed by a Department of Government and it is proved that the offence has been committed with the consent or connivance of /or is attributable to any neglect on the part of any officer or official other than that of the Head of the Department or office, such officer or official shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

14. Civil liability for misuse of funds

(i) Any official/functionary entrusted with or engage in any relief and/or rescue operation, if found responsible, directly or indirectly, for loss of public money or damage to public property shall be liable for recovery of funds which shall be to the tune of 150 per cent of the total loss/damage caused.

(ii) An amount to the tune of 150 per cent of the embezzled/ misappropriated amount shall be recovered and a penalty in cash shall be imposed on such official/ functionary without prejudice to any other legal proceedings or criminal prosecution that may be launched against him.

(iii) The Competent Authority for imposing such penalty shall be as prescribed for loss of public money and damage to public property.

15. Previous sanction of the government

(i) No prosecution shall be instituted against any person other than a public servant in respect of any offence under the Act without previous sanction of the Central Relief Commissioner, State Relief Commissioner or District Relief Commissioner as the case may be.

(ii) When any public servant not removable from his office save by or with the sanction of the Government is accused of any offence alleged to have been committed by him while acting or purporting to act in the discharge of his official duty under the Act, no court shall take cognizance of such offence except with the previous sanction:-

(a) In the case of a public servant who is employed or, as the case may be, was at the time of commission of the alleged offence employed, in connection with the affairs of the Union, of the Central Government;

(b) In the case of a public servant who is employed or, as the case may be, was at the time of

commission of the alleged offence employed, in connection with the affairs of the State, of the State Government.

CHAPTER – V

MISCELLANEOUS

16. Protection of action taken in good faith

No suit, prosecution or other legal proceeding shall lie against any person for anything which is in good faith done or intended to be done under the Act.

17. Bar of jurisdiction

No Civil Court shall have jurisdiction to entertain any suit or proceeding in respect of anything done, action taken or order or direction issued by the State Government or any other authority or officer in pursuance of any power conferred by or in relation to its or his functions under the Act.

18. Effect of other laws

(i) Subject to the provisions of sub-section (2), the provisions of the Act and the Rules or orders made thereunder shall have effect, notwithstanding anything inconsistent therewith contained in any enactment other than the Act.

(ii) Where any act or omission constitutes an offence punishable under the Act and also under any other Act, then the offender found guilty of such offence shall be liable to be punished under the other Act and not under the Act.

19. Power to make rules

(i) The Government of India may make rules to carry out the purposes and objects of this Act.

(ii) All Rules made by the Government of India under this Act shall be published in the official gazette and on such publication, shall have effect as if the Rules were enacted in this Act.

(iii) Every Rule made by the Government of India under this Act shall be laid, as soon as may be after it is made, before Parliament.

SCHEDULE - 1

LIST OF CALAMITIES

I. Water and Climate Related Calamities

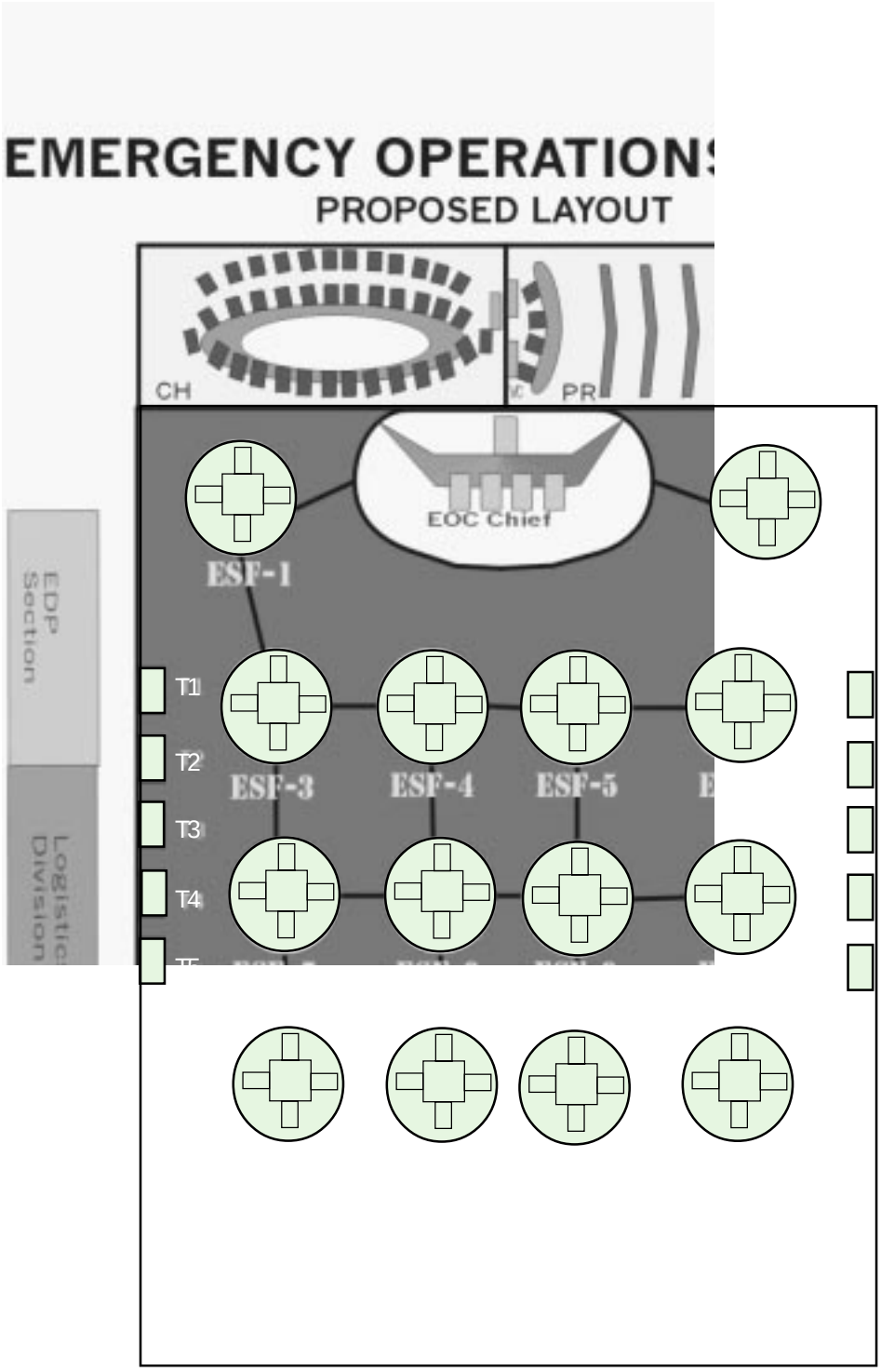
1. Floods and Drainage Management
2. Cyclones
3. Tornadoes and Hurricanes
4. Hailstorm
5. Cloud Burst
6. Thunder and Lightning
7. Snow Avalanches
8. Heat Wave and Cold Wave
9. Sea Erosion
10. Droughts

II. Geologically related Calamities

1. Earthquakes
2. Landslides and Mudflows
3. Dam Bursts
4. Mine Fires

Annexure 6

EMERGENCY OPERATIONS CENTRE PROPOSED LAYOUT


EMERGENCY OPERATIONS
PROPOSED LAYOUT
CH
PR
EOC Chief
ESF-1
EDP Section
T1
T2
ESF-3
ESF-4
ESF-5
T3
T4

Annexure 7

National Institute of Disaster Management - A Vision

National Institute of Disaster Management

A VISION



MINISTRY OF DISASTER MANAGEMENT

GOVERNMENT OF INDIA

NEW DELHI

The National Institute of Disaster Management (NIDM) will function as the nodal centre for Human Resource Development in the area of Disaster Mitigation and Response. The Institute will network with International, National, State Level Training Institutions with Disaster Management Cells as well as National and State Institutes of Rural Development and other Training Organisations set up by various Ministries. It shall also network with NGOs involved in Disaster Management as well as International Organisations.

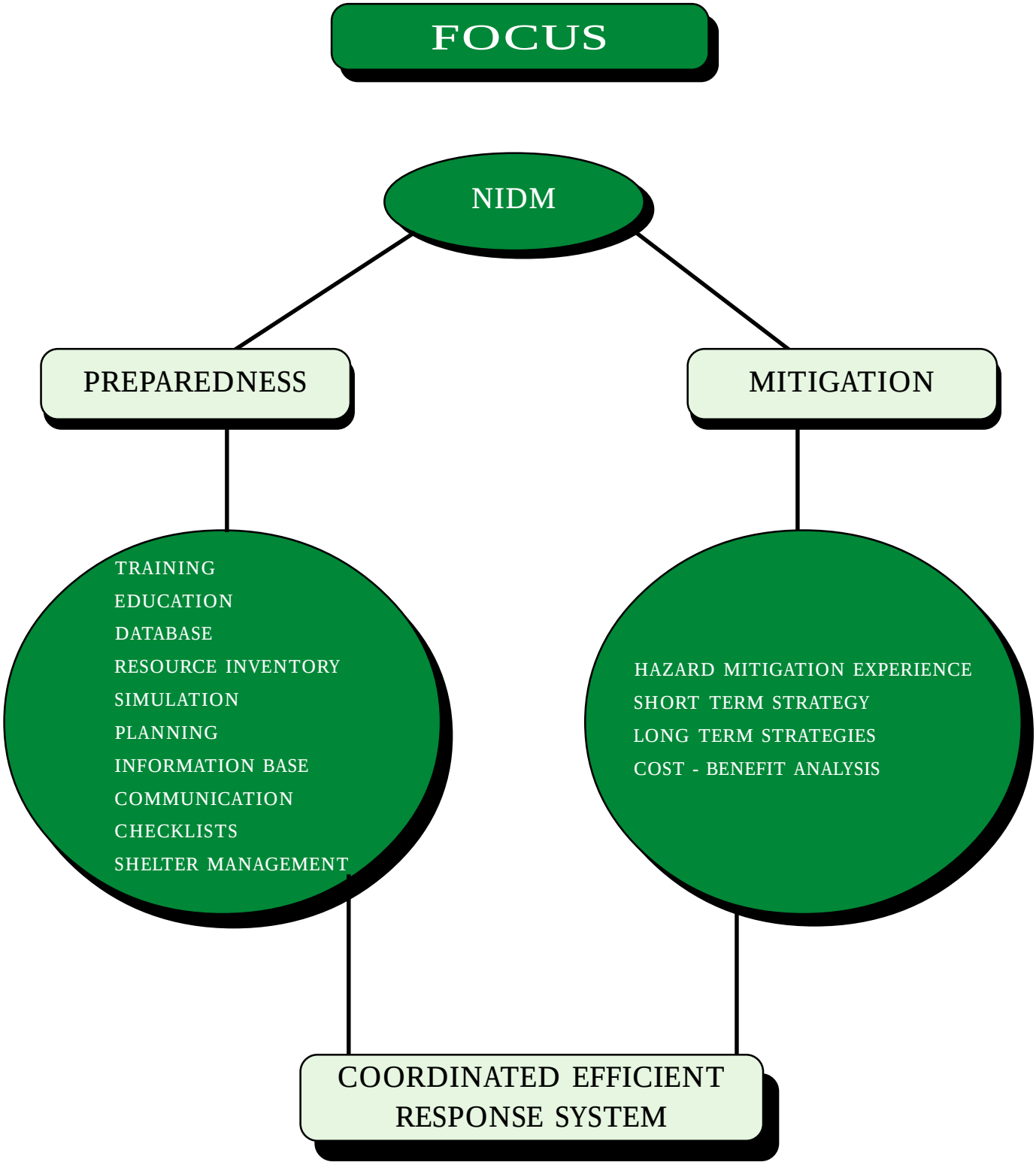
NIDM is envisioned to be an autonomous Institute with its own campus and infrastructure with alternate emergency operation centre for hands on training.

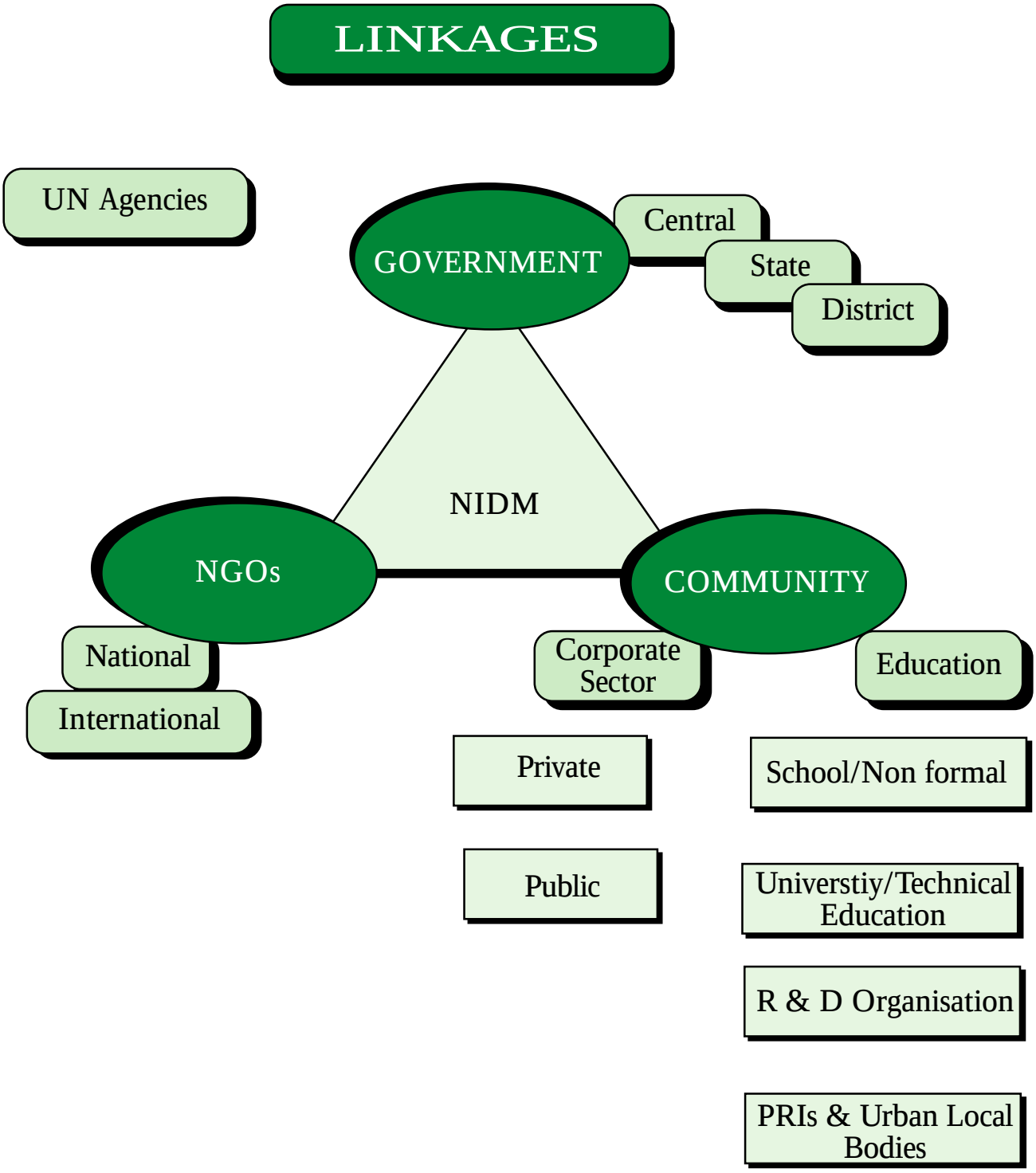
GOAL:

Disaster reduction through mitigation, preparedness and well coordinated efficient response system.

OBJECTIVES:

- Human Resource Development covering multiple aspects of disaster management and to play a lead role in national level policy formulation.
- To coordinate various role players within the field of disaster management: government, non-governmental organisations, public and private sector and international organisations.
- To establish an exhaustive national level information base on disaster policies, prevention mechanisms, mitigation measures, and region wise preparedness and response plans as well as resources spent on mitigation and response for various types of disasters.
- To forge, promote & sustain international & regional partnerships for launching joint, synergistic projects & programmes.
- To assist various states in strengthening their disaster management systems and capacities, and in preparation of their plans and strategies for hazard mitigation and disaster response.
- To set up linkages with other international institutions in the region for mutual benefits and sharing of experiences.


FOCUS
NIDM
PREPAREDNESS
MITIGATION
TRAINING
EDUCATION
DATABASE
RESOURCE INVENTORY
SIMULATION
PLANNING
INFORMATION BASE
COMMUNICATION
CHECKLISTS
SHELTER MANAGEMENT
HAZARD MITIGATION EXPERIENCE
SHORT TERM STRATEGY
LONG TERM STRATEGIES
COST - BENEFIT ANALYSIS
COORDINATED EFFICIENT
RESPONSE SYSTEM

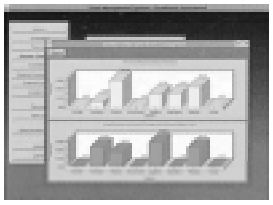

LINKAGES
UN Agencies
GOVERNMENT
Central
State
District
NIDM
NGOs
National
International
COMMUNITY
Corporate Sector
Education
Private
School/Non formal
Public
Universtiy/Technical Education
R & D Organisation
PRIs & Urban Local Bodies

Thrust Areas

Training

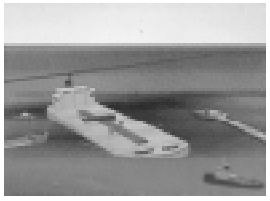


Disaster Specific



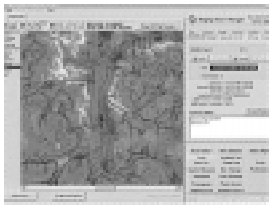
Preparedness, Mitigation & Response

Simulation



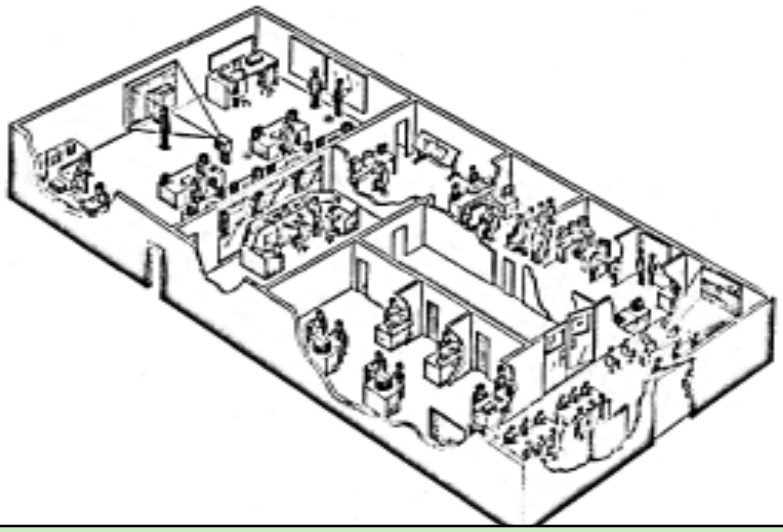
Simulation Control & Monitoring

- Flood
- Earthquake
- Fire
- Oil Spill
- Cyclone



Instructional System

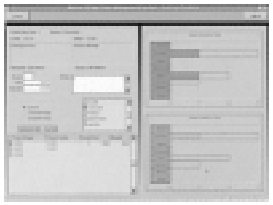
- Quantified Scoring of Performance for Feedback
- Instructor Control
- Scenario Generation



Planning



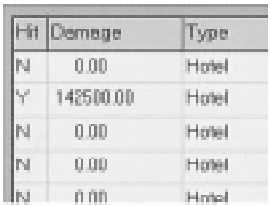
- Contingency Plan
- District Plan
- Community Plan
- Family Level Plan



- Training and Awareness programmes
- Support to Working Group on Disaster Management for preparation and operationalization of National Response Plan, State & District Disaster Management Plans and local as well as subject plans



- Database Management and Development

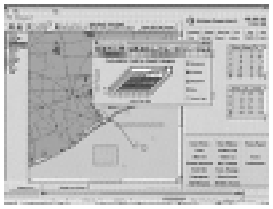


- Damage Assessment

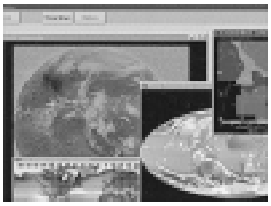
Databases



- Response Plans
- Resource Inventories

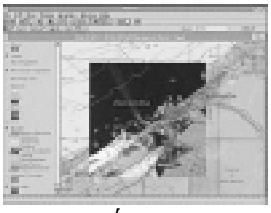


- Vulnerability



- Environment

Gis

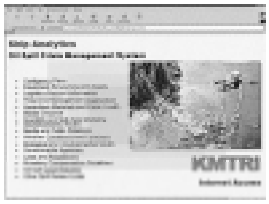


- Graphic, Image
- Map Displays



- Personnel
- Equipment
- Exposure Limits
- Response Plans
- Hazardous Materials
- Resource Inventories

Management



- Shelters
- NGOs/CBOs
- Disaster Medicine
- Trained Doctors/ Nurses



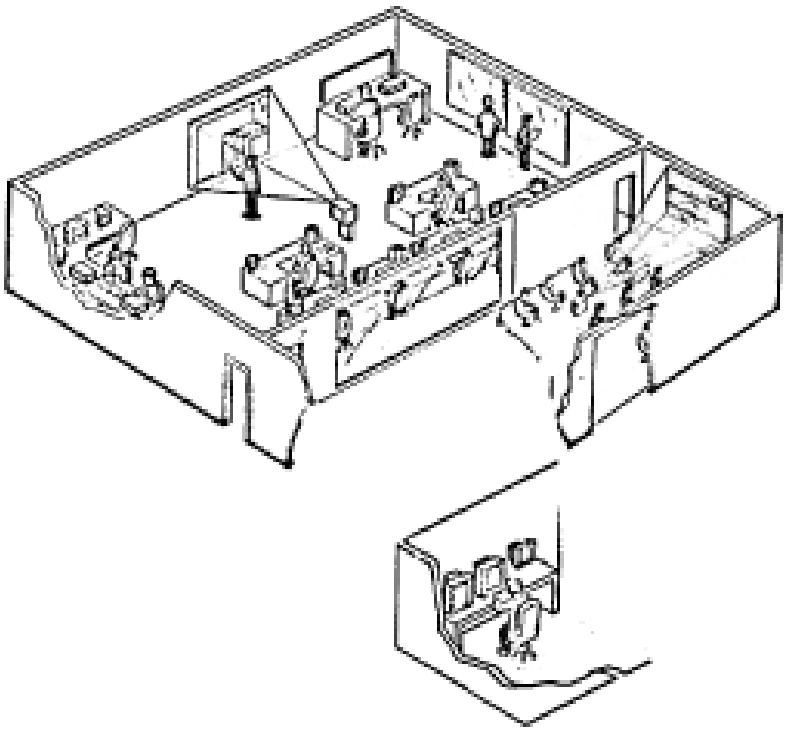
- Press Management
- Briefing Centre Network

Specific Crisis Models & Software

- Earthquake
- Flood
- Cyclone
- Drought
- Landslide
- Forest Fire
- Oil Spill
- Nuclear
- Accidents
- Epidemics
- Industrial/Chemical

Emergency Operation Cum Training Centre

- ESFs
- Databases
- Media



Our Mission

BUILDING A DISASTER FREE INDIA

Annexure 8

Model State Disaster Management Act

Chapter - 1	Preliminary Introduction Definitions
Chapter - 2	Principal Authorities Their powers and responsibilities
Chapter - 3	Liabilities and Legal Proceedings
Chapter - 4	Miscellaneous

State Disaster Management Act
(Draft Of A Model Act For The State)

An Act to ensure efficient and effective management of disasters, to achieve greater co-ordination and responsiveness in respect of prevention, reduction and mitigation of disaster and preparedness programmes for the same, to provide for better rescue, relief and rehabilitation of the victims of such disaster and for matters connected therewith or incidental thereto.

Be it enacted by Vidhan Sabha (Legislative Assembly) in the Fifty First Year of the Republic of India as follows:-

Chapter - 1
Preliminary

1. Short title extent and commencement:

(i) The Act may be called State Disaster Management Act, 2000.

(ii) It extends to the whole of the State.

(iii) It shall come into force on such date as the State Government may, by notification in the official Gazette, appoint in this behalf.

2. Definitions: In the act, unless the context otherwise requires

(i) "Disaster" means a catastrophe, calamity or mishap, a grave occurrence, which causes loss of life, human suffering, damage to and destruction of property, and/or degradation of environment and/or which disrupts the normal functioning of societies, Government and/or communities and/or adversely affects individuals and families with severity and it includes any or more of the occurrences mentioned in Schedule - 1

(ii) "The State Government" means the Government of the State of .....

(iii) "Public Servant" shall have the same meaning assigned to that term in Section 21 of the Indian Penal Code.

(iv) "Life" means Human and Animal Life.

(v) "State" means the State of .....

(vi) "Local Bodies" shall have same meaning as defined in Panchayat Act and Urban Local Bodies Act of the State.

(vii) "Act" means State Disaster Management Act.

(viii) "Notification" means a notification published in the official gazette.

(ix) "Prescribed" means prescribed by the Rules made under the Act.

(x) "District' means a Revenue District in the State.

(xi) "District Magistrate" includes Collector and/or Deputy Commissioner incharge of a district by whatever nomenclature he may be called.

(xii) "DRC" means District Relief Commissioner who is the District Magistrate so designated by the State Government.

(xiii) "SRC" means State Relief Commissioner, the Officer not below the rank of Secretary to the State Government so designated by the State Government.

(xiv) "STC" means Standing Technical Committee, the Committee constituted by the State Government under Section 4 (iii) by this Act.

(xv) "Relief Operations" include any action or step or measure taken, assistance given or support rendered or succour delivered, at any time, before, during or after disaster towards preventing, easing, alleviating, mitigating any suffering or hardship, pain or injury or distress arising out of or relatable to a disaster.

(xvi) "Imprisonment" shall mean imprisonment of either description as defined in Indian Penal Code 1860.

3. Principal authorities for disaster management

The Principal Authorities for the purpose of carrying out the objects of this Act and operationalising its provisions and the rules made thereunder shall be as specified below:

(i) The State Government

(ii) Standing Technical Committee (STC)

(iii) An Officer of the State Government not below the rank of the Secretary shall be appointed to be the State Relief Commissioner (SRC) and he shall be placed in-charge of the relief operations throughout the State.

(iv) District Magistrate shall be designated as District Relief Commissioner (DRC) and he shall be responsible for relief operations within the district.

4. Powers and responsibilities of the state government

(i) Subject to the provisions of this Act, the State Government shall have the power to take all such measures, as it deems necessary or expedient for the purpose of preventing and managing disaster.

(ii) In particular and without prejudice to the generality of the provisions of sub section (i), such measures may include measures with respect to all or any of the following matters, namely,

a) co-ordination of actions by the State Government, officers, officials, other authorities and NGOs under this Act or rules made thereunder or under any other law for the time being in force which is relatable to the objects of this Act.

b) Planning and execution of a Statewide programme for prevention, management and mitigation of disaster.

c) Laying down procedures and safeguards for the prevention of disaster.

d) Collection and dissemination of information in respect of matters relating to disasters including suo motto propagation of vital information affecting the public.

e) Preparation of manuals, codes, or guidelines relating to prevention, management and mitigation of Disaster.

(iii) The State Government shall constitute a Standing Technical Committee for the purpose of facilitating procurement related to disaster management and ensuring the quality of materials, equipments and services to be procured in connection therewith.

(iv) State Government shall exercise supervision and control over the STC, SRC and DRC.

(v) It shall be the duty of the State Government to

a) notify disaster prone areas for the general information of the public and also for the purpose of implementation of the provisions of the Act or Rules made thereunder.

b) such notification shall be issued once in three years or at such shorter interval whenever the circumstances so warrant.

(vi) The State Government shall draw up a plan for relief in advance and ensure that the concerned officials and local inhabitants are given adequate training for the successful execution of the plan.

(vii) The State Government shall declare an area where a disaster has occurred to be a "disaster affected" area as early as possible and shall denotify the same as soon as disaster ceases, both within a period of time prescribed in this behalf.

(viii) Notwithstanding anything contained in any other law but subject to the provisions of this Act, the State Government, may exercise its powers and performance of its functions under this Act, issue directions in writing to any person, officer, or authority and such person, officer, or authority shall be bound to comply with such directions.

5. Duties and functions of the standing technical committee

(i) The Standing Technical Committee shall

a) identify such materials, equipments and services as are essential for Disaster Management for any or more of the purposes specified in Sub Clauses a – l, of Clause (i) of section 16.

b) ensure the quality and standard of such materials, equipments and services by appropriate certification.

c) for the purpose of facilitating purchase and avoiding delay, select suitable suppliers and enter into rate contracts with them, the facility of which may be availed by State Relief Commissioner, District Relief Commissioner or any other agency so authorised.

(ii) In special circumstances to be prescribed in this behalf, it shall be lawful for the Standing Technical Committee to relax or to waive, by general or special orders, to dispense with the ordinary procedures and routine formalities for the purpose of procurement of such materials, equipments and services.

6. Duties and functions of the state relief commissioner and district relief commissioner :

(i) The SRC and the DRC shall be placed in charge of and be responsible for disaster management operations within the local limits of the State and the District respectively.

(ii) State Relief Commissioner / District Relief Commissioner shall supervise, coordinate, discharge the responsibilities and perform functions within their respective territorial, jurisdiction, as mentioned hereinunder -

a) to draw up disaster management plans in respect of their territorial jurisdictions for prevention, reduction, preparedness, mitigation, response, warning, emergency operations, rescue, evacuation, relief, recovery and rehabilitation, and to update the same.

b) to organise training programmes and exercises.

c) To issue timely warnings to State and local officials and also to the people likely to be affected by any disaster regarding risks and hazards.

d) To utilize the services or facilities of local bodies, including Panchayats and Gram Sabhas.

e) To seek support/assistance from any institution, organisation, authority, both Government as well as Non-Government and to identify essential functionaries as may be prescribed.

f) To provide public health and safety information including dissemination of such information.

g) To adopt health and safety measures including constructing temporary bridges.

h) To arrange for distribution of medicine, food and other consumable supplies and emergency assistance.

i) To strive earnestly to save lives and to protect properties.

j) To strive earnestly to protect and improve the natural environment including forest, flora and fauna.

k) To endeavor earnestly to ensure at least a minimum standard of relief and rehabilitation as may be prescribed in this behalf.

l) The State Relief Commissioner shall ensure that medicines and relief equipments are stored at convenient places so that at times of crisis they could be reached to the needy at a short notice. The State Relief Commissioner shall periodically review the validity and availability of medicines, so as to make them readily available in proper condition.

m) State Relief Commissioner/ District Relief Commissioner shall monitor the registration of all daily wage earners to be carried out by their respective employers in disaster prone area so as to facilitate identification of migratory labourers at times of disaster.

n) State Relief Commissioner/ District Relief Commissioner shall enlist volunteers for HAM (Help All Mankind) and other essential requirements and utilise their services.

o) State Relief Commissioner/ District Relief Commissioner shall make a first report to the next higher authority as prescribed within 24 hours of the occurrence of a disaster, and a weekly report till the disaster continues and a detailed final report of the disaster soon after the cessation of the disaster.

p) They shall submit an Annual Report (Financial Year) as prescribed regarding the disasters occurring and management thereof within their jurisdictions by the end of the month of June of the following year, to the next higher authority.

7. Powers of state relief commissioner and district relief commissioner

(i) It shall be lawful for the State Relief Commissioner/District Relief Commissioner or any of his nominees, duly authorised in this behalf

a) to requisition the services of any adult private individual and to assign to him such responsibility, consistent with his age and ability, as may be deemed fit and proper, for the purpose of carrying out the objectives of this Act and translating its provisions into actions.

b) to requisition men, material, building and transport from any Government organization, department, corporations, companies, public sector undertakings, and the like, functioning within his jurisdiction, with a view to operationalise the Act and the persons in charge of such organisations, departments, corporations, companies, public sector undertaking, shall be bound to comply with the requisition made in this behalf.

(ii) Whoever being called upon in writing by the State Relief Commissioner or District Relief Commissioner to comply with such requisition, without reasonable excuse, refuses or neglects to do so, shall be deemed to have committed an offence, punishable u/s 187 of the Indian Penal Code.

(iii) It shall be lawful for the State Relief Commissioner or District Relief Commissioner or for any other person authorised by general or special order of the State Relief Commissioner/ District Relief Commissioner in his behalf, to enter into or upon any building or land with or without assistants or workmen in order to make any inquiry, inspection, measurement, valuation or survey or to execute any work, which is authorised by the Act, or to see whether the provisions of the Act were complied with.

(iv) It shall be lawful for any person, authorised by or under the Act to make any entry into any place, to open or cause to be opened, any door, gate or other barrier in saving lives and/or properties, if he considers the opening thereof necessary for the purpose of such entry; and, if the owner or occupier is absent, or being present, refuses to open such door, gate or barrier for any or more of the purposes specified below:

a) Removal of Debris

b) Conduct of search and rescue operations

c) Providing Emergency shelter and/or services

d) Provisioning of food, medicine and other essential needs

e) Demolition of unsafe structure which may endanger the public

f) Warning of further risk and hazards.

g) Dissemination of information including do's and don'ts

h) Rendering technical safety advice

i) Reduction of all immediate threats to life and public health and safety.

j) Constructing temporary bridges for emergency evacuation.

(v) a) It shall be the responsibility of the State Relief Commissioner and/or District Relief Commissioner to make adequate arrangements for

evacuation of the inhabitants before, during and after the disaster strikes and for the purpose, they shall be competent to give appropriate direction for evacuation.

b) In the event of such direction being disobeyed, it shall be lawful for the SRC/DRC or such authority as may be empowered in his behalf to use such amount of force as may be necessary for effecting the evacuation of inhabitants before, during and after the disaster strikes.

c) Wilful violation of such directions shall constitute an offence under this Act.

8. Role of police in disaster management

(i) Under the overall supervision of the SRC, the Police of the State shall be geared effectively and adequately to reach the site of disaster immediately with a view to carrying out relief and rescue operations.

(ii) Under the overall supervision of DRC, it shall be the responsibility of the Superintendent of Police in-charge of the District to ensure that the police personnel of adequate strength reach the site of Disaster immediately with a view to carrying out rescue and relief operations. Each of them may be utilized during the disaster period for giving warnings, supervising relief operations, providing relief and rehabilitating people.

(iii) The Police communication system, for instance, wireless etc. shall be made available, free of charge, for being used for transmission and receipt of messages in connection with disaster.

(iv) The Director General of Police shall make suitable provisions for the following:

a) Police wireless system/ communication system must be always in good working condition.

b) Police personnel should be identified, and given adequate training for the purposes of disaster management so that at times of crisis their services may be readily and properly utilised.

c) Essential elements of disaster management should be incorporated in the training at entry point of service to all police personnel.

d) A code of conduct shall be prescribed for the Police personnel to be observed strictly by them in any Disaster situation and the contents thereof shall be notified for general information of the public.

e) It shall be the duty of every police personnel to rush to the aid of any person in need of help in a disaster situation.

f) It shall be the duty and responsibility of the police personnel deployed for such relief operations to prevent commission of cognizable offences including all offences against property, human body and public tranquility.

9. Role of fire service, home guard and civil defence personnel in disaster management

Under overall supervision of the SRC/ DRC,

(i) It shall be the responsibility of the Chief of each of the aforesaid organisation to ensure that their personnel of adequate strength reach the site of Disaster immediately with a view to carrying out rescue and relief operations. Each of them may be utilised during the disaster period for giving warnings, supervising relief operations, providing relief and rehabilitating people.

(ii) The aforesaid organisations shall be geared effectively and adequately so that its personnel may reach the site of disaster immediately with a view to carrying out relief and rescue operations.

(iii) The communication system of the above said organisations, for instance, wireless etc. shall be made available, free of charge, for being used for transmission and receipt of messages in connection with disaster.

(iv) The Chief of the Organisations shall make suitable provisions for the following:

a) wireless system/communication system must be always in good working condition.

b) personnel should be identified, and given adequate training for the purposes of disaster management so that at times of crisis their services may be readily and properly utilised.

c) Essential elements of disaster management should be incorporated in the training at entry point of service to all personnel

d) It shall be the duty of every person to rush to the aid of any person in need of help in a disaster situation.

e) A code of conduct shall be prescribed for the personnel to be observed strictly by them in any Disaster situation and the contents thereof shall be notified for the general information of the public.

10. Duties Of Local Bodies And Other Agencies

(i) Each Municipal Local Body shall prepare a Disaster Management plan to meet adequately the requirements of the locality concerned.

(ii) Each Factory as defined under the Factories Act 1948, each of the authorities, undertakings and enterprises, as may be prescribed, shall have a disaster management plan in conformity with the disaster management plan of local authorities/ district administration and consistent with the laws made in this behalf.

(iii) Such local bodies, factories, authorities, undertakings, enterprises shall be responsible for effective implementation of the plans drawn up by them in this behalf.

11. Financial arrangements

All civil works, equipment purchases, and training activities for prevention and reduction of Disaster shall be treated as developmental projects and the expenditure on such accounts shall be the first charge on the plan funds.

12. Insurance

(i) The State government by making rules, shall make life and property insurance mandatory for the persons residing in the recurrent disaster prone

areas; for example the coastal belts, the flood prone areas, the areas near the nuclear, chemical and hazardous industries, large congregations as may be specified under the rules.

(ii) It shall be lawful for the State Government to use Panchayats for carrying out the insurance contracts with the insurance companies. Further, local inhabitants, including landless / shelterless, who are living below the poverty line shall be identified and their insurance premium shall be paid by the State.

(iii) Every property owner in the disaster prone areas prescribed shall be under a legal obligation to get his property insured as per the local standards, expeditiously, failing which no claim for compensation shall be entertained.

13. Communication

It shall be lawful for any of the principal authorities namely, State Government, State Relief Commissioner and District Relief Commissioner to use or cause to be used all media like Doordarshan, Cable TVs, All India Radio, FM Radios, Internet, cinema halls and similar communication channels for broadcasting news and disseminating information regarding disasters.

14. Severity of disaster

(i) As soon as the disaster has occurred, the State Government shall make a report to the Central Government giving out the essential details which would include among other things, the extent of damage to and destruction of properties and loss of life, etc.

(ii) Whenever the situation so warrants, the State Government may seek assistance from the Central Government in such form and to such extent as may be deemed necessary.

(iii) On receipt of such request from the State Government, the Central Government may make appropriate arrangements for relief and rescue operations and if considered necessary, depute a team of experts to assess the gravity of the Disaster and extent of damage and destruction.

(iv) The Central Government may with due regard to the nature and gravity of the Disaster, including the extent of damage and destruction, release such funds as may be deemed appropriate.

(v) On receipt of financial assistance from the Central Government, the State government shall be accountable to the Central Government for proper utilization of funds and for submitting full accounts thereof.

15. Training

Key functionaries belong to police force, fire service, civil defence, home guard organisation and selected members of the public shall be trained regularly and in case of necessity, their services may be requisitioned at short notice.

16. Obligation to assist relief officials

(i) Every citizen shall be bound to assist the State and/or District Relief Commissioner or such other public servant entrusted with or engaged in Disaster Management work as may be authorised by him in this behalf reasonably demanding his aid for the

purpose of disaster management which includes among other things:

(a) Prevention

(b) Reduction

(c) Preparedness

(d) Mitigation

(e) Response

(f) Warning

(g) Emergency Operations

(h) Rescue

(i) Evacuation

(j) Relief

(k) Recovery

(l) Rehabilitation

(ii) Any person, who without reasonable cause, refuses or neglects to perform such public duty, when called upon to do so by an order in writing delivered or tendered to him, shall be deemed to have committed an offence punishable under section 187 of the Indian Penal Code.

17. Non discrimination in disaster management

All principal authorities shall ensure that the distribution of supplies, the process of application and other relief and assistance activities are accomplished in an equitable and impartial manner without discrimination on the grounds of race, colour, religion, caste, sex, age, region, language, economic status or political affiliation.

CHAPTER – III

LIABILITIES AND LEGAL PROCEEDINGS

18. Offences

(i) Wilfull violation of any duty imposed by the Act or Rules made thereunder shall be deemed to be an offence.

(ii) Such offence shall be punishable with imprisonment for a term not exceeding six months or with fine which may extend Rs. 5000/- or with both.

19. Penalty for contravent-ions of the provisions of the act and the rules, orders and directions

(i) Whoever fails to comply with or contravenes of any of the provisions of this Act or the rules made thereunder or orders or directions issued in this behalf shall in respect of each such failure or contravention be guilty of an offence against this Act.

(ii) Such offence shall be punishable with imprisonment of either description, simple, or rigorous, for a term, which may extend to six months or with fine, which may extend to Rs. 5000/- or with both.

(iii) Notwithstanding anything contained in the Criminal Procedure Code, 1973 no court inferior to that of Metropolitan Magistrate or a Judicial Magistrate of First Class, shall try any offence under this Act.

20. Offences committed by the government department/agency

(i) Where an offence under this Act has been committed by any department of Government, the Head of the Department or Office shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly, provided that, nothing contained in this section shall render such Head liable to punishment if he proves that the offence was committed without his knowledge or that he exercised due diligence to prevent this commission of such offence.

(ii) Notwithstanding anything contained in sub section (i), where an offence under this Act has been committed by a Department of Government and it is proved that the offence has been committed with the consent or connivance of /or is attributable to any neglect on the part of any officer or official other than that of the Head of the Department or office, such officer or official shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

21. Civil liability for misuse of funds

(i) Any official/functionary entrusted with or engaged in any relief and/or rescue operation, if found responsible, directly or indirectly, for loss of public money or damage to public property shall be liable for recovery of funds which shall be to the tune of 150 per cent of the total loss/damage caused.

(ii) An amount to the tune of 150 per cent of the embezzled/ misappropriated amount shall be recovered and a penalty in cash shall be imposed on such official/

functionary without prejudice to any other legal proceedings or criminal prosecution that may be launched against him.

(iii) The Competent Authority for imposing such penalty for loss of public money and damage to public property shall be as prescribed.

22. Previous sanction of the government or the district magistrate necessary

(i) No prosecution shall be instituted against any person other than a public servant not removable from his office save by or with the sanction of the government in respect of any offence under the Act without the previous sanction of the District Magistrate.

(ii) When any public servant not removable from his office save by or with the sanction of the Government is accused of any offence alleged to have been committed by him while acting or purporting to act in the discharge of his official duty under the Act, no court shall take cognizance of such offence except with the previous sanction:-

a) In the case of a public servant who is employed or, as the case may be, was at the time of commission of the alleged offence employed, in connection with the affairs of the Union, of the Central Government;

b) In the case of a public servant who is employed or, as the case may be, was at the time of commission of the alleged offence employed, in connection with the affairs of the State, of the State Government.

23. Protection of action taken in Good Gaith

No suit, prosecution or other legal proceeding shall lie against any person for anything, which is in good faith done or intended to be done under the Act.

24. Bar of Jurisdiction

No Civil Court shall have jurisdiction to entertain any suit or proceeding in respect of anything done, action taken or order or direction issued by the State Government or any other authority or officer in pursuance of any power conferred by or in relation to its or his functions under the Act.

25. Effect of other Laws

(i) Subject to the provisions of sub-section (ii), the provisions of the Act and the Rules or orders made there under shall have effect, notwithstanding anything inconsistent therewith contained in any enactment other than the Act.

(ii) Where any act or omission constitutes an offence punishable under the Act and also under any other Act, then the offender found guilty of such offence shall be liable to be punished under the other Act and not under the Act.

26. Power to make rules

(i) The State Government may make rules to carry out the purposes and objects of this Act.

(ii) All Rules made by the State Government under this Act shall be published in the official gazette and on such publication, shall have effect as if enacted under this Act.

(iii) Every Rule made by the State Government under this Act shall be laid, as soon as may be after it is made, before the State Legislature.

Annexure 9

Guiding Principles for Preparation of State Disaster Management Plan

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INTRODUCTION

State Disaster Management Plans will vary in accordance to the contextual situation. As such, it may not be correct to 'prescribe' a model plan. This document is to serve as guiding principles for preparation of an appropriate State Disaster Management Plan. It provides checkpoints to ensure comprehensiveness of the plan; at the same time it is flexible and leaves room for situation specific designs.

PREFACE

Note from HPC on appropriate use of this tool.

Feedback and suggestions are welcome.

<annex: feedback form>

LIST OF ACRONYMS

List of all acronyms used in the document

LIST OF DEPARTMENTS TO BE CONSULTED

List of State and Central departments to be consulted during preparation of the State Disaster Management Plan.

Central:

NDM Division

NCDM

IMD

CWC

BMTPC

Railways

Civil Aviation

CPCB

….

State:

Line Departments

…

…

IMPORTANT DATES

Date on which the Plan was last revised

Date on which the Plan was last rehearsed

Due dates for revision and rehearsal

PLANNING ASSUMPTIONS

The plan is based on the principle that response, and level of preparedness required, are dependent on the extent of vulnerability.

Disasters are graded at three levels:

L1: A District Level disaster, within the capabilities of the District Administration to deal with

L2: A State Level disaster, within the capabilities of the State Government to deal with

L3: A National Level disaster, requiring direct intervention of the Central Government

In addition to the disaster situations, the following 'peace-time' situation has also been identified:

L0: A 'no-disaster' situation. This is the level at which surveillance, preparedness and mitigation activities must be focussed on.

Clear guidelines must be laid out for identification and declaration of level of disaster, and required response level.

Alerts

Alerts and warnings are to be treated as trigger time for those disasters for which it is technically feasible to formulate forecasts and issue alerts.

<annex: sample alert format(s)>

Mostly for cyclones, floods.

Also for droughts and landslides

First Information Reports

First Information Reports need to be the trigger point for those disasters for which forecasting is not feasible, or where the time window between warning and occurrence of disaster is very narrow.

<annex: sample FIR format>

Mostly for earthquakes, accidents etc.

Criteria for Level Definition

Severity of Damage / Expected Damage

Damage reports and/or damage simulations may be used.

Extent of Damage

Geographical and functional spread of damage

Need for Direct Involvement of Central Government Departments

Thresholds beyond which involvement of Central Government is automatically warranted.

(List of such situations: earthquake above magnitude 6, accident involving more than x casualties etc.)

L0 Activities

L0 is the 'no-disaster' phase. Activities during this phase will focus on surveillance, mitigation and preparedness. These have to be monitored and ensured at the level of the State Disaster Management Authority. Plans have to be asked for and feedback given to all agencies and higher authorities.

Establishment of Disaster Management Cell

A Disaster Management Cell within the State Relief Commissioner's Office will operate as a peace-time disaster control room. It will carry out L0 activities, and stay in readiness to be upgraded to a L2 control room at very short notice (notice time defined).

Monitoring Development and Preparedness Activities

The desk will monitor the development, mitigation and preparedness activities at the State level for disaster management compliance.

It will ensure timely rehearsals, mock drills and reviews of the Disaster Management Plan.

It will make provision for and ensure conduct of trainings to various role players at different levels.

It will ensure that certain vital components of the Plan, such as the list of contact numbers, always stay updated.

Environment, Buildings, Infrastructure

Vigil will be kept on environmental compliance issues, trends of building construction, infrastructure and area development to ensure compliance with local disaster prevention principles.

<<Annual Reports>>

Monitoring of L1 occurrences

The Desk will monitor L1 occurrences in any district(s) within the State, and maintain vigil for contingent need to upgrade to L2.

<<Link with district plans>> <<Consistent report format for all districts>>

L1 and L2 occurrences within neighbouring states will be monitored for possibility of spreading to plan state.

Preparedness to assist other state(s) facing L3

L3 occurrences in any part of the country will be monitored for identification of need to respond with assistance.

L2 RESPONSE RESPONSIBILITIES

Identification of Primary & Secondary Functions

EMERGENCY RESPONSE

First 24 hours

State Relief Commissioner is the competent authority to press the trigger

<L2 declaration format>

Conditions under which trigger may be pressed are specified

(List of conditions: request from District to upscale L1, declaration of L1 in number of districts, occurrences requiring direct intervention)

Disaster Management Cell upgraded to State Control Room

(Specification of time 'x hrs.' within which Control Room to be operationalised)

(Location, layout, strength, person in charge, infrastructure specifications for setting up of room/desks)

<<manual for setting up and operation of Control Room>>

<<hardware/software to be used for operation>>

Emergency Support Function Desks Activated

(List of ESFs)

(Time, location, strength, person in charge, infrastructure specifications for setting up of desks)

Control Rooms at district level

(Time, location, strength, person-in-charge, infrastructure specifications for setting up of desks)

Quick Response Teams to be dispatched to affected area

(Time, strength, list of members, person in charge, infrastructure specifications for teams)

Quick Response Teams to comprise two sets of officials:

Line Officers Team:

Officials from line departments, led by nodal control officer

Give feedback to respective ministries, Central Control Room and the CMG.

Rush immediately (within time x hrs.) for

	DEPARTMENTS						
ESFs		Power	Telecom	Agriculture	Health	PWD	
	SAR	●	●			●	Police
	Health				●		
	Relief Material			●			Transport
	Info and Planning	●	●	●	●	●	Home
	Water	●				●	

(shaded cells represent primary function and marked cells mean participation in ESF)

quick assessment and quick response. (Specify their roles and framework in advance with self contained operational framework, protocol briefs and instructions)

<sample TOR for QRT-LOT>

Area Officers' Pool:

Officers belonging to the affected area, those officers who have served in affected districts as DMs or SPs.

Rush and stay till local administration stabilizes.

(Specify their roles and framework in advance with self contained operational framework, protocol briefs and instructions)

<sample TOR for QRT-AOP>

Assistance Teams:

Communications, Medical, Power, Armed Forces. These are to be activated depending on the feedback of the concerned person in the QRT.

Search, Rescue, Evacuation, Relief Operations begin

(Mobilization procedure of SAR teams)

(Evacuation plans with maps and list of available and accessible infrastructure) (Relief distribution plans with list, types, quantities, and locations, and movement and distribution details of pre-stocked relief material)

State Crisis Management Committee

(List members, time of meeting, agenda framework)

State Technical Committee

(This committee is mainly for planning during L0 phase, but needed here as standby for clarifications and contingencies)

First 48 Hours

State Control Room

Information, Planning & Reporting

(Instruments, Proformas, Contacts etc. provided)

Relief Coordination

Local (operations for district and Panchayat/ ULB levels)

From outside the State

Impact Assessment

External/Military Support

Entry Points: Air, Road, Water, Rail

All entry points to be manned by extension teams of ESFs that need to provide immediate exposure and guidance to personnel and material entering the area. Control rooms, information kiosks, briefing venues to be established at major points of entry.

Decentralised Material Storage Points

Material storage points to be planned in consideration of points of entry as well as points/channels of distribution.

Distribution logistics, time and distance functions, and storage security to be considered for location of material storage points.

Relief Material: Type & Quality

Immediate dissemination of information regarding type, quality and packaging system of relief material should be carried out to educate the donors and aid agencies.

This information should be based on local conditions and practices, as well as the nature of the disaster. The information should be kept in readiness during L0 stage.

Distribution Modes

Government

Public distribution systems to be strengthened where operational, and activated where non-operational.

Non-Government

Coordination to be ensured in NGO distribution systems to avoid duplication of efforts.

NGO ESF to play this role through NGO control rooms and information centers.

Information Management

Disaggregated information management system to be established to provide sector specific information based on ESF functions.

Information system to be operated through feeder links from ESFs to Central Control.

Assimilated, processed and appropriately packaged information to flow from Central Control through control rooms and information desks to all concerned information seekers.

Media Management

Media management to be done through designated media management team within the Control Room.

Media releases to be issued at periodic intervals. Media teams to be briefed and provided orientation at points of entry.

Communication facilities such as satellite phone timesharing to be made available to media teams.

Human Services

ESFs requiring direct intervention with affected population, such as health, food, SAR to be activated as a first line of response.

Special vulnerable groups including children, aged, pregnant and lactating women, people with disabilities to be given priority attention. Special team to be constituted to monitor this. Special vulnerable group functions to be made mandatory under all ESFs.

Infrastructure Support

Temporary shelter to be provided to affected people. Staggered response to be designed based on nature and scale of disaster, as well as response capacity. Priority to be given to individual household level shelter provision, upgradable to permanent houses through long-term rehabilitation phase. Relief camps to be established where individual household coverage not possible.

Specifications and Standards for Relief Camps

<<manual to set up and operate: layout, nos. sanitation etc. refer sphere standards>>

Donations: Material and Fund Mobilisation

<<Set-up of donation coordination team>>

Specifications for types, condition, packaging of donation material to be disseminated to donors and aid agencies. This information to be based on local conditions and practices as well as nature and scale of disaster. Information to be kept in readiness during L0 for immediate availability on onset of emergency.

Prepackaging as relief kits to avoid inconvenience at distribution point. Packaging units to be specified. Package colour codes to be specified. Loading plan of material in trucks to be specified to enable direct downloading and distribution at distribution site.

Impact Assessment

Impact assessment to be carried out using scientific survey and assessment methods.

<impact survey and analysis methods>

Compensation Claims

Rehabilitation

Shelter

Criteria laid out for temporary, semi-permanent and permanent shelter construction.

Relief camps to operate only for minimum possible time (3 months to 1 year depending on nature and scale of disaster).

Emphasis on disaster-resistant shelter. Specifications to be laid down and widely disseminated.

Infrastructure

Infrastructure provision to be carried out as per basic minimum standards of infrastructure services.

Staggered infrastructure development plan: permanent infrastructure building and stop-gap infrastructure need fulfillment.

Emphasis on disaster-resistant shelter. Specifications to be laid down.

Livelihoods

Household livelihood restoration through mid-term and long-term rehabilitation packages.

Mid-term packages may need to be supported through work generated by State. Long-term livelihoods to be strengthened through widened livelihood options.

Liveilhood strategy to be in place during L0 stage.

Deactivation of L2 (back to L0)

Specification of conditions to be met for L2 to be called off.

The State Relief Commissioner shall deactivate the L2 state.

<format of L2 deactivation notification>

(Subject to State's request for Central intervention, or special case requiring direct central intervention)

Control Room upgraded to EOC

(Specification of time 'x hrs.' within which EOC to be operationalised)

(Location, layout, strength, person in charge, infrastructure specifications for setting up of room/desks)

<<manual for setting up and operation of EOC>>

Structure of EOC

Coordination Hub

Functional Control Rooms/Desks/Posts

Communications

Traffic (air, water, rail, road)
Meeting points, briefing venues

Initial brief to people called

Arrival brief to all:

Basic information, latest situation update, instructions, code of conduct, helpful tips

Briefing of aliens about socio-cultural requirements, dignity

Health

Supporting documents, standards of medicines required, requirements per unit population, all major hospitals to have mobile units

NGO

SAR

Relief

Inform in advance regarding nature of material, time of dispatch, target location

Instructions on standard items required, how to pack, package coding

Composition of basic units of relief, say 10 trucks

Truck management, routing information, team food and facilities, diesel stocking etc.

Media

Rationing of sat phone time

International Support

Victim Helplines

Control rooms/desks/posts to be manned by sector specialists

STATE'S VULNERABILITY

Vulnerability to Disasters

Vulnerable Districts Identified

Vulnerability Maps

Summary of Past Events

Summary of Past Disaster Management Measures and Experiences

Risk Maps

Population at Risk

Density, Social Cultural Economic Patterns

Infrastructure availability

Houses, Roads, Power, Communications

Maps

Districts

Blocks

Cities

Transport Routes (with entry and exit points, alternate routes, all modes)

Facilities (emergency and sustenance)

Installations (strategic, risky, useful for disaster management activities)

Indigenous Knowledge

Traditional knowledge of disaster forecasting and management

Peculiarities of local food, clothing, socio-cultural habits, sanitary habits

Access to Information

Vulnerability and Plan related information to be made available on state website.

Website to be converted to emergency website within x hours of declaration of warning or disaster. Regular updates to be given thereafter.

RESOURCES

Annual Summary

Personnel

Government

Response Machinery

Emergency services - medical, fire, police

Armed forces, para military, home guards, NCC, S&G

State Technical Committee

Non Government

NSS, Civil Defence

Universities, colleges, schools

Contact Addresses, Phones

PSUs

Corporate Sector

Events

April End Updating

May Drills

Surveillance Reports

Seminars, Conferences

Training Programme

Material & Equipment (with specifications and rates)

Mobile Communication

Urban Search & Rescue

Road Clearing Equipment

Water Treatment

Power Generators

Medical Facilities

Basic Relief Material

Blankets, tents, utensils, food, water

REFERENCES

The Sphere Project: Humanitarian Charter and Minimum Standards in Disaster Response

Red Cross Code of Conduct

Vulnerability Atlas of India (1997)

National Disaster Response Plan

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•

•

FEEDBACK FORM

About you:

Your experience on using this Plan:

Comments:

Suggestions for improvement:

•

•

•

Send this form to:

(address of planning authority)

Annexure 10

An Outline for District Disaster Management Plan

CHAPTER I: INTRODUCTION

- Location
  - Area
  - Boundaries with other districts/ State
- Administrative Divisions
  - Subdivisions
  - Taluqa/Tehsils
  - Blocks
  - Villages
  - Zila Panchayat
  - Intermediate level Panchayats
  - Gram Panchayats
  - District/Metropolitan Planning Committees
  - Municipal Corporations
  - Municipalities
  - Nagar Panchayats
- Physical Features
  - Geology
  - Climate
  - Rainfall
  - Drainage System
- Economic and Social Conditions
  - Population
  - Decennial changes
  - Composition
  - Age-structure
  - Sex-ratio
  - Rural-urban distribution
  - Scheduled Caste/Scheduled/ Backward Composition and their locational
  - distribution
  - Education and Literacy
  - Occupational Distribution
  - Poverty Ratio
  - Status of agriculture –direct and indirect dependence on it
  - Status of Industry; its nature and direct and indirect dependence on it. Townships
  - developed or developing along with the industry may be specifically stated
  - Status of tertiary sector indicating the extent of dependence on it
  - Health Infrastructure
  - Educational Infrastructure
  - Non-government and other voluntary organizations engaged in social work

CHAPTER II: HAZARD ANALYSIS

- Status Of Disasters in and around the District
  - Water and Climate related disasters
  - Floods
  - Cyclones
  - Tornadoes and Hurricanes
  - Hailstorm
  - Droughts
  - Any other indicated in the HPC list or peculiar to the district and falling in this category

- Geologically related disasters
  - Landslides and mudflows
  - Earthquakes
  - Dam Failures/ Dam Bursts
  - Mine Fires
- Biologically related disasters
  - Biological disasters and epidemics
  - Pest Attacks
  - Cattle Epidemics
  - Food poisoning
- Chemical, Industrial and Nuclear disasters
  - Chemical and Industrial disasters
  - Nuclear disaters
- Accident related disasters
  - Forest Fires
  - Urban Fires
  - Serial Bomb Blasts
  - Air, Rail, and Road Accidents
  - Any other disasters mentioned in the HPC list for this category or any type of disaster peculiar to the district falling in this category but not included in the list
- Details of the disasters which occurred in the district along with brief information about the loss—physical, material and human—and the measures taken to meet it.

Chapter III: Risk Analysis

- Identification of Areas likely to be affected by each type of disaster. Population and Area to be indicated in the map of the district.
- Vulnerable Groups should be identified
- Capability assessment be Done. In particular, following aspects be covered:
  - Level of awareness.
  - Existing prevention and mitigation measures
  - Present level of preparedness
  - Response Capability
  - Community and NGO preparedness, capability, response and participating Abilities.
  - Existing Laws and regulations; their analysis and effectiveness for meeting disasters.

Chapter IV: Organizational Structure

- National Level
  - The nodal Ministry/Department for each disaster to which the district is prone may be indicated. For example, The Ministry of Agriculture is the Ministry for every natural disaster. Similarly, Ministry of Environment and Forests is the nodal Ministry for the management of chemical accidents. The nodal Ministry/ Department be ascertained and indicated so that unnecessary time is not wasted in ascertaining it at the time of disaster and furnishing information and getting Support. Ordinarily, Secretary of the concerned Ministry/Department acts as head of the Crisis Management Group with representatives from other concerned Central Government organizations and Ministries. For each disaster, it should be separately given.

- In the case of serious disasters, The Cabinet Secretary heads the Crisis Management Group with Secretaries of concerned Ministries/Departments and heads of Central organizations.

♦ State Level

- The State level organizational structure for disaster management be indicated. Where responsibility for management of different types of disasters is assigned to different departments, the nodal department for each type of disaster should be clearly indicated. While ordinary disasters (difficult to define and therefore intensity and severity to be determined in each case) may be dealt by the secretariat administrative departments, serious may require coordination and action at the Chief Secretary and Chief Minister's level. Provision of an official Committee at the Chief Secretary's level consisring of Secretaries of relevant departments and a ministerial level Committee at the Chief Ministers level consisting of Ministers of relevant departments for coordination, direction, monitoring action and organizing support be provided in the plan.

♦ District Level

- At the district level, the Collector is the focal point for disaster response and recovery. A district level Committee consisting of the district level representatives of all the concerned departments. This could be designated as District crisis management Group.
- Sub-division level committees consisting of subdivision level officers for coordination and action.
- Each concerned departmental head to organize his team for carrying out the plan of action for management.
- Involvement of panchayati raj and municipal institutions with specific responsibility for disaster management.
- Involvement of District Planning committee and other elected representatives in disaster management role as may be determined.
- Involvement of NGOs and community in awareness generation and management.
- Involving media for collection and dissemination of authentic information.

CHAPTER V : PREVENTION AND MITIGATION MEASURES

♦ Emphasis on prevention and mitigation

♦ Prevention and Mitigation measures be identified for each type of disaster to which the district is prone.

♦ Preparation of a plan of action with time schedule for implementation keeping in view the availability of resources.

♦ Generating private and institutional support –institutional and

otherwise—for identified prevention and mitigation measures.

- Exploring financial support for prevention and mitigation plan from government, private, and institutions including financial institutions.
- Review existing legal framework for proper implementation of prevention and mitigation measures and suggest modifications for making them more effective where necessary.

Chapter VI: Preparedness Plan

- Inventory of human resources. This may consist of:
  - names and addresses of principal functionaries all concerned departments at the district level to be kept in the District Emergency Control Room (DECR).
  - names and addresses of all key functionaries of all concerned departments at the district to be kept with the principal functionary of the department.
  - list of equipment and stores for rescue and relief operations in each type of type of disaster and their availability at various places—private and government—be prepared and kept in the DECR and with the concerned department at the district level.
  - preparation of list of members of the community, NGOs and their members and elected representatives who could be helpful in management of the disaster.
  - Setting of DECR in the Collector's office and due publicity to it.
  - Setting of similar control rooms in the offices of the principal functionaries of concerned for coordination and action their level.
  - Identification of shelters and other facilities near the hazard prone areas for accommodating affected population.
  - Identification of sites near the hazard prone areas for setting temporary control rooms for rescue and relief operation.
  - Establishing a coordination mechanism for incoming relief material and teams from outside at their possible places of disembarkation and deploying them in affected areas in a planned manner.
  - preparation of alternate communication arrangements in case of conventional communication channels.
  - Inventory of transport –public and private—available for deployment in times of emergence including names and addresses of owners, drivers, mechanics and repair workshops and fuel depots.
  - Preparation of the community especially in the disaster prone areas.
  - Identification of manpower for manning the DECR and other control rooms and allocation of duties.
  - Arrangement for training of all

identified functionaries and periodic upgrading of their knowledge.

- Periodic simulation exercises as a test preparedness for all the functionaries and the community.

Chapter VII : Response Plan

- Alerting and strengthening the various control rooms
- Alerting the community
- Restoring the communication channels
- Organizing Rescue of the affected population
- Organizing medical relief
- Organizing Shelters for population rendered homeless
- Coordinating the relief operations of NGOs and community worker
- Coordinating relief from outside agencies including distribution of relief material
- Assessment of damage
- Organizing post-mortem, death certificates, disposal of dead bodies and carcasses
- Maintaining law and order and protecting the property of the affected population
- Assisting the population towards rehabilitation

Chapter VIII : Recovery

- Physical and Economic rehabilitation of the affected population
- Restoration of community services—street lighting, water supply, scavenging, schools and medical services
- Restoration of physical infrastructure—roads, public buildings, community centers etc.
- Restoration of private enterprises including farming activities
- Restoration of private residential buildings
- Helping organizing institutional finance in restoration work
- Medical rehabilitation of people seriously affected by the disasters
- Psychological rehabilitation of persons and families traumatized by the disaster

Chapter IX : Appraisal, Documentation, and Reporting

- Reappraisal of the plan in operation
- Comprehensive documentation on disaster management
- Preparation of report and submitting it to the Sate Government

Annexure 11

CONTENTS OF NATIONAL DISASTER RESPONSE PLAN

National Disaster Response Plan – Contents

STRUCTURE

I. Introduction

a Vision of the Plan
b. Evolution of the Document
c. HPC Approach to management of disasters
d. Role of the National Government

II. Methodology

a. Key Issues
b. How to use the Document of the N D R P
c. National Response plan

III. Approach

a. National Response Approach (Acts)
b. New Concepts
c. Disaster Specific Activities
d. Concept of Operation
   Flow chart - Information
   Flow chart – Command
e. Emergency Information Disk net

IV. Vulnerability and Resource Maps

V. Quick Response

a. Quick Response system
b. Pre disaster Warning
   1. Warning
   2. No Warning
   3. De-warning
c. Response Planning
   • NCMC
   • CMG
d. Arrival Points
e. National Disaster Quick Response
   1. Quick response teams
      • Assessment Teams
      • Response Teams
   2. First 24 hours
   3. Base report for forth coming actions
   4. First 24- 48 hours
f. Continued Response
g. Deactivation and Documentation

VI. National Operation Centre

a. National Emergency Operation Centre
   Aim of an EOC
   Location
   Concept of Operation
   Activation steps
   Organisational Set up
   Material and Man-Power requirements
b. Incident Command System
c. Over all Command

VII. Emergency Support Functions

ESF No. 1	- Communication
ESF No. 2	- Public Health and Sanitation
ESF No. 3	- Power
ESF No. 4	- Transport
ESF No. 5	- Search and Rescue
ESF No. 6	- Donation
ESF No. 7	- Public Works and Engineering
ESF No. 8	- Information and Planning
ESF No. 9	- Relief Supplies
ESF No. 10	- Food
ESF No. 11	- Drinking Water
ESF No. 12	- Shelter
ESF No. 13	- Media
ESF No. 14	- Helplines

VIII Disaster Specific Modules

Proposed Framework
Specific Models - Sudden disasters
Slow creeping Disasters

CONTEXT

RESPONSE ACTIONS

RESPONSIBILITIES

Disaster Modules

Annexure 12

GLOSSARY OF TERMS

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Glossary of Terms

Aftershocks

Follow-up earthquakes that occur after the first earthquake and are usually smaller than the first one.

Avalanche

An event where a mass of snow, rock, and ice falls down a mountain. Usually it refers to a snow avalanche. Sometimes the term snow slide is used to mean a snow avalanche.

Blizzard

A storm that produces heavy blinding snow, near zero visibility, deep drifts and dangerous wind chill.

Disaster

An occurrence of a severity and magnitude that normally results in deaths, injuries, and property damage and that cannot be managed through the routine procedures and resources of government. It usually develops suddenly and unexpectedly and requires immediate, coordinated, and effective response by multiple government, voluntary and private sector organizations to meet human needs and speed recovery.

Disaster Management

A Collective term encompassing all aspects of planning for and responding to disasters, including both pre- and post-disaster activities. It may refer to the management of both the risks and consequences of disasters.

Dust Storm

A strong windstorm that fills the air with thick dust. Visibility can be reduced to 1/2 mile or less.

Earthquake

The shaking, rolling or sudden shock of the earth's surface. Earthquakes happen along fault lines in the earth's crust.

Emergency

An extraordinary situation where there are serious and immediate threats to human life as a result of disaster, imminent threat of disaster, cumulative process of neglect, civil conflict, environmental degradation and socio-economic conditions.

Eye

A name used for the center of a hurricane. It is the point where the storm rotates in a counter-clockwise direction. In the eye of a hurricane, the winds do not blow.

Fault Lines

Breaks in the Earth's crust where pressure is created as the two sides of the break rub against each other. This pressure is sometimes released in an earthquake.

Flash Flood

A dangerous and sudden flood that threatens lives and property and usually occurs after heavy rain. May also occur after an ice jam breaks up or after a dam breaks.

Food Security

Access by all people at all times to enough food for an active, health life, including the requirements of adequate supply, stable supply, and access to the supply (including adequate consumption, adequate income in relation to food prices and access to employment).

Freezing Drizzle Or (Freezing Rain)

Rain that freezes when it hits the ground, creating a coating of ice on roads and walkways.

Funnel Cloud

A rotating, visible extension of cloud, with the top attached to the cloud but not touching the ground.

Haboob

A violent duststorm or sandstorm found in northern Africa, India, or the southwestern United States.

Hail

Rain that has been frozen many times on its way to the ground, creating a lumpy ball of ice.

Hazard

A rare or extreme natural or human made event that threatens to adversely affect human life, property or activity to the extent of causing disaster.

Hazard Assessment

The process of estimating, for defined areas, the probabilities of the occurrence of potentially-damaging phenomena of given magnitudes within a specified period of time.

Hazard Mapping

The process of establishing geographically where and to what extent particular phenomena are likely to pose a threat to people, property, infrastructure, and economic activities.

Heavy Surf

Large waves breaking on the shore or near the shore caused from storm swells created by a distant storm.

Human-made Disaster

Disaster or emergency situation of which the principal, direct causes are identifiable human actions, deliberate or otherwise

Hurricane

A dangerous tropical cyclone with winds speeds of 74 mph, or higher. Also known as a typhoon in the western Pacific Ocean.

Ice Storm

Freezing rain that creates a dangerous sheet of ice that is 1/4 inch thick or greater.

Lightning

A sudden visible flash of energy and light caused by electrical discharges during a thunderstorm.

Mitigation

Mitigation refers to measures, which can be taken to minimize the destructive and disruptive effects of hazards and thus lessen the magnitude of a disaster.

Preparedness

Measures to ensure the readiness and ability of a society to forecast and take precautionary measures in advance of an imminent threat, and to respond to and cope with the effects of a disaster by organizing and facilitating timely and effective rescue, relief and appropriate post-disaster assistance.

Post Disaster Assessment

Also called damage and needs assessment, it is the process of determining the impact of a disaster or events on a society, the needs for immediate, emergency measures to save and sustain the lives of survivors, and the possibilities for expediting recovery and development.

Richter Scale

The scale used by scientists to measure the intensity of an earthquake. It was created by Charles F. Richter in 1935.

Risk

The expected losses (lives lost, persons injured, damage to property, and disruption of economic activity or livelihood) caused by a particular phenomenon.

Risk Assessment

Also called Risk Analysis or Evaluation, it is a process of determining the nature and scale of losses and damage due to disaster, which can be anticipated in particular areas during a specified period of time.

Risk Mapping

The presentation of the results of risk assessment on a map, showing the levels of expected losses, which can be anticipated in specific areas, during a particular time period, as a result of particular disaster hazards and vulnerabilities.

Severe Thunderstorm

A thunderstorm that produces either of the following: damaging winds of 58 miles an hour or greater, hail 3/4 of an inch in diameter or larger, or a tornado. Severe thunderstorms can result in the loss of life and property.

Sleet

Rain that turns to ice pellets before reaching the ground. Sleet also causes roads to freeze and become slippery.

Slow-onset Disasters

Also called creeping disasters or slow-onset emergencies, these are situations in which the ability of people to sustain their livelihood slowly declined to a point where survival is ultimately jeopardized.

Storm Swell

A long, often massive and crestless wave or succession of waves that are caused by hurricanes.

Sudden-onset Disasters

Sudden calamities caused by natural phenomena such as earthquakes, floods, tropical storms and volcanic eruptions.

Technological Disasters

Situations in which large numbers of people, property, infrastructure, or economic activity are directly and adversely affected by major industrial accidents, severe pollution incidents, nuclear accidents, air crashes, major fires or explosions.

Tornado

A wild, rotating column of air, usually attached to a cloud at the top and touching the ground. It nearly always starts off as a funnel cloud and may be accompanied by a loud roaring noise, like a train coming.

Tropical Disturbance

A powerful storm that forms over water in the tropics or subtropics and holds its strength for 24 hours or more. As it gains power, it may become a tropical wave, tropical depression, tropical storm, or hurricane.

Tsunami

An ocean wave produced by an event at sea, like an earthquake, landslide, or volcanic eruption. These waves may reach enormous size and have been known to travel across entire oceans.

Vulnerability

The extent to which an individual, community, sub-group, structure, service, or geographic area is likely to be damaged or disrupted by the impact of a particular disaster hazard.

Vulnerability Analysis

The process of estimating the vulnerability to potential disaster hazards of specified elements at risk.

Waterspout

A wild, rotating column of air over a body of water, usually attached to a cloud at the top and reaching the water.

Wind Chill

An apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.

Annexure 13

Different Volumes Relating to Backgroud Work of HPC

Different Volumes Relating to Background work of HPC

HPC Report - at a glance 1

- Executive Summary
- Recommendations
- Structure of NDMS
- National Calamity Management Act
- EOC - proposed layout
- NIDM - A vision document
- Model State Disaster Management Act
- Guiding principles for preparation of State Disaster Management Plan
- An outline for District Disaster Management Plan
- Content of HPC Report
- Content of NDRP

Report 2

- Signature Page
- Preface
- Acknowledgement
- Report
- Order for constitution of the HPC
- Order for Enhancement of Terms of Reference
- Structure of NDMS
- National Calamity Management Act
- EOC - proposed layout
- NIDM - A vision document
- Model State Disaster Management Act
- Guiding principles for preparation of State Disaster Management Plan
- An outline for District Disaster Management Plan
- Contents of HPC Report
- Contens of NDRP
- Glossary of Terms

Minutes and Chairman's Writings 3

- Minutes of the Meetings of the HPC
- Chairman's Writings
- Photo Gallery of Various Meetings under the aegis of HPC

Sub-Group Reports 4

- Water & Climate Related Disasters
- Geological Disasters
- Industrial, Chemical and Nuclear Disasters
- Accident Related Disasters
- Biological Disasters

Model State Plan : Sub-groups 5

- Water & Climate Related Disasters
- Geological Disasters
- Industrial, Chemical and Nuclear Disasters
- Accident Related Disasters
- Biological Disasters

Sub-Committees 6

- Mapping Mission
- Insurance
- District Disaster Management Plan
- National Calamity Management Act
- Model State Disaster Management Act
- Trigger Mechanism

Technical Reports 7

- Knowledge Network
- Electronic Media
- Role of Agro-Forestery
- Print Media
- Building Codes
- Civil Defence
- Coastal Hazards
- Riverine Systems
- Himalayan Geology
- Armed Forces
- Community Preparedness
- Role of Space Technology
- List of Equipments

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- Role of PRIs/ULBs
- Vision for NCDM
- Organisational Structures
- National Disaster Information System
- Early Warning Systems
- Capacity Building
- Environmental Concerns
- Socio-Psychological Aspects
- Educational Sector
- Minimum Standard of Relief
- Women, Children , Disabled and Old
- Emergency Support Functions
- Existing Mechanisms in Ministries
- Role of GIS

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- List of Members
- List of Sub-Group Members
- List of MSP Sub-group Members
- List of Contributors
- List of NGOs who participated in HPC Meetings
- List of participants of NCC, NYKS, NSS and BS&G
- List of participants of International NGOs
- List of Website Addresses of International Agencies consulted
- List of participants of Knowledge Based Institutions

National Disaster Response Plan