DRMMP

LIA, Greater Mumbai- 2010

A MCGM Initiative

DRMMP

Disaster Risk Management Master Plan

in Collaboration with Earthquakes & Megacities Initiative

Legal and Institutional Arrangements

Disaster Risk Management in Greater Mumbai

About the Project

One of the objectives of the project *Disaster Risk Reduction in Greater Mumbai* of the Municipal Corporation of Greater Mumbai (MCGM) or BrihanMumbai Municipal Corporation (BMC) is to build MCGM's competency to manage disaster risks. In support of this objective, the Earthquakes and Megacities Initiative (EMI) and MGCM consulted with a broad range of stakeholders who have indicated the need for an analytical study on Legal and Institutional Arrangements for Disaster Risk Management to improve coordination and facilitate information exchange among institutions involved in disaster risk management.

The Project proposes to establish a disaster risk management process that would close the institutional gap in Mumbai City's competency to manage disaster risk by equipping the MCGM with a Disaster Risk Management Master Plan (DRMMP) and internal competent structure for Emergency and Crisis Management. The development of a DRMMP entails a structured participatory process by which stakeholders can understand their relationship to the various risks envisaged in Mumbai City and their role in the City's DRM agenda. Further, it would establish the inter-institutional coordination processes and protocols that would align and harmonize the DRM process in MCGM with those of the relevant National, State and other public and private institutions, in particular those that provide critical services (such as, but not limited to utilities, health, education and public safety), to ensure adequate communication protocols before, during and after a disaster.

The Legal and Institutional Arrangements Report can serve as a reference for line agencies of the government, local government, non-governmental and private organizations doing actual work in Disaster Risk Management. The report is a tool for identifying and strengthening key legislations and institutional systems on DRM, to better equip governing institutions like the MCGM in coping with disasters.

About the Report

The report is divided into seven(7) parts: 1) the global and national perspectives including emergence of DRR strategies in India; 2) the legal and policy framework, 3) DRM-related institutional systems and structures at the national and state level 4) institutional arrangements at the Greater Mumbai level 5) sectoral arrangements; 6) DRM institutional linkages and 7) identification and analysis of gaps in legal, policy, institutional and regulatory framework ,conclusions and recommendations.

Part 7 is presented as a Working Paper consisting of the team's initial insights which need to be validated with the stakeholders. The results of such validation and agreements on the proposed institutional arrangements on DRM in Greater Mumbai shall then form part of the final chapter of this Report.

An appendix contains supplementary and detailed information on the different legal statutes or acts, organizations of other agencies involved in DM related work and other information. Most of the information was quoted from on line sources and supplemented with the PIT's field investigations and consultations with stakeholders. To the extent possible authoritative websites of relevant agencies were quoted. Few sources coming from open encyclopedia were added, and should be treated as supplementary information, that could add to one's perspective of the relevant institutions.

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Abbreviations and Acronyms

ADPC	Asian Disaster Preparedness Center
AEC	Atomic Energy Commission
AIILSG	All India Institute of Local Governance
ALM	Advanced Locality Management
BARC	Bhabha Atomic Research Center
BEST	Brihanmumbai Electricity Supply and Transport
BMC	Brihin Mumbai Municipal Corporation
BIS	Bureau of Indian Standards
CBRI	Central Building Research Institute
CIDCO	City and Industrial Development Corporation of Maharashtra Ltd.
CPHEO	Central Public Health Engineering and Environmental Organization
CBO	Community Based Organization
CRF	Calamity Relief Fund
CWC	Central Water Commission
DAE	Department of Atomic Energy
DDMA	District Disaster Management Authority
DDWS	Department of Drinking Water Supply
DRMMP	Disaster Risk Management Master Plan
DoT	Department of Telecommunications
DIG	Deputy Inspector General
DM	Disaster Management
DMU	Disaster Management Unit
DMAP	Disaster Management Action Plan
DRM	Disaster Risk Management
EMI	Earthquakes and Megacities Initiative
EEZ	Exclusive Economic Zone
FSI	Floor Space Index
GOI	Government of India
GOM	Government of Maharashtra
HFA	Hyogo Framework for Action
HPC	High Powered Committee

IAY	Indira Awas Yojana
IDNDR	International Decade for Natural Disaster Reduction
IEC	Information, Education and Communication
ICG	Indian Coast Guard
ICS	Incident Command System
ICT	Information and Communication Technology
IDKN	India Disaster Knowledge Network
IDRN	India Disaster Resource Network
IIPA	Indian Institute of Public Administration
IIT	Indian Institute of Technology
IMD	India Meteorological Department
IT	Information Technology
ITK	Indigenous Technical Knowledge
ITI	Industrial Training Institutes
IG	Inspector General
JNNURM	Jawaharlal Nehru National Urban Renewal Mission
MCGM	Municipal Corporation of Greater Mumbai
MARG	Mutual Aids
MHA	Ministry of Home Affairs
MHADA	Maharashtra Housing and Area Development Authority
MMRDA	Mumbai Metropolitan and Region Development Authority
MIDC	Maharashtra Industrial Development Corporation
MoA	Ministry of Agriculture
MoD	Ministry of Defense
MoEF	Ministry of Environment & Forests
MoHFW	Ministry of Health and Family Welfare
MoLE	Ministry of Labour and Employment
MoRD	Ministry of Rural Development
MPCB	Maharashtra Pollution Control Board
MPT	Mumbai Port Trust
MR&TP	Maharashtra Regional and Town Planning
MSEB	Maharashtra State Electricity Board
MSEDCL	Maharashtra State Electricity Distribution Company Limited

MSRDC	Maharashtra State Road Development Corporation
MT	Metric Tons
NATMO	National Atlas and Thematic Mapping Organization
NCDM	National Centre of Disaster Management
NCC	National Cadet Corps
NCCF	National Calamity Contingency Fund
NCDC	National Civil Defense College
NDEM	National Database for Emergency Management
NDMA	National Disaster Management Authority
NDPM	National Policy on Disaster Management
NDRF	National Disaster Response Force
NEC	National Executive Committee
NGO	Non-Government Organizations
NIDM	National Institute of Disaster Management
NIT	National Institutes of Technology
NOC	Nature of Compliance
NREGS	National Rural Employment Guarantee Scheme
NFSC	National Fire Services College
NSDI	National Spatial Data Infrastructure
NSDF	National Slum Dwellers Foundation
NSS	National Service Scheme
NYKS	Nehru Yuva Kendra Sangathan
PRI	Panchayati Raj Institutions
R&R	Relief and Rerhabilitation
SAARC	South Asian Association For Regional Cooperation
SDRF	State Disaster Response Force
SDMA	State Disaster Management Authority
SEC	State Executive Committee
SGRY	Sampooran Grameen Rojgar Yojna
SPARC	Society for the Promotion of Area Resource Centers
SRA	Slum Rehabilitation Authority
TEC	Telecommunication Engineering Centre
TOT	Training of Trainers

UEVRP	Urban Earthquake Vulnerability Reduction Project
ULB	Urban Local Bodies
UNISDR	United Nations International Strategy for Disaster Risk Reduction
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
UT	Union Territories
WSSD	Water Supply and Sewerage Department

Glossary of Terms

Civil Defense	Includes any measures, not amounting to actual combat, for affording protection to any person, property, place or things in India or any part of the territory thereof against any hostile attack, whether from air, land, sea or other places or, depriving any such attack of the whole or part of its effects, whether such measures are taken before, during, at, or after the time of such attack ***or any measure taken for the purpose of disaster management, before, during, at, or after any disaster***" **Source :** Section 2(a) of the Civil Defense Act of 1968, ***as amended in 2009***
Disaster	A catastrophe, mishap, calamity or grave occurrence in any area, arising from either natural or man made causes, or by accident or negligence which results in substantial loss of life or human suffering, or damage to and destruction of property or damage to or degradation of environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area. **Source:** Section 2 (d), Disaster Management Act, 2005
Disaster management	A continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient to prevent danger or threat of any disaster, mitigation or reduce the risk or severity or consequences of any disaster, capacity-building and preparedness to deal with any disaster, prompt response to any threatening disaster situation or disaster, assessing the severity or magnitude of effects of any disaster, evacuation, rescue and relief, rehabilitation and reconstruction. **Source:** Section 2 (e), Disaster Management Act, 2005
Disaster risk management	The systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards. **Source:** UNISDR Library on Disaster Risk Reduction, 2009
Disaster risk reduction	The conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks

	throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development. The disaster risk reduction framework is composed of the following fields of action, as described in "Living with Risk: A Global Review of Disaster Reduction Initiatives"(UNISDR, 2002): Risk awareness and assessment including hazard analysis and vulnerability/capacity analysis; Knowledge development including education, training, research and information; Public commitment and institutional frameworks, including organisational, policy, legislation and community action; Application of measures including environmental management, land-use and urban planning, protection of critical facilities, application of science and technology, partnership and networking, and financial instruments; Early warning systems including forecasting, dissemination of warnings, preparedness measures and reaction capacities. **Source:** UNISDR Library on Disaster Risk Reduction, 2009
Disaster mitigation	Focuses on the hazard that causes the disaster and tries to eliminate or drastically reduces its direct effects. Examples include strengthening buildings to make them cyclone resistant , controlling land use patterns to restrict development in high-risk areas and diversification of economic activities to act as insurance to offset losses in different sectors. **Source:** Section 2 (e), Disaster Management Act, 2005
	Measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation. **Source:** Source: Section 2 (i), Disaster Management Act, 2005
Disaster preparedness	Preparedness focuses on plans to respond to a disaster threat or occurrence. It takes into account an estimation of emergency needs and identifies the resources to meet these needs. It also involves preparation of well-designed plans to structure the entire post-disaster response, and familiarizing the stakeholders, particularly the communities through training and simulation exercises.

	The best examples of preparedness activities are the development of local warning and community evacuation plans through community education, evolving local response structures and administrative preparedness by way of stockpiling of supplies; developing emergency plans for rescue and relief. **Source:** http://mcgm.gov.in/irj/portal/anonymous/qlms
Municipal Corporation	Municipal incorporation occurs when such municipalities become self-governing entities under the laws of the state or province in which they are located. Often, this event is marked by the award or declaration of a municipal charter. **Source:** Constitution of India
National Plan	The plan for disaster management for the whole of the country prepared in accordance with Section 11 of the Disaster Management Act of 2005. **Source:** Section 2 (l), Disaster Management Act, 2005
Pre-disaster planning	Pre-disaster planning consists of activities such as disaster mitigation and disaster preparedness. Disaster mitigation focuses on the hazard that causes the disaster and tries to eliminate or drastically reduce its direct effects. Examples include strengthening buildings to make them cyclone or earthquake resistant, controlling land-use patterns to restrict development in high-risk areas and diversification of economic activities to act as insurance to offset losses in different sectors. Structural measures such as the construction of protective works or alterations designed to diminish the vulnerability of the elements at risk, and non-structural measures, such as regulating land use and building codes, and equipping line departments for damage reduction, can all reduce the impact of a disaster on a region or a population. Everything that is done to reduce or prevent the damages that a disaster may cause is called mitigation of risks. **Source**: http://mcgm.gov.in/irj/portal/anonymous/qlms

Executive Summary

This report is a compilation of reference materials on statutes and institutions that perform disaster risk management functions in Greater Mumbai which include government agencies at the national, state, city level, private companies, training institutes, civil society/self help groups and other organizations. It discusses interrelationship amongst various stakeholders, identify gaps and provide recommendations to strengthen institution on Disaster Risk Management (DRM).

Change in orientation from reactive to pro-active approach

In the aftermath of the super cyclone in Orissa in October, 1999 and the Bhuj earthquake in Gujarat in January, 2001, there has been a change in orientation in India and a pro-active outlook has been adopted in place of a reactive approach. There has been a change in focus from mere post-disaster response to holistic preparedness and mitigation. To make up for earlier inadequacies, the Government of India has increasingly insisted on intensive multi-departmental involvement and pro-active mainstreaming of disaster management into all Government activities, particularly developmental initiatives.

The Legal Mandate

While the response of the Government and other relevant agencies to the tsunami disaster in December 2004 was generally regarded as adequate, there was a sense that it could be improved further if appropriate preparedness and capacity building measures are put in place, together with effective coordination mechanisms, and backed up by necessary legislation. The Disaster Management Act, 2005 was enacted on 23rd December, 2005 in this context. The legislation complements Entry 23 (Social Security and Social Insurance) in the Concurrent List of the Constitution of India. It has the advantage of permitting the States to have their own legislation on Disaster Management.

The Disaster Management Act, 2005 puts in place the following mechanisms to address all phases of disaster management, including pre-disaster aspects of prevention, mitigation and preparedness, as well as post-disaster aspects of response, relief, rehabilitation and recovery, including reconstruction:

- Institutional mechanism through establishment of Disaster Management Authorities at national, state and district levels, as well as entrusting specific functions to local authorities;
- Planning mechanism by providing for development of Disaster Management Plans at national, state and district levels;
- Training and capacity building mechanism through establishment of National Institute of Disaster Management for planning and promoting training and research in the area of disaster management, documentation and development of national-level information base relating to disaster management policies, prevention

mechanisms and mitigation measures, as well asthe formation of the National Disaster Response Force;

- Funding mechanism by mandating that all Ministries/ Departments of the governments at national, state and district levels shall make adequate financial provision for implementation of Disaster Management Plans in their jurisdiction, as well as the establishment of Disaster Response Funds and Disaster Mitigation Funds at national, state and district levels; and
- Coordination mechanism by providing horizontal and vertical linkages from national to local levels, encompassing all stakeholders for synergized efforts to integrate disaster risk reduction with the development process.

Legislative back up for MCGM

The Disaster Management Act, 2005 is silent about the functions of corporations in megacities like the Municipal Corporation of Greater Mumbai (MCGM), although it does not prohibit such entities from undertaking actions for Disaster Risk Reduction or in a post-disaster scenario. Legally, MCGM's status is that of a local authority. As a local authority, MCGM is supposed to function "subject to the directions of the district authority." However, the district authorities in Greater Mumbai are in fact subordinate to MCGM. The role of MCGM, which has been entrusted with the functions of disaster risk management in Greater Mumbai and has subsumed the functions of both district and local authorities for urban risk mitigation in Greater Mumbai, needs to be legally mandated under the Act.

Civil Defense

The Civil Defense and Home Guards, which together make up a volunteer force that is over 1.2 million strong, function under the Civil Defense Act, 1968. Originally, these organizations did not have the legal mandate to function in the field of disaster management although, despite this limitation, several state governments had enlisted their support in disaster situations. Conscious of the need to extend the legal mandate to civil defense to enable it to function in all facets of disaster management, the Civil Defense (Amendment) Act was enacted by the Parliament in December, 2009. With the proposed amendment, civil defense will have a key role to perform in disaster management with the requisite legislative mandate and the amendment will also bring about the long overdue convergence between the Disaster Management Act, 2005 and the Civil Defense Act, 1968. Hopefully, the Civil Defense and Home Guards mechanisms would be adequately strengthened to effectively discharge the additional responsibility now legally entrusted to it. The State Government may issue such Governments Regulations as considered necessary and also formulate a program for strengthening Civil Defense and Home Guards systems in the state to comply with the recent legal mandate.

National Policy on Disaster Management

One of the statutory functions of the National Disaster Management Authority (NDMA) is to lay down policies on disaster management. The National Policy on Disaster Management

(NPDM) was unveiled by the NDMA in October 2009 after approval by the Cabinet. The vision of the Policy is *"to build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response."* The vision gives expression to the concepts enunciated by the High Powered Committee on Disaster Management and is in line with the course of action laid down in the National Roadmap. The National Policy states that a holistic and integrated approach will be evolved toward disaster management with emphasis on building strategic partnerships at various levels. The themes underpinning the policy are:

- Community-based DM, including last mile integration of the policy, plans and execution;
- Capacity development in all spheres;
- Consolidation of past initiatives and best practices;
- Cooperation with agencies at national and international levels;
- Multi-sectoral synergy.
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The policy seeks to achieve the objectives of promoting a culture of prevention, preparedness and resilience at all levels through knowledge, innovation and education; encouraging mitigation measures based on technology, traditional wisdom and environmental sustainability; mainstreaming disaster management into the developmental planning process; establishing institutional and techno-legal frameworks to create an enabling regulatory environment and a compliance regime; ensuring an efficient mechanism for identification, assessment and monitoring of disaster risks; developing contemporary forecasting and early warning systems backed by responsive and failsafe communication with information technology support; promoting a productive partnership with the media to create awareness and contributing towards capacity development; ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of society; and undertaking reconstruction as an opportunity to build disaster resilient structures and habitat for ensuring safer living.

The policy deals with the existing institutional and financial arrangements, stakeholders and measures to be taken for disaster prevention, mitigation and preparedness, techno-legal regime, response, relief and rehabilitation, reconstruction and recovery, capacity development, knowledge management, and research and development. The policy document mainly describes the future roadmap as *"…merely the first step in the new journey. It is an instrument that hopes to build the overarching edifice within which specific actions need to be taken by various institutions and individuals at all levels. The central theme is the belief that a disaster intelligent and resilient community, duly empowered by a newly created DM Structure, working in cohesion multi-sectorally, will help realize the national vision."*

Reservations may be expressed as to the need for laying down a policy when the Disaster Management Act, 2005 is already in force. While the provisions of the Act are

enforceable from the date(s) when these were published, the National Policy lays down the roadmap of long-term goals which may be followed by governments at national, state, district and local levels. In a way, the distinction between the Act and the Policy is broadly the same as between the Fundamental Rights and the Directive Principles of State Policy, enshrined in the Constitution of India. While the former are enforceable in a court of law, the latter lay down the future strategy through a set of guiding principles, though not immediately enforceable unless granted legislative mandate when the State is ready to implement them.

Maharashtra: Vulnerability Profile, Legal Mandate, State Policy and Plan

Maharashtra has a multi-hazards vulnerability profile. Floods, droughts, earthquakes, landslides, cyclones, fire incidents and industrial accidents are some of the major hazards. Also, due to dense population, epidemics are a possible hazard. It is also exposed to human-induced disasters, since Mumbai is the financial hub of the country, providing a tempting target for terrorist attacks. The State Government has not enacted any law on disaster management. It is following the National Act, based on which the State Disaster Management Authority and State Executive Committee have been established. There is no State Disaster Management Policy in place.

Soon after the Latur earthquake in 1993, the Government of Maharashtra initiated various mitigation and preparedness measures. The preparation of the disaster management plans at the State and District levels commenced as a result of an Action Plan which emerged during the International Workshop on Disaster Management held in May 1995. As a first step in pursuance of the Action Plan formulated in the International Workshop, a Disaster Management Council headed by the Chief Secretary was constituted in January 1996 to supervise the preparation of a comprehensive multi-hazard Disaster Management Plan for the state, which coincidentally was also one of the mandated activities of the Government of Maharashtra under the Maharashtra Emergency Earthquake Rehabilitation Program (MEERP). The World Bank, United Nations Development Program (UNDP) and Department for International Development (DFID) extended support for undertaking different complementary components of this multi-faceted effort. It had a State plan as the core and all the district plans forming the superstructure. These disaster management plans identified administrative and technical measures essential to disaster preparedness, response action, and mitigation efforts. These plans eventually resulted in an Action Plan for implementation.

The main components of the State Plan are a risk analysis & vulnerability assessment, a response plan and a mitigation strategy. The objectives of the State Plan were to understand the vulnerability of various districts to disasters; ascertain the status of existing resources and facilities available with the various agencies involved in disaster management in the state; assess their adequacies in dealing with a disaster; and identify the requirements of institutional strengthening and capacity building. A State Disaster Management Action Plan (DMAP) was also developed as part of the State Plan to be implemented by various departments and agencies of the Government of Maharashtra and other non-governmental agencies expected to participate in disaster management. The

State Plan has been proven to be exceptionally responsive, addressing almost all relevant concerns which were articulated at national level almost half a decade after its development. The foresight of the formulators of the State Plan needs to be appreciated, in light of the fact that the State Plan was finalized as early as 1998, even before the High Powered Committee on Disaster Management was set up in August 1999 and before the Orissa super cyclone and Bhuj earthquake. The State Plan had also mobilized funds through international agencies for implementation of the Action Plan. There is, however, no indication that the programs included in the Action Plan were taken up for implementation. The State Plan has also not been updated after it was initially prepared.

MCGM-The Nodal Agency for Greater Mumbai

It has been decided by the committee headed by the Additional Chief Secretary (R & R) that the nodal agency for Greater Mumbai for all aspects related to disaster management will be MCGM. Therefore, MCGM has to coordinate and take the lead to ensure the active participation of all stakeholders in Greater Mumbai in all facets of disaster management, namely, prevention, mitigation, preparedness, response, relief, rehabilitation and recovery. As Nodal Agency, MCGM also has to spearhead the preparation of the Disaster Management Plan for Greater Mumbai and the development of standard operating procedures by all concerned agencies with respect to their corresponding areas of responsibility. In short, MCGM has to facilitate the convergence of actions by all stakeholders including government, public and private agencies to avoid duplication of efforts by different agencies, both during pre-disaster as well as post-disaster phases.

Institutional Systems and Structures

At the national level, the institutional systems and structures which would be required to extend support to MCGM in case of a major disaster beyond the coping capacity of the state government, depending on nature of specific disaster, include Civil Defense and Home Guards, Indian Coast Guards, Ministries/ Departments of Atomic Energy (including Bhabha Atomic Research Centre), Drinking Water Supply, Space, Telecommunications, IMD, Agriculture, Defense, Environment and Forests, Health and Family Welfare, Labor and Employment, Power, Rural Development, Science and Technology, Urban Development, Water Resources and Railways. However, it is the Ministry of Home Affairs (MHA), being the nodal Ministry in the National Government, which would be required to coordinate and extend support to deal with the different facets of a disaster situation. The Vision Statement of MHA states *"Peace and harmony are essential pre-requisites for development and blossoming of individual as well as social aspirations and building a strong and prosperous nation."* To this end, MHA would strive to mitigate the sufferings resulting from natural and man-made disasters.

At the state level, the stakeholders which would extend support to MCGM would include Mumbai Police, Maharashtra Fire Services, MMRDA, MTNL, MHADA, MSRDC, MSEB, MPT, SRA, BEST, IIT, Mumbai, HPCL, RIL, Tata Power Company Limited, All India Institute of Local Self Government and Mumbai Transformation Support Unit, aside from several other actors in the corporate sector housed in Greater Mumbai. Therefore, coordination with

these agencies in pre-disaster as well as disaster situations would be a monumental task for MCGM, unless adequate systems are put in place and reviewed well in advance.

MCGM: vulnerability profile of Greater Mumbai

Limited geographical area (437.71 sq km) which is densely populated (11.91 million as per 2001 Census, plus 2 to 3 million transient population) with about 54% of residents living in informal settlements, commonly known as slum areas, creating immense pressure on civic amenities are few factors which alone underscore the fragile vulnerability of Greater Mumbai. The hazards which have impacted or may potentially impact the city of Mumbai have been identified as fire and industrial accidents, floods, earthquakes, chemical, biological, and nuclear hazards, cyclones, landslides and tidal surge. Mumbai is likewise a soft target for human induced disasters such as bomb blasts, terrorism and riots. The additional factors contributing to disaster risks are the city's being situated on what is basically an island, the poor quality of the transport networks, the disparity between road widths and available parking spaces; the lack of retrofitting or structural upgrading for buildings whose uses have changed, the lack of back-up water systems, inadequate sewerage systems, the presence of traffic flyovers, structurally unsound hospitals, frequent power failures due to the interstate power grid, extensive reclamation of coastal areas, the presence of hazardous industries in the city, the threat of oil spills, the presence of a large transient population during office hours, the high population density in commercial areas and slums, and improper and inadequate garbage collection and disposal.

MCGM: Functions, Plans and Coordination Arrangements

The key functions of MCGM include administering and providing basic infrastructure to the city such as the building and maintenance of roads, streets and flyovers; public municipal schools; water purification and supply; public health and hospitals; street lighting; maintenance of parks and open spaces; sewage treatment and disposal; garbage disposal and street cleanliness; assistance in the prevention of epidemic outbreaks; cemeteries and crematoria; registration of births and deaths; lighthouses; removal of encroachments; regulation of markets, shops and establishments; and security for MCGM establishments. MCGM is responsible for establishing DRM priorities in Greater Mumbai. The Commissioner is tasked to supervise and monitor disaster management and relief activities and enlist the services of Government of India (GOI), Government of Maharashtra (GOM) and expert institutions for specialized services when necessary. He is also required to coordinate the activities of NGOs, aid agencies, and is in charge of coordinating the activities of the Control Rooms in Greater Mumbai. MCGM prepares a disaster management plan which provides disaster-related information, as well as a plan of action for the city to prevent, avoid and reduce disaster risks and effectively respond to emergency events. Each ward has its own disaster management plan for the areas under its jurisdiction.

A State-level Executive Sub-Committee for Mumbai has been set up under the Additional Chief Secretary (Home) to address the disaster management concerns in Greater Mumbai including relief and rescue operations, make available and provide emergency

shelter, food, water, medical services and other emergency goods to victims affected by disaster, coordinate rescue operations with other departments, organizations and agencies; make available specialist services during emergencies; provide all facilities and services to victims of disasters; ensure that all nongovernmental organizations work in affected areas without any bias; provide information to citizens during emergencies; and comply with any other orders of the State Government.

Sectoral Institutional Arrangements

MCGM has over 40 departments and 24 ward offices. These departments/ ward offices need to function in close coordination with respect to DM-related functions, as well as to have effective coordination mechanisms with nongovernmental organizations and other stakeholders in line with the internationally accepted nature of DRM as an inclusive multi-sector, multi-disciplinary and multi-agency activity, and not merely a function of government agencies alone. The sectoral institutional arrangements therefore assume greater importance, particularly for key sectors such as land use planning, urban development and re-development, integration of DRR with various projects undertaken under the JNNURM, construction regulations, housing and shelter, including slum rehabilitation; health and health care delivery, education, water supply delivery, sanitation and solid waste management, integration with the Advanced Locality Management (ALM) program and Slum Adoption Scheme (SAS), waste water drainage, rail and road transport, power supply and communications.

Inter-Agency Coordination

Disaster management implies a multi-disciplinary and multi-sector approach. There are several stakeholders in Greater Mumbai aside from MCGM which have to discharge key responsibilities such as the Fire Brigade, BEST, MMRDA, Mumbai Police, Traffic Police, Home Guards and Civil Defense, District Collectorates (City & Suburban), India Meteorological Department (Regional Office), Railways (Central & Western), M.T.N.L, Electric supply agencies and several other stakeholders including the Armed Forces, NDRF, Civil Society, etc. Multi-sectoral institutional arrangements linking these agencies based on their sectoral functions is a prerequisite for prompt and efficient discharge of the responsibilities assigned to each agency, while avoiding duplication of efforts. An inter-agency coordination committee for each sector, if put in place, may go a long way to ensure synergy of action in pre-disaster as well as disaster situations. For this purpose, each organization needs to designate a Nodal Officer as well as an alternate Nodal Officer to participate in the sector-wise meetings, assist in organizing mock drills and report on pro-active actions taken by each organization. This would work as an effective institutional arrangement for each sector.

DRM Institutions

Disaster risk management for Greater Mumbai entails the participation and active involvement of different institutions during emergencies and in the conduct of disaster risk reduction activities. As key stakeholders, the roles of these institutions in disaster risk management maybe direct or indirect, minimal or substantial. With MCGM as the central stakeholder, the networking of DRM institutions has been undertaken through the linking of institutional capacities in Greater Mumbai through the convergence of different organizations in the following networks:

- Risk Assessment Network;
- Disaster Preparedness Network;
- Mitigation Network;
- Risk Transfer Network;
- Disaster Response Network; and
- Recovery and Reconstruction Network

Conclusions and Recommendations

Based on the study of various issues at national, state and city level, the following observations and recommendations have been identified:

National/State Level
Legislative Backup for MCGM 1. Maharashtra State Government should consider enacting its own DRM Law specific to the State. 2. Amendments to the DMA 2005 should be proposed to include the status/role of Municipal Corporations on DRM.
Civil Defense 3. The State Government should consider issuance of Government Regulations as considered necessary to strengthen the Civil Defense and Home Guards systems in the state and to comply with the recent CDA Amendment 2009 and DMA 2005.
State Executive Committee 4. The constitution of the SEC needs to be revised, in accordance with the provisions stipulated in the DMA 2005.
State Disaster Management Policy

5. There is a need for the State Disaster Management Authority to initiate the exercise to lay down the State DM Policy within a given timeframe.
6. Arrangements similar to the instructions issued by Ministry of Finance may be put in place by the state government and made applicable to all departments and organizations.

Sectoral Level

Inter-Agency Coordination

7. An Inter-agency coordination committee for each sector should be instituted to ensure synergy of action in normal as well as disaster situations.

Land Use Planning

8. Informal Settlements, decongestion, landfill sites, hazardous units and control on land reclamation should be considered in drafting land use plans.

Urban development and re-development

9. The core areas in the McKinsey Study need to be paid focused attention in the conduct of urban development and redevelopment.
10. Disaster risk reduction needs to be integrated with all the components of the projects being taken up under JNNURM.

Construction Regulations

11. A Roadmap on construction standards and specifications need to be drawn up to ensure compliance among construction agencies.

Education

12. The School safety programs should include both structural and non-structural measures.

Solid Waste Management

13. There must be sanitation programs (e.g. dealing with human waste) that encompass Greater Mumbai.
14. The number of vehicles conducting daily sweeping of roads needs to be augmented.
15. A pro-active roadmap with supporting SOP therefore needs to be established in advance with the involvement of other stakeholders.

Waste Water Drainage

16. The sewerage system underground drainage pipes in Greater Mumbai needs renovation and a plan in providing underground drainage connectivity to slum areas needs to materialize.
17. The need to provide new sewerage network and pre-identify open places during disasters for evacuation where disaster victims may be temporarily settled in relief camps with proper waste disposal facilities.

Transport

18. Focused attention needs to be paid to the transport bottlenecks which may arise in disaster situations, particularly if main arterial roads are breached or obstructed and (2) disaster risk reduction needs to be incorporated in the JNNURM either as a mandatory or optional reform.

Power

19. There is a need for alternative power supply systems in Greater Mumbai in case there are disruptions in the main supplies.

Communications

20. There is need to have in-built linkages in all Control Rooms in Greater Mumbai so that these control rooms function in a well-coordinated manner during emergencies.

STATE ACTORS

MMRDA

21. MMRDA should develop a Disaster Management Plan.

MTNL

22. There is need to develop disaster-specific training modules and programs for training of employees.
23. MTNL needs to prepare a separate DM plan for Greater Mumbai taking into consideration the SOPs on specific situations, collaborative arrangements with other institutions, and develop an alternate communication plan.

MHADA

24. A fresh survey of the post 1969 constructed buildings should be carried out and viable and realistic solution has to be developed to complete the stupendous task of making these buildings structurally safe.

Mumbai Police

25. There should be separate funds earmarked for proactive DM-related functions.
26. There is a felt need to associate few senior and middle rung police officers with the EM Focus Group for getting a proper perspective of police role clarity during emergencies.
27. There should be proper incentives given to qualified constables who will discharge multiple purpose roles in all facets of disaster management.
28. Joint mock drills with other stakeholders, particularly with hospitals, fire services, MCGM etc need to be held by Mumbai Police, with MCGM taking the lead.

SRA

29. There is need to explore re-location in vacant lands available with government including railways, located in close proximity and (2) there has to be a well coordinated multi-sector approach involving agencies responsible for all the above mentioned sectors.
30. The engineers from SRA need to be trained in disaster and earthquake related activities so that they can carry out the inspection process effectively; at present they are not so trained.

HPCL

31. There should be protocols in place for rescue and evacuation should there be emergencies emanating from petro-chemical accidents.
32. Coordination among licensing authority (RTO), police and HPCL is needed to work out effective mechanism to check drivers' identity/certificates.
33. Parking space exclusive for tankers with hazardous and flammable materials is needed.

MCGM

Gaps in adoption of an Integrated approach

34. There is need to adopt an integrated approach in DRR to ensure safer constructions at all levels including at MCGM level.

Gaps in Convergence

35. A National Task Force should be constituted and similar Task Forces need to be constituted at State , District and MCGM level to coordinate and monitor the qualitative as well as quantitative progress under different government programs.

Disaster Management Department

36. There is a need to revise comprehensively the functions of the DM Department to reflect statutory provisions for MCGM responsibilities on DRM.
37. Strengthen and capacitate the existing Disaster Management Department to enable it to carry out its mandated functions.
38. The Head of the DM Department should be delegated administrative powers to issue instructions to other MCGM departments as well as Ward Officers.
39. The delegation of financial powers should be uniform to all MCGM Departments and not just the DM Department both in normal as well as disaster situations.

General Administration and Personnel Departments

40. Training should be organized for all personnel in consultation with the DM Department and manpower should be made available to the DM Department should the need arise.

Municipal Secretary's Department

41. The Municipal Commissioner may roll out the roadmap for MCGM and the possible role which the councilors can play in educating people in their respective constituencies and facilitating micro level risk assessment and vulnerability analysis with possible intervention programs.

Legal Department

42. The department may undertake, on regular basis, an exercise to identify gaps which need to be bridged with legislative back up.
43. The Legal Department officers should participate in training programmes as resource persons to sensitize and educate the MCGM personnel about the legal framework already in place at national, state, MCGM and ward level.

Labor Department

44. The Labor Department should institute a program that provides awareness on DRM per se and activities among the workforce.

Finance Departments

45. The officers and employees of finance departments need to be trained and sensitized towards the significance and crucial importance of DRR features.
46. There should be a Finance Officer (Additional or Joint Municipal Commissioner level) who could, by protocol, be able to advice the Municipal Commissioner down to the Joint Commissioner and be able to conduct financial reforms.

Engineering Departments

47. There should be a reassessment on the assigned/delineation/distribution of responsibilities among MCGM Engineering Departments to avoid duplication and making the departments more proactive in ensuring standards and safety in Greater Mumbai.
48. There should be protocol/detailed SOP to audit the performance of these departments, taking into consideration the safety monitoring and coordination mechanisms conducted by these departments.
49. Training on detailed evaluation and retrofitting techniques for structural safety should

be conducted.

50. Institutional memory cannot alleviate deficiency in coordination, other mechanisms are needed.
51. The entire system of delegation of financial powers to engineering departments needs to be re-visited by an independent agency.
52. The Director for Engineering Services & Projects should be given the superior charge of all engineering departments.
53. All the above recommendations for the Engineering departments should be considered by an Expert Committee and appropriate decisions/actions should be taken.

Public Relations Department

54. There is need to create a post of Principal Information Officer in the rank of Deputy Municipal Commissioner, preferably to be taken on deputation from Press Information Bureau of Central or state government.
55. A training capsule on media management for all levels (especially the junior level) needs to be developed and special professional training is also required to develop user-friendly media handouts.

Health Department – MCGM Hospitals

56. The medical facilities need to be upgraded at KEM, Sion, Nair and all suburban hospitals.
57. It is also necessary for MCGM to enter into pre-contract arrangements with private hospitals in case of a disaster.
58. It is recommended that a three years B. Sc. Course for paramedics with assured prospects of employment in government hospitals may be considered.
59. The Disaster Management Plan related to health sector should particularly take care of equitable distribution of patients among different hospitals keeping in view the locations.
60. There is a need to introduce system of heli-ambulances due to traffic congestion, particularly in critical cases.

Fire Services

61. There should be at least 300 fire brigades and adequate firefighting equipment in Greater Mumbai.
62. There should be an increase in the number of firemen and intensive training should be provided to them.
63. The state of the art SOPs need to be put in place and training imparted to firemen.
64. There is also need to have adequate number of administrative officers.
65. The communication system also needs to be put on a fast track.
66. Delegation of financial powers to fire services is not commensurate with the responsibility and accountability assigned to them; one reason being weak administration wing.

Municipal Security Force

67. Additional Municipal Security Force is vital for the security of Greater Mumbai and its public facilities.
68. There is a need to totally revamp the security arrangements.
69. There should be a security audit to be carried out to assess type of security needed at each installation so that intelligence sharing and proper coordination among government

security agencies in Greater Mumbai will be pursued.

Estate and Land Management (ELM) Department

70. There should be an effective coordination mechanism in place and proper delineation and delegation of authority among departments and offices that are closely associated with estate and land management.

Markets Department

71. There should be proper delineation of responsibilities, particularly on structural safety, between the Markets Inspectors and the Development Plan Department Officials.

Project Planning and Control Department

72. Disaster risk reduction should be integrated with the development plans and structural and non-structural safety should be considered among project proposals.

Licensing Department

73. There should be an up to date training module related to trade and storage of hazardous chemicals for Senior Inspectors.
74. Responsibilities should be distributed accordingly on the following manner: technical inputs may be provided by health and fire departments respectively while administrative action for inspections and issue of licenses may appropriately be taken by license department.
75. There should be a sound and articulated policy on the status of hawkers vis-avis legitimacy and licensing or else the requirement of obtaining licenses for pre-1970s licensees may as well be discontinued since the present arrangement is discriminatory and the number of hawkers further add to traffic congestion leading to road accidents.

Gardens and Zoos Department

76. There is need to impart training to employees to give them a clear perception about the important task assigned to them particularly in environmental protection.

Shops and Establishment Department

77. The Shops and Establishments Department should generate mitigation and preparedness awareness and disseminate information related to DRR to its clients.

Ward Offices

78. Each Ward should develop a disaster risk management plan and conduct a regular update at least once a year.
79. In preparation for the rainy months, mock drills should be consistently conducted in low-lying Wards in Greater Mumbai during pre-monsoon months and damage infrastructure should be repaired.
80. Proper training should be given to the Disaster Manager in each Ward.
81. Policy guidelines on integration of disaster risk reduction elements in new projects should be shared with all wards with a monitoring mechanism in force.
82. As for response, trigger mechanism is in force but it needs to be streamlined and refined further.
83. There is also need to fill in gaps in the availability of essential equipments.
84. There is also need to have intensive interaction with the corporate sector to ensure that corporate social responsibility is not only accepted but implemented meticulously in times of need.
85. Ward offices should take proactive measures to facilitate the task of fire services.

86. UEVRP needs to be made more comprehensive by including other specific disasters.
87. Basic training on first aid and search and rescue should be conducted in the community.
88. Frequent field visits from MCGM Departments and among Wards to other Wards is encouraged.

The following key observations/recommendations cutting across various sectors have also been developed based on the identification and analysis of existing gaps:

1. It is desirable to undertake an exercise in respect of all key stakeholders to assess that there is no mismatch in Authority, Responsibility, Accountability and Capacity. It has been observed that in few cases, while the authority may vest at a senior level, the responsibility is entrusted to a comparatively lower level, which in turn is again entrusted to next below levels on task-wise basis. In several cases, the officers responsible or accountable do not have the adequate authority to discharge their functions effectively. Besides, there is no assessment whether the officers held responsible or accountable have the requisite capacity to discharge their obligations. In normal times, the capacity can be built through adequate training. A mismatch in these four components invariably adversely affects the optimum results.

2. There should also be adequate delegation of administrative and financial powers, particularly in disaster situations, to officers responsible for coordinating response, relief and rescue operations. For instance, Chief Officer (DM) is of the same rank as Ward Officers with the result that he/she can 'request and persuade' but cannot 'command and control' the actions of ward offices.

3. Disaster Management is still perceived as the responsibility of DM Department which has come in the way of mainstreaming disaster risk reduction in the functions of all departments at city level. This can be corrected by training and capacity building of concerned departments. The training modules need to be specific to the requirements of each department based on training needs analysis as well as capacity needs analysis.

4. Despite trained and professional manpower, the optimum results cannot be achieved if necessary facilities and equipments have not been made available. The specific instances have been brought out in case of Fire Services and Health Care Management. These aberrations need to be corrected.

5. Each stakeholder/department needs to put in place Standard Operating Procedures (SOPs) and conduct frequent mock drills to ensure there is role clarity in respect of functions to be discharged by each stakeholder/official in a disaster situation. This was found to be lacking in MCGM departments and particularly in ward offices.

6. Lack of adequate coordination among different stakeholders/ departments is a major bottleneck. An effective inter-agency as well as intra-agency coordination mechanism needs to be put in place.

7. Community participation was not clearly visible. There is need for MCGM to take a lead and have regular interaction with community through ward offices for community sensitization and training, if necessary through the mechanism of civil defense and home guards, with the lead being taken by respective ward offices. Unless the MCGM departments and ward offices change their mindset from discharging regulatory functions in a colonial manner to a participatory approach, there is little hope of community coming forward to work hand in hand with providers of civic amenities. There is a crisis of confidence so far as community's active participation with MCGM departments and ward offices is concerned. It is unfortunately a harsh but accurate assessment.

8. A Disaster Management Action Plan needs to be developed as a part of Disaster Management Plan for Greater Mumbai to be prepared by MCGM. The identified gaps may be bridged through the Action Plan by short, medium and long term interventions. The modalities for necessary financial arrangements to take up intervention programs need to be worked out and included in the disaster management plan.

9. Documentation of good practices needs to be undertaken and extensively utilized for sensitization and training. MCGM has responded well in past disasters, particularly Mumbai Floods, 2005. If the past experiences are documented both with good practices as well as impediments/ bottlenecks faced, these would significantly improve the future performance.

10. Women empowerment and their active participation in training programs and mitigation measures to be taken by the corporation is essential; more so when 54% of the population is in slum areas where habitats are more vulnerable and womenfolk have the major responsibility of looking after their habitats and children, besides working as hard as men-folk to supplement the household income. MCGM may develop a comprehensive program for imparting training to women for pro-active action in case of a disaster for saving lives, property and community assets.

Path Ahead

The DRMMP may aim at a vision 2020 to build a safer and secure Mumbai through sustained collective effort, synergy of capacities of all stakeholders in the city and active community participation. In order to achieve this end, a serious introspection within MCGM is the first small step which needs to be taken. MCGM's march forward should actually be visible to the community and not merely be a plan on paper, how so ever laudable it may be

PART I. THE CONTEXT AND RELEVANCE OF THE LIA REPORT

The report was prepared as a deliverable of the project Disaster *Risk Management Master Plan (DRMMP) for Greater Mumbai*. This project is a joint undertaking between the Municipal Corporation of Greater Mumbai (MCGM) and the Earthquakes and Megacities Initiative (EMI). The Report provides the legal foundation and the institutional context to develop the elements of the DRMMP. The relevant elements of the DRMMP include:

- Shelter and Disaster Risk Resiliency, which include housing and slum rehabilitation policy, transport, water, drainage and sanitation and other core services such as health delivery
- Emergency Management
- Risk Assessment and Risk Analysis
- Land Use Management and Construction Standards and Regulation; and
- Training and capacity building

The document is also intended to serve as a reference material and guide for government as well as nongovernmental agencies that perform disaster risk management functions including Disaster Management Cells, Nodal Officers in public and private sector, state and district level institutes, civil society, Self Help Groups and other stakeholders. The scope of the Report is limited to the context of urban disaster risk management and its relevance to Greater Mumbai. Thus, the Report is neither exhaustive nor complete in its analysis, findings and recommendations of the legal and institutional policies, arrangements and practices of disaster risk management.

The Key Audiences of the Report include:

- The Project Implementation Team composed of officers and experts from Municipal Corporation of Greater Mumbai (MCGM) and EMI, as well as several stakeholders organized in the project Focus Groups[1]
- The various departments and institutions under the jurisdiction of MCGM, primarily those dealing with disaster/emergency management, fire fighting, public safety, health delivery, and lifelines, but also including Advisory and other Committees and Sub-Committees.
- The various departments and institutions under the jurisdiction of the State Government of Maharashtra, and in particular the State and District Disaster

[1] Refer to the DRMMP Handbook for details on the DRMMP project, the composition of the Project Implementation Team and the members and organization of the Focus Groups.

Management Authorities in Maharashtra, public safety, fire fighting, health and lifelines, but also including Advisory Committees and Sub-Committees, other State Governments having similar issues in their respective megacities and/or dealing with urban risk management

- Central Government of India, and in particular institutions, committees and subcommittees dealing with urban disaster risk management, emergency management, public safety and essential lifeline services
- National Disaster Management Authority
- .Private, public and regulated service providers such as transport, power, sanitation, water, drainage, waste management, health, education, communication, and other similar core functions and lifeline services
- Civil society, Self Help Groups, and other concerned organizations like community-based and nongovernmental organizations
- National and state-level stakeholders formulating and implementing Urban Disaster Risk Reduction interventions and mitigation strategies
- All other stakeholders concerned with Urban Risk Mitigation in general and in megacities in particular

The Report consolidates materials on statutes and institutions that perform disaster risk management functions in Greater Mumbai including statutes and institutions which support or facilitate performance of such functions in Greater Mumbai.

The salient features of the Report include both global and national perspectives including the emergence of disaster risk reduction strategy in India; legal, policy and regulatory frameworks at National, State, District, and local /MCGM local level; DRM-related institutional systems and structures at national and state levels; legal and institutional arrangements for MCGM; sectoral institutional arrangements; DRM institutional linkages in Greater Mumbai; identification and analysis of gaps in legal, policy, institutional and regulatory frameworks, and conclusions and recommendations.

INTRODUCTION

Global Perspective

At the global level, there has been considerable concern over natural disasters. Even as substantial scientific and material progress is made, the loss of lives and property due to disasters has not decreased adequately. In fact, the human toll and economic losses have mounted. It was within this context that in 1989 the United Nations General Assembly declared 1990-2000 as the International Decade for Natural Disaster Reduction (IDNDR), with the objective to reduce loss of lives and property and restrict socio-economic damage through concerted international action, especially in developing countries. (National Disaster Management Division, August 2004)

The Yokohama Strategy for a Safer World for Natural Disaster Prevention, Preparedness and Mitigation and its Plan of Action adopted in 1994 provided landmark guidance on reducing disaster risk and the impacts of disasters. The review of progress made in implementing the Yokohama Strategy identified major challenges in ensuring more systematic action to address disaster risks in the context of sustainable development and in building resilience through enhanced national and local capabilities to manage and reduce risk. The review stressed the importance of disaster risk reduction being underpinned by a more pro-active approach to informing, motivating and involving people in all aspects of disaster risk reduction in their own local communities. It also highlighted the scarcity of resources allocated specifically from development budgets for the realization of risk reduction objectives, either at the national or the regional level or through international cooperation and financial mechanisms, while noting the significant potential to better exploit existing resources and established practices for more effective disaster risk reduction.

The specific gaps and challenges were identified in the following five main areas:

- Governance: organizational, legal and policy frameworks;
- Risk identification, assessment, monitoring and early warning;
- Knowledge management and education;
- Reducing underlying risk factors;
- Preparedness for effective response and recovery.

The Hyogo Framework for Action 2005-2015, drawing on the conclusions of the review of the Yokohama Strategy and the IDNDR, and on the basis of deliberations at the World Conference on Disaster Reduction held in January 2005 at Kobe, Hyogo, Japan, especially the agreed expected outcome and strategic goals, adopted the following five priorities for action by all member countries of the United Nations:

- Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation.
- Identify, assess and monitor disaster risks and enhance early warning.
- Use knowledge, innovation and education to build a culture of safety and resilience at all levels.
- Reduce the underlying risk factors.
- Strengthen disaster preparedness for effective response at all levels.

National Perspective

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena. About 60% of the landmass is prone to earthquakes of various intensities; over 40 million hectares is prone to floods; about 8% of the total area is prone to cyclones and 68% of the area is susceptible to droughts. India is also vulnerable to man-made disasters. In the decade 1990-2000, an average of about 4,344 people lost their lives and approximately 30 million people were affected by disasters every year. The loss in terms of private, community and public assets has been astronomical. (Disaster Management in India Status Report[2], August 2004)

The conversion of hazards into disasters is primarily based on the following four factors which have a multiplier effect:

- Hazard frequency and severity due to geo-climatic and environmental conditions;
- Physical vulnerability caused by man-made intervention in the use and management of land and natural resources, construction of building and infrastructure, and protection of the environment;
- Poverty due to fairly high segment of economically disadvantaged population;
- Social vulnerability due to socially disadvantaged population, be it caste, community or gender bias.

The vulnerabilities to disasters in India have been escalating with the increasing population, leading to additional settlements in more disaster prone areas; accelerating urbanization, social and gender bias and changing modes of construction. It is also the poor who are most vulnerable to disasters. Their habitats are fragile and because of their extreme poverty, they have to settle in marginal areas which are most susceptible to natural hazards. Recurrent disasters further marginalize the poor.

[2] See Disaster Management in India Status Report, August 2004 at http://www.ndmindia.nic.in

Disasters wipe out development gains achieved over the decades. Development, therefore, cannot be sustainable unless mitigation measures are made part of the developmental process. The huge expenditure incurred on post-disaster relief is an indicator that if mitigation and preparedness measures are put in place and resources are invested in the core area of human resource development, the expenditure being incurred on response and relief will be drastically reduced, accompanied by a reduction in the loss of lives, community assets and infrastructure.

Paradigm shift in India

The disaster management mechanism in India had primarily been response and relief-oriented. However, the need for a comprehensive disaster management mechanism had been discussed for some time. The gaps in disaster management were starkly highlighted by the devastating cyclone in Orissa and the catastrophic earthquake in Gujarat. The terrorist attack on the World Trade Towers, and reports of terrorist organizations trying to lay their hands on radiological/biological/chemical weapons had also underlined the need for the disaster management mechanism to be so equipped as to be able to handle these dimensions as well. The Group of Ministers on Internal Security had gone into the issue in 2001. They recommended as follows: -

"It is imperative that appropriate procedures, structures etc. are expeditiously put in place to cope with national calamities like cyclones, floods, earthquakes etc. Since disaster management requires dealing with one or more authorities and often requires the intervention of CPOs, the law and order machinery, etc., it may be appropriate to transfer this subject from the Ministry of Agriculture to the MHA (with the exception of drought relief and famine which would continue to be handled by the Ministry of Agriculture). The relevant sections of the Allocation of Business Rules may be amended for this purpose".

The super cyclone in Orissa in October 1999 and the Bhuj earthquake in Gujarat in January 2001 underscored the need to adopt a multi dimensional endeavor involving diverse scientific, engineering, financial and social processes; the need to adopt multi-disciplinary, multi-sector and multi-stakeholder participatory approach and the incorporation of risk reduction in developmental plans and strategies. It was also recognized that the capabilities of people in India have to be built to enable them to work towards their own risk reduction. (Disaster Management in India Status Report, August 2004)

The Group of Ministers which examined this issue recommended that it is imperative that appropriate procedures and structures be expeditiously put in place to cope with national calamities like cyclones, floods, earthquakes, etc. Since disaster management requires dealing with one or more authorities with the intervention of central police organizations, the law and order machinery, and other

related agencies, it may be appropriate to transfer this responsibility from the Ministry of Agriculture to the Ministry of Home Affairs (with the exception of drought relief and famine which would continue to be handled by the Ministry of Agriculture, and epidemics by the Ministry of Health and Family Welfare). The Group of Ministers had therefore recommended that the Allocation of Business Rules be amended for this purpose.

In light of the abovementioned recommendation, the Government of India (Allocation of Business) Rules 1961 were amended in February 2002 transferring the subject of Disaster Management (except drought and epidemics) and those disasters which have not been specifically allotted to any other Ministry, to the Ministry of Home Affairs. The work was effectively transferred to the Ministry of Home Affairs from 1st June 2002.

With the transfer of work to the Ministry of Home Affairs, there has been a change in orientation and a pro-active approach has been adopted in place of a reactive orientation. There is a change in focus from mere post-disaster response to holistic preparedness and mitigation. To remedy earlier inadequacies, the Government of India has increasingly insisted on intensive multi-departmental involvement and pro-active mainstreaming of disaster management into all government activities, particularly developmental initiatives. The multi-disciplinary approach involves partnership with a large number of Ministries/Departments such as Health, Water Resources, Environment and Forests, Agriculture, Railways, Atomic Energy, Defense, Chemicals, Science & Technology, Telecommunication, Urban Development, Rural Development, India Meteorological Department and Civil Defense.

National Roadmap

Keeping in view the change in orientation, a review of disaster management mechanisms was carried out by the Government of India after the Gujarat earthquake. It was noted that there was a felt need to build up holistic capabilities for disaster management to be able to handle both natural and human-induced disasters. The Government of India, therefore, brought about a change in policy which emphasizes mitigation, prevention and preparedness. A strategic National Disaster Management Framework (National Roadmap) was drawn up for reducing the country's vulnerability to disasters with the mandate that action for reducing the vulnerabilities shall be taken in accordance with the Roadmap.

The National Roadmap covers the institutional mechanism; legal and policy framework; disaster prevention strategy; early warning systems; disaster mitigation, preparedness and response; National Network of Emergency Operation Centers; human resource development; and research and knowledge management. The expected inputs, areas of intervention and agencies to be involved at national, state and district levels were also identified and listed in the national roadmap. The national roadmap was shared with all State Governments and Union Territory

Administrations, Ministries/Departments of the Government of India, international agencies and other concerned organizations. The State Governments were advised to develop their respective roadmaps taking the national roadmap as a broad guideline. This has brought about a convergence of activities being undertaken by all participating organizations and highlighted the need for a uniform approach as a national theme for disaster mitigation and preparedness.

High Powered Committee on Disaster Management

In order to look into the entire gamut of disaster management in India, the Government constituted a High Powered Committee on Disaster Management (HPC on DM) in August, 1999. The Members of the HPC were drawn from the Ministries/States/NGOs and experts from relevant fields. It was a first attempt in India towards drawing up a systematic, comprehensive and holistic approach towards disasters.

The original mandate of the HPC was confined to preparation of management plans for natural disasters. It was expanded subsequently to include man-made disasters also. The enhanced terms of reference of the HPC were as follows:

- To review existing arrangements for preparedness and mitigation of natural and man-made disasters including industrial, nuclear, biological and chemical disasters;
- Recommend measures for strengthening organizational structures; and
- Prepare model plans for management of these disasters at the National, State and District level.

The HPC submitted its report in October, 2001. The major recommendations made by HPC were briefly as follows:-

- Inclusion of disaster management in the Concurrent List of the 7th Schedule of the Constitution and enactment of a National Calamity Management Act, as well as State Disaster Management Acts;
- Constitution of a permanent Cabinet Committee on Disaster Management and an all Party National Committee on Disaster Management;
- Creation of separate Departments of Disaster Management and Mitigation in States and the Ministry of Disaster Management in the Union Government;
- Establishment of a National Institute of Disaster Management as a Centre of Excellence for the creation of knowledge network and its dissemination, including training and networking with State-level training institutes;
- Creation of state of the art Emergency Operation Centers at State and District levels;
- Creation of a National Fund for rehabilitation and reconstruction and a separate National Fund for prevention and mitigation;

- Preparation of large-scale digital maps, topographic maps, seismic micro zoning and satellite remote sensing;
- Development of a sound information database and documentation of previous disasters;
- Development of District Disaster Management Plans and their integration with the State Plans and the National Plan;
- Preparation of Panchayat, local body and community-level Disaster Management Plans;
- Strengthening of forecasting/warning and alert systems;
- Human resource development by training of Police and Paramilitary personnel, Fire Services personnel, Civil Defense/Home Guards, Territorial Army, ex-servicemen, National Cadet Corps, National Service Scheme, Scouts and Guides, Nehru Yuva Kendra Sangathan and Youth Clubs;
- Collaboration with SAARC and neighboring countries for forecasting, information sharing and pooling of resources;
- Trigger mechanism to simultaneously activate response on all fronts;
- Development of a standard cache of equipment for search & rescue and medical response;
- Development of minimum standards of relief;
- Preparation of disaster-specific medical plans.

In the aftermath of the Bhuj Earthquake, a Working Group on Disaster Management was constituted under the Chairmanship of Mr. Sharad Pawar, a former Chief Minister and Cabinet Minister and the then Vice-Chairman of National Committee on Disaster Management constituted under the Chairmanship of the then Prime Minister soon after Bhuj earthquake, with the Members of the HPC as the Members of the Working Group. The Working Group submitted its report to the Prime Minister in June 2003, which in general endorsed the recommendations made by the HPC.

The Government considered and accepted most of the recommendations of the HPC and the Working Group. Initially it was felt that since disaster management is primarily the responsibility of the State Governments and the Central Government provides financial and logistic support in case of major disasters, the State Governments should enact the relevant legislation on the subject. The State Governments were advised accordingly. However, after the tsunami disaster in December 2004, it was decided in the All Party meeting held under the Chairmanship of the Prime Minister on 9th January 2005 to enact a Central Legislation covering all aspects of disaster management – prevention, mitigation, preparedness, response, relief, rehabilitation and reconstruction – and constitute Disaster Management Authorities at National, State and District levels.

Key Institutions

UN defines Disaster Risk Management as the systematic process of using administrative directions, organizations, and operational skills and capacities to implement policies, strategies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disasters (UNISDR, 2009). According to UNISDR (2009), DRM activities may be categorized into the following essential elements:

- Risk Assessment and Analysis
- Disaster Preparedness
- Mitigation
- Risk Transfer
- Response, Rescue & Relief
- Recovery, Rehabilitation & Reconstruction

DRM activities at the city level comprise of a wide range of actions that aims to prevent, mitigate hazards and prepare the city for potential disasters. These activities include measures to minimize the impacts of hazards, reduce vulnerabilities of people and places and increase social resilience. Some of the actions and initiatives performed by authorities and institutions in Greater Mumbai are explicitly categorized as disaster risk management activities such as contingency planning and emergency preparedness. Other activities however, like land use planning or flood proofing of roads and public works are important measures undertaken to reduce disaster risks and improve resiliency of the city.

The responsibility for carrying out all the activities and tasks of disaster risk management does not fall under one single institution but traverses the lines of responsibility of several government, private and non-government organizations. At times, the performance of these activities requires inter-institutional coordination in order to harmonize planning strategies and action plans, share technical expertise, clarify roles and mandates, and agree on the pooling of resources.

As the principal protector of people's welfare and safety, the government has key responsibilities in the realm of disaster risk management (Fernandez et.al 2004). The following discussion in Part II outlines the responsibilities mandated to central, state and district level government authorities.

PART II. LEGAL, INSTITUTIONAL, POLICY AND REGULATORY FRAMEWORK

National Level

Disaster Management Act, 2005

After the tsunami disaster in December 2004, it was felt that while the response of the Government and other relevant agencies had been adequate, it could be improved further if appropriate preparedness and capacity building measures are put in place together with an effective coordination mechanism, and the necessary legislative mandate. The Disaster Management Act, 2005 was enacted on 23rd December 2005 in this context. The legislation complements Entry 23 (Social Security and Social Insurance) in the Concurrent List of the Constitution of India. This provides the advantage of permitting the States to have their own legislation on disaster management.

The salient features of the Disaster Management Act are as follows:-

- It establishes a National Disaster Management Authority (NDMA) headed by the Prime Minister with such other Members, not exceeding nine, as may be nominated by Prime Minister.
- The National Authority shall have the responsibility for laying down the policies, plans and guidelines for disaster management. It will be assisted by a National Executive Committee of Secretaries.
- The National Executive Committee shall also be responsible to ensure compliance of directions issued by the Central Government for the purpose of disaster management in the country.
- The NDMA may constitute an Advisory Committee consisting of experts in the field of disaster management.
- Every State Government shall establish a State Disaster Management Authority headed by the Chief Minister with such other members, not exceeding eight, to be nominated by the Chief Minister. The Chief Secretary who will be the Chairperson of the State Executive Committee which will assist the State Authority, would be the ex-officio Member of the State Authority.
- The State Executive Committee shall also be responsible to ensure compliance of directions issued by the State Government under the Act.
- The State DM Authority shall have the responsibility for laying down policies and plans for disaster management in the State.
- The State Authority may, as and when it considers necessary, constitute an Advisory Committee of experts.

- Each State Government shall establish a District Disaster Management Authority (DDMA) for every district in the State. The Authority shall be headed by the Collector or District Magistrate or Deputy Commissioner, as the case may be, and will have an elected representative of the local authority as co-chairperson. The other Members of the District Authority will be the Chief Executive Officer of the District Authority, the Superintendent of Police, the Chief Medical Officer and not exceeding two other district level officers to be appointed by the State Government.
- In any district where a zilla parishad[3] exists, the Chairperson thereof shall be the co-Chairperson of the District Authority, provided that in the tribal areas, the Chief Executive Member of the district council of autonomous district shall be the co-Chairperson.
- The District Authority shall act as the district planning; coordinating and implementing body for disaster management and take all measures for the purpose of disaster management in the district in accordance with the guidelines laid down by the National Authority and State Authority.
- The Central Government shall be responsible to take all measures, as it deems necessary or expedient, for the purpose of disaster management. It would be responsible for coordination of actions of the Ministries or Departments of the Government of India, State Governments, National Authority, State Authorities, governmental and non-governmental organizations; ensure integration of measures for prevention of disasters and mitigation by Ministries or Departments of the Government of India in their development plans and projects; ensure appropriate allocation of funds; deployment of Armed Forces and coordination with UN and other international organizations and Governments of other countries.
- The Act also lays down the responsibility of each Ministry or Department of Government of India which include taking necessary measures for mitigation, preparedness and capacity building; integrate into its development plans and projects, the measures for prevention or mitigation of disasters; responding effectively and promptly to any threatening disaster situation or disaster etc.
- Each Ministry or Department shall also prepare a disaster management plan for the purpose
- Similar functions have been assigned to the State Governments and the Departments of the State Governments.
- The local authorities[4] have been assigned functions which include ensuring training of its officers and employees, maintenance of resources relating to disaster management as to be readily available for use in the event of any

[3] A local government body at the district level in India. It looks after the administration of the rural areas of the district and its office is located at the district headquarters. The Hindi word *Zilla Parishad* translates to *District Council*.

[4] As per the definition of the 'local authority' in the Disaster Management Act, 2005, it "includes panchayati raj institutions, municipalities, a district board, cantonment board, town planning authority or Zilla Parishad or any other body or authority, by whatever name called, for the time being invested by law, for rendering essential services or, with the control and management of civic services, within a specified local area".

disaster; ensure all construction projects under it conform to the standards and specifications laid down for prevention and mitigation of disasters and carry out relief, rehabilitation and reconstruction activities in the affected areas. The local authority may take such other measures as may be necessary for disaster management.

- The Act also provides for constitution of a National Institute of Disaster Management which shall function within the broad policies and guidelines laid down by the National Authority and will be responsible for planning and promoting training and research in the area of disaster management, documentation and development of national level information base relating to disaster management policies, prevention mechanism and mitigation measures.
- A National Disaster Response Force shall be constituted for the purpose of specialist response. The general superintendence, direction and control of the Force shall vest in the National Authority while the command and supervision of the Force shall vest in the Director General of the Force.
- The Act provides for constitution of Disaster Response Fund and Disaster Mitigation Fund at National, State and District level. It also provides for every Ministry or Department of the Government of India and the State Governments to make provisions in its annual budget for the purpose of carrying out the activities and programs set out in the disaster management plan.
- The Act makes special provision for emergency procurement of resources in a disaster situation.
- The Act provides for punishment for obstruction, false claims, misappropriation of money and materials, issue of false warnings etc. However, it also gives protection to officers for actions taken in good faith in the discharge of their duties.

National Disaster Management Authority[5]

Pending enactment of the law, the National Authority was constituted on 30th May 2005 and the Vice-Chairperson and 5 Members were notified on 28th September 2005. At present, all Members in the National Authority are in position, including the Vice-Chairperson. The Authority has been entrusted with the following responsibilities:

- Promulgate policies on disaster management;
- Approve the National Plan which shall include measures to be taken for prevention and mitigation of disasters, integration of mitigation measures in the development plans, preparedness and capacity building measures and roles and responsibilities of different Ministries or Departments of the Government of India;

[5] More on NDMA at http://www.ndmindia.nic.in/

- Approve plans prepared by the Ministries or Departments of the Government of India;
- Lay down guidelines to be followed by State Authorities in drawing up the State Plan and different Ministries or Departments of the Government of India and coordinate enforcement and implementation of the policies and plans for disaster management;
- Recommend provision of funds for the purpose of mitigation;
- Provide such support to other countries affected by major disasters as may be determined by the Central Government;
- Take such other measures for the prevention of disaster or mitigation or preparedness or capacity building, as it may consider necessary;
- Lay down policies and guidelines for the functioning of the National Institute of Disaster Management;
- Recommend minimum standards of relief to be provided to persons affected by disasters including minimum requirements to be provided in the relief camps, special provisions for widows and orphans, ex-gratia assistance for loss of life and damage to houses and for restoration of means of livelihood etc.;
- Recommend relief in repayment of loans or for grant of fresh loans to the persons affected by disaster on such concessional terms as may be appropriate, in case of disasters of severe magnitude.

The National Vision of NDMA, as enunciated by the Authority is '***to build a safe and disaster-resilient India by developing a holistic, proactive, multi-disaster and technology-driven strategy for DM***". This will be achieved through a culture of prevention, mitigation and preparedness to generate a prompt and efficient response at the time of disasters. The entire process will focus on the community and will be provided momentum and be sustained through the collective efforts of all government agencies and nongovernmental organizations'.

The National Authority has taken up several initiatives. These are:

- Formulation of guidelines through a participatory and consultative process involving all stakeholders including government, nongovernment, academic and scientific institutions, corporate sector and the community;
- Release of the guidelines on Management of Earthquakes, Cyclones, Chemical (Industrial) Disasters, Medical Preparedness and Mass Casualty Management, Floods and preparation of State Disaster Management Plans. The guidelines on nuclear disasters, biological hazards, landslides, urban flooding, river erosion, micro finance and insurance and community based disaster management are being prepared;
- Facilitating and equipping of the National Disaster Response Force; it has been constituted by converting and upgrading eight battalions of Central Paramilitary Forces;

- Planning national-level mitigation projects related to cyclones, earthquakes, floods, school safety etc.;
- Conduct of awareness campaign to improve risk perception, preparedness and self-reliance;
- Facilitating mock exercises in vulnerable states on various types of natural and man-made disasters to help the state governments in reviewing the adequacy and efficacy of state and district level disaster management plans and identify gaps in resources and systems;
- Oversee the progress of post-tsunami rehabilitation and reconstruction activities in the Andaman & Nicobar Islands.

National Executive Committee

The Act provides for the constitution of a National Executive Committee (NEC) to assist NDMA in the performance of its functions. The NEC also has the responsibility to ensure compliance with directives issued by the Central Government for the purpose of disaster management in the country. It consists of the secretary of the Ministry or Department having administrative control of disaster management as chairperson with secretaries of Ministries/ Departments of Agriculture, Atomic Energy, Defense, Drinking Water Supply, Environment and Forests, Finance (expenditure), Health, Power, Rural Development, Science and Technology, Space, Telecommunications, Urban Development, Water Resources, and the Chief of the Integrated Defense Staff of the Chiefs of Staff Committee as members. The main functions of the NEC are:

- Implement the policies and plans of the National Authority;
- Act as the coordinating and monitoring body for disaster management;
- Prepare the National Plan to be approved by the National Authority and monitor its implementation;
- Coordinate and monitor the implementation of National Policy for disaster management;
- Lay down guidelines for preparing disaster management plans by Ministries and Departments of Government of India and State Authorities;
- Provide technical assistance to State Governments and State Authorities;
- Monitor the implementation of guidelines issued by the National Authority;
- Monitor, coordinate and provide directions regarding mitigation and preparedness measures to be taken by Ministries, Departments and agencies of the government;
- Evaluate preparedness at all government levels for responding to any threatening disaster situation or disaster and provide directions, where necessary, for enhancing such preparedness;
- Plan and coordinate specialized training programs for different levels of officers, employees and voluntary rescue workers;

- Coordinate response in the event of a threatening disaster situation or disaster;
- Promote general education and awareness related to disaster management;
- Perform such other functions as may be required by the National Authority;

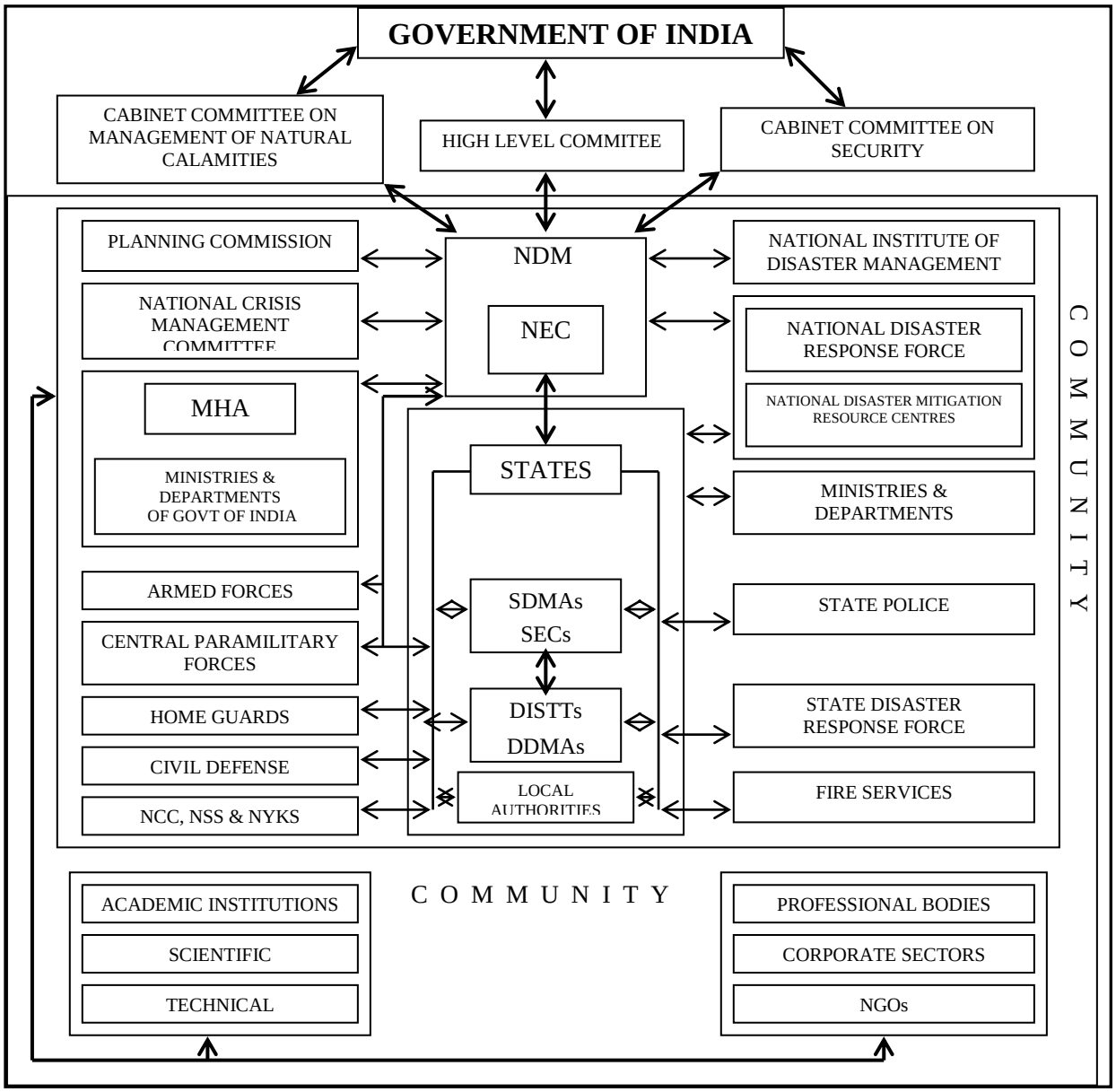
National Plan

The Act provides for preparation of a National Plan for disaster management for the whole country by the National Executive Committee. The Plan has to be prepared in consultation with the state governments and expert bodies or organizations in the field of disaster management, with regard to National Policy. The National Plan has to be approved by National Authority. The National Plan shall include:

- Measures to be taken for prevention of disasters or mitigation of their effects;
- Integration of mitigation measures in the development plans;
- Measures to be taken for preparedness and capacity building to effectively respond to any threatening disaster situation or disaster;
- Roles and responsibilities of different Ministries and Departments of Government of India for disaster prevention, mitigation, preparedness, capacity building and response.

The National Plan is at present under preparation by the National Executive Committee.

Figure 1: National Disaster Management Authority



Notes:

- This diagram reflects interactive linkages for synergized management of disasters and not a hierarchical structure.
- Backward and forward linkages, especially at the functional level, are with a view to optimize efficiency.
- Participation of the community is a crucial factor.
- Source: http://ndma.gov.in/ndma/dmstructure.htm

National Institute of Disaster Management

The National Center of Disaster Management (NCDM) was set up in 1995 at the Indian Institute of Public Administration (IIPA). The functions assigned to NCDM were as follows:

i) Organizing training programs for policy planners, decision makers, disaster managers, as well as trainers for regional/state training institutes;
ii) Research and development of case studies relating to disaster management activities;
iii) Development of database and dissemination of information in the field of natural disasters.

The NCDM was subsequently assigned the function of providing secretarial assistance to the HPC which was set up in August 1999 and submitted its report in October 2001. After the Bhuj Earthquake, a National Committee on Disaster Management was also set up under the Chairmanship of the Prime Minister and the HPC was converted into a Working Group to provide requisite support to the National Committee on Disaster Management. The NCDM was also entrusted with the responsibility of providing secretarial assistance and other support to the Working Group.

Initially, the proposal under consideration in 1995 was to have a full-fledged National Center of Disaster Management. However, since there was hardly any time to develop the necessary infrastructure and the need to set up NCDM was very urgent in the wake of international calls for action to reduce the occurrence and minimize the adverse impact of natural calamities during the 1990s, it was decided that instead of establishing a separate Institute for Disaster Management, the task may be entrusted to an existing leading National Institute. It was in this context, that the Indian Institute of Public Administration (IIPA) was selected for this purpose. An Advisory Committee was constituted in June 1995 under the Chairmanship of the Central Relief Commissioner, Department of Agriculture. The Advisory Committee was entrusted with the following responsibilities:

- To identify and recommend programs on disaster mitigation and preparedness to be taken up by the Center;
- To review the impact of the programs conducted by the Center from time to time;
- To review the performance of the Center;

- To consider and recommend suitable candidate for selection as Head of the Center;

The HPC considered the role of NCDM and recommended the following functions for NCDM, with a further recommendation that it may be developed as a full-fledged National Institute of Disaster Management:

- Human resource development covering multiple aspects of disaster management, and to play a lead role in national level policy formulation;
- Coordinate the actions of various role players within the field of disaster management: government, non-governmental organizations, public and private sector and international organizations;
- Establish an exhaustive national-level information base on disaster policies, prevention mechanisms, mitigation measures, and regionwise preparedness and response plans, as well as resources spent on mitigation and response for various types of disasters;
- Forge, promote & sustain international & regional partnerships for launching joint, synergistic projects & programs;
- Assist various states in strengthening their disaster management systems and capacities, and in the preparation of their plans and strategies for hazard mitigation and disaster response;
- Set up linkages with other international institutions in the region for mutual benefits and sharing of experiences;

Accordingly, the National Institute of Disaster Management (NIDM) was established on 16th October 2003. The objective in making the NIDM a separate entity was to develop it as an Institute of Excellence and make it an autonomous organization, registered as a society, to enable it to have requisite flexibility. When the process for the enactment of the Disaster Management Act, 2005 commenced, it was considered that NIDM may be made a statutory body under the proposed legislation. Accordingly, NIDM was re-constituted with a Governing Body. It shall function within the broad policies and guidelines laid down by NDMA and be responsible for planning and promoting training and research in the area of disaster management, documentation and development of national-level information base relating to disaster management policies, prevention mechanisms and mitigation measures. In accordance with the above tasks, NIDM, as prescribed by the law, may:

- Develop training modules, and conduct training where it is needed such as State training institutes;
- Develop educational materials and promote awareness among stakeholders;
- Develop research programs and undertake research on DM;
- Formulate and implement a human resources development plan;
- Provide assistance in national level policy formulation;
- Provide assistance to State Governments and state training institutes in the formulation of state level policies, strategies, disaster management framework and assist these institutions for the capacity building of stakeholders, governments including its functionaries, civil society members, corporate sector and people's elected representatives;
- Promote awareness among stakeholders; and
- Undertake documentation in disaster management.

In order to give NIDM requisite autonomy, it has been empowered to make regulations with the approval of the Central Government.

National Disaster Response Force (NDRF)

The NDRF has been constituted under the Act for the purpose of specialist response to a threatening disaster situation or actual disaster. As a rapid action and specialized force during disasters, the NDRF has been placed under the control of the NDMA. It is a multi-disciplinary, multi-skilled, high-tech force for all types of disasters, capable of insertion by air, sea and land. All the eight battalions, consisting of 144 specialist rapid response teams are being trained and equipped to respond to all natural disasters including four battalions for dealing with nuclear, biological and chemical disasters.

State Level

State Disaster Management Authorities

The Act provides for the constitution of a State Disaster Management Authority (SDMA) by every State Government with the Chief Minister as Chairperson and other members, not exceeding eight, to be nominated by the Chief Minister and the chairperson of the State Executive Committee, who shall be the Chief Secretary ex officio, as member and Chief Executive Officer of the State Authority. However, in the case of the Union Territory of Delhi, the Lieutenant Governor shall be the chairperson of the State Authority and the Chief Minister thereof shall be the vice-chairperson. The powers and functions assigned to the State Authority are to:

- Lay down policies and plans for disaster management in the state;
- Lay down the State Disaster Management Policy;
- Approve the State Plan in accordance with the guidelines laid down by the National Authority;
- Approve the disaster management plans prepared by the departments of the state;
- Lay down guidelines to be followed by the departments of the state government for integration of measures for prevention of disasters and mitigation of their effects, in their development plans and projects and provide necessary technical assistance for this purpose;
- Coordinate the implementation of the state plan;
- Recommend provision of funds for mitigation and preparedness measures;
- Review the development plans of different departments to ensure that prevention and mitigation measures are integrated therein;
- Review the measures being taken for mitigation, capacity building and preparedness by the state departments and issue such guidelines as may be necessary;
- Lay down detailed guidelines for minimum standards of relief to persons affected by disasters in the state provided that such standards shall not be less than the minimum standards laid down in the guidelines of National Authority;
- In case of an emergency, the Chairperson of the State Authority has the powers to exercise all or any of the powers of the State Authority subject to post facto ratification by the State Authority.

Twenty seven state governments/ union territories have already established their respective State Authorities. While some of them had constituted it before the enactment of the Act and the notification of its provisions in respect of states/union territories with effect from 1st August 2007, few states/ union territories have constituted the Authorities after the enactment of the Act and the notification of the relevant provisions for states, in terms of the constitution indicated in the Disaster Management Act, 2005. Gujarat and Uttar Pradesh are two exceptions since these states have notified the State Authority under their respective state Acts. Most of the other states/ union territories, which have not notified the State Authorities under the Central Act, are in the process of doing so.

State Executive Committee

Similar to the national level, where the National Executive Committee is constituted by the Central Government, the State government shall constitute a State Executive Committee (SEC) to assist the State Authority in the performance of its functions and to coordinate action in accordance with the guidelines laid down by the State Authority. The State Executive Committee shall also ensure compliance of directives issued by the State government under the Act. The SEC shall consist of the Chief Secretary of the State government, who shall be the ex officio chairperson,

and four secretaries to the government of the state, ex officio, of such departments as the state government may think fit. The functions entrusted to the SEC are to:

- Coordinate and monitor the implementation of the National Policy, National Plan and the State Plan;
- Examine vulnerability of different parts of the state to different disasters and specify measures to be taken for their prevention or mitigation;
- Lay down guidelines for preparation of disaster management plans by the state departments and District Authorities and monitor their implementation;
- Monitor implementation of guidelines laid down by State Authority for integrating measures for prevention and mitigation of disasters by the departments in their development plans and projects;
- Evaluate preparedness at all governmental and non-governmental levels to respond to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness;
- Coordinate response to a threatening disaster situation or disaster;
- Give directions to any state department or any other authority or body in the state regarding actions to be taken in response to any threatening disaster situation or disaster;
- Promote general education, awareness and community training for different disasters to which different parts of the state are vulnerable and measures that may be taken by such community to prevent, mitigate and respond to such disaster;
- Provide necessary technical assistance or give advice to district and local authorities for carrying out their functions effectively;
- Advise the state government regarding all financial matters related to disaster management;
- Examine the constructions in any local area to ensure compliance of prescribed standards, by giving directions to district and local authorities, where necessary;
- Provide information to National Authority relating to different aspects of disaster management;
- Lay down, update and review the state level response plans and guidelines and ensure that district level response plans are prepared, reviewed and updated;
- Ensure that communication systems are in order and the disaster management drills are carried out periodically;
- Perform such other functions as may be assigned to it by the state authority or as it may consider necessary.

State Plan

The Act provides for a State Disaster Management Plan for each State. The State Plan shall be prepared by the SEC having regard to the guidelines laid down by

the National Authority and after such consultation with the local authorities, district authorities and the people's representative, as the SEC may deem fit. The State Plan is required to be approved by the State Authority. It shall include:

- The vulnerability of different parts of the state to different forms of disasters;
- Measures to be adopted for prevention and mitigation of disasters;
- Manner in which the mitigation measures shall be integrated with development plans and projects;
- Capacity building and preparedness measures to be taken;
- Roles and responsibilities of each State Department for disaster prevention, mitigation, preparedness, capacity building and response.

Appropriate provisions shall be made by the state government for financing for measures to be carried out under the State Plan. The State Plan shall be reviewed and updated every year. Based on the State Plan, each Department of the State shall draw up its own disaster management plan.

The National Authority has laid down guidelines for the preparation of State Disaster Management Plans. It states that "*ideally, state DM plans should be made after vulnerability assessment and risk analysis of a state have been undertaken. Guidelines issued by the NDMA will also need to be internalized in these plans. Even though this process has begun, it is likely to take some time. It is felt that the preparation of plans cannot, and should not, await the outcome of the disaster risk analysis. On the basis of extant information and knowledge, a plan should be formulated by every state and updated regularly adding fresh inputs on an ongoing basis. Pending detailed micro-level vulnerability assessment and risk analysis, information as currently available about the vulnerability profile of different areas of a state, including information contained in the Vulnerability Atlas of India published by the Ministry of Urban Development may be incorporated in the plan*" Accordingly, several State Governments have finalized the State Plan and others are in the process of doing so.

The NDMA guidelines cover the approach, objectives, key responsibilities of different agencies, guiding principles and basic features of the State Plan, and also suggest the outline of the State Plan. It particularly emphasizes the participatory approach to be adopted by keeping a focus on the community.

District Level

District Disaster Management Authority

The Act mandates that every state government shall establish a District Disaster Management Authority (DDMA) for each district in the state. The District Authority shall consist of the chairperson and such other members, not exceeding seven, as may be prescribed by the state government by making appropriate rules.

The District Authority, shall consist of, unless otherwise provided by rules, the Collector or District Magistrate or Deputy Commissioner of the district as chairperson, elected representative of local authority as co-chairperson and the Chief Executive Officer of the District Authority, Superintendent of Police, Chief Medical Officer of the district and not exceeding two district level officers to be appointed by the state government, as members. As for elected representative, in any district where Zilla Parishad exists, the chairperson thereof shall be the co-chairperson of DDMA. In the tribal areas, the Chief Executive Member of the district council of autonomous district shall be the co-chairperson since there is no zilla parishad in tribal districts. The Chief Executive Officer of the DDMA shall be appointed by the state government and shall not be less than the rank of Additional Collector or Additional District Magistrate or Additional District Commissioner, as the case may be.

The main function of the District Authority is to act as the district planning, coordinating and implementing body for disaster management. The DDMA may:

- Prepare a disaster management plan including district response plan;
- Coordinate and monitor the implementation of National Policy, State policy, National, State and District Plans;
- Ensure that areas in the districts vulnerable to disasters are identified and measures for prevention and mitigation are undertaken by the concerned district level departments;
- Ensure that guidelines for prevention, mitigation, preparedness and response measures, as laid down by National Authority and State Authority are followed by all district level departments;
- Give directions to different authorities at district level and local authorities to take such other measures for prevention and mitigation of disasters as may be necessary;
- Lay down guidelines for preparation of disaster management plans by the district level departments and local authorities and monitor the implementation of disaster management plans of departments at district level;
- Review the state of capabilities for responding to disasters in the district and give directions to relevant departments or authorities at district level for their up-gradation as may be necessary;
- Review the preparedness measures and give directions to concerned district level departments and other concerned authorities for bringing the preparedness measures to the level required, where necessary;
- Organize and coordinate specialized training programs for district level officers, employees and voluntary rescue workers;
- Facilitate community training and awareness programs with the support of local authorities, governmental and non-governmental organizations;
- Set up, maintain, review and upgrade the mechanisms for early warning systems;

- Provide technical assistance or advise the local authorities for carrying out their functions.

The detailed functions of district authorities are given in section 30 of the Act. The powers and functions of the district authority in response to a threatening disaster situation or disaster for the purpose of assisting, protecting and providing relief to the community are also contained in section 34 of the Act.

It can be noted that, unlike the national and state levels, there is only one body at the district level and the functions of the National Authority and National Executive Committee at national level and State Authority and State Executive Committee at state level converge at the district level, to be discharged by the district authority. The district authority is, however, empowered to constitute advisory committees, as and when necessary, for the efficient discharge of its functions.

District Plan

The Act provides for a district plan to be prepared by the district authority after consultation with local authorities and in alignment with the National and State Plans. The district plan shall be approved by the State Authority. It shall include:

- Areas in the district vulnerable to different forms of disasters;
- Measures to be taken for prevention and mitigation of disasters by the district level departments and local authorities;
- Capacity building and preparedness measures to be taken by district level departments and local authorities to respond to any threatening disaster situation or disaster;
- Response plans and procedures, in the event of a disaster, providing for allocation of responsibilities to district level departments and local authorities, prompt response to disaster and relief thereof, procurement of essential resources, establishment of communication links, and dissemination of information to public;
- Such other matters as may be required by the State Authority.

Copies of the district plan shall be made available to district-level departments and the State Authority which shall forward it to the state government. The district authority shall review the implementation of the plan from time to time and issue such instructions to different district level departments as it may deem necessary for its implementation.

Disaster Management Plans by different authorities

In addition, every office of the Government of India and the State Government in the district and local authority shall, subject to the supervision of the district authority, prepare a disaster management plan covering provisions for prevention and mitigation measures as provided for in the district plan to that department or agency, provisions for taking measures for capacity building and preparedness as laid down in the district plan, response plans and procedures, coordination of preparation and implementation of its plans with those of the other organizations at the district level including local authorities, communities and other stakeholders. The organizations are required to regularly review and update the plan and submit a copy to the district authority.

Local Level

Local Authorities

As per the definition of the 'local authority' in the Disaster Management Act, 2005, it "*includes panchayati raj institutions, municipalities, a district board, cantonment board, town planning authority or Zila Parishad or any other body or authority, by whatever name called, for the time being invested by law, for rendering essential services or, with the control and management of civic services, within a specified local area*". Section 41 of the Act states that subject to the direction of the district authority, a local authority shall ensure that its officers and employees are trained for disaster management, resources relating to disaster management are so maintained as to be readily available in the event of a disaster, all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention and mitigation of disasters by the National, State and District Authorities; and carry out relief, rehabilitation and reconstruction activities in the affected area in accordance with the State and District Plans. There is also a general provision stating that the local authority may take such other measures as may be necessary for disaster management.

Linkages

Linkages from national to local level are crucial for synergized efforts to integrate disaster risk reduction with the development process. The following measures indicate that due care has been taken to statutorily put in place such linkages:

- The National Plan shall be prepared in consultation with the state governments and expert bodies and organizations in the field of disaster management.
- Concerned Ministries and Departments are required to prepare their respective plans in accordance with the National Plan.

- The State Plan shall be prepared having regard to the guidelines laid down by the national authority and after consultation with the local authorities, district authorities and people's representatives.
- The District Plan shall be prepared after consultation with the local authorities and having regard to the National Plan and the State Plan, to be approved by the state authority.
- The elected representative of the local authority (chairperson, zila parishad) has been made the co-chairperson of the district authority.
- The local authority shall discharge its functions subject to the directions of the district authority.

Involvement of community

One of the reservations generally expressed is that 'community' has not been defined and its role has not been covered adequately in the Act. It is well known that community is not only the victim but invariably the first responder in any disaster situation. A holistic disaster management approach would, therefore, not be inclusive unless the community is intricately associated with all the facets of disaster management including prevention, mitigation, preparedness, training and capacity building, response, relief, recovery, as well as short term and long term rehabilitation and reconstruction. It is also well known that the approach to disaster management has to be multi-disciplinary and multi-sectoral. A pro-active participatory approach involving all stakeholders including the community is necessary. The Act does not attempt to define the community since the constitution of community varies from time to time. A person may be a member of different communities at different periods. The ADPC's Field Practitioners Handbook on CBDRM attempts to define the community as a group that may share one or more things in common such as living in the same environment and having similar disaster risk exposure, or having been affected by a disaster. Common problems, concerns and hopes regarding disasters may also be shared. However, people living in a community may have different vulnerabilities and capabilities. Therefore, the involvement of all segments of community in disaster risk reduction as well as in the aftermath of a disaster is crucial. The civil society and the elected representatives of people are generally taken as community leaders or facilitators and they constitute an important link to reach the community. Taking note of this position, the Act seeks to adopt an inclusive approach covering all stakeholders with the following salient provisions:

- The National Executive Committee has been entrusted with the responsibility to advise, assist and coordinate the activities of non-governmental organizations and others engaged in disaster management. **Section 10(2)(n).**
- The State Executive Committee is also required to evaluate preparedness at non-governmental levels and give directions, where necessary for enhancing such preparedness. **Section 22(2)(f).**

- The State Executive Committee may promote general education, awareness and community training and the measures that may be taken by such community to prevent, mitigate and respond to disasters. **Section 2(2)(i).**
- The State Executive Committee may also advise, assist and coordinate the activities of non-governmental organizations engaged in disaster management. **Section 22(2)(j).**
- The State Executive Committee has also been entrusted with the responsibility to ensure that non-governmental organizations carry out their activities in an equitable and non-discriminatory manner and to disseminate information to public to deal with any disaster situation. **Section 24(j).**
- The State Executive Committee may disseminate information to public to deal with any threatening disaster situation or disaster. **Section 24(k).**
- The District Authority is required to organize and coordinate specialized training programmes for voluntary rescue workers in the district**. Section 30(2)(xii)**.
- It is also required to facilitate community training and awareness programmes for disaster prevention or mitigation with the support of local authorities, governmental and non-governmental organizations. **Section 30(2)(xiii).**
- It may advise, assist and coordinate the activities of non-governmental organizations in the district engaged in disaster management. Section 30(2)(xix).
- The District Authority may encourage the involvement of non-governmental organizations and voluntary social welfare institutions working at grassroots levels in the district for disaster management. **Section 30(2)(xxvii).**
- Every office of the central and state government in the district and the local authorities shall coordinate the preparation and implementation of its disaster management plan with those of the other organizations at the district level including local authority, communities and other stakeholders. **Section 32(b)**.
- Local Authority has been assigned specific functions which include training of its officers and employees for disaster management; maintenance of resources relating to disaster management; construction projects in its jurisdiction to conform to standards and specifications laid down by National, State and District Authorities for prevention and mitigation of disasters; relief, rehabilitation and reconstruction activities to be carried out in the affected area; besides such other measures as may be necessary for disaster management. The definition of local authority includes PRIs, municipalities, district board, cantonment board, town planning authority or Zila Parishad etc invested by law for rendering essential services or with the control and management of civic services within a specified local area. The local authorities, therefore, in a way, discharge the role of community leaders. **Section 41 and section 2(h).**
- The National Institute of Disaster Management may provide required assistance to the training and research institutes for development of training

programmes for stakeholders; provide assistance for capacity building of stakeholders including civil society members, corporate sector and people's representatives; and promote awareness among stakeholders including college or school teachers and students. **Sections 42(9)(d) & 42(9)(e).**

The Act, therefore, lays due stress on community-based disaster management by making it obligatory for government agencies at national, state, district and local level to ensure training and capacity building of all stakeholders including community-based organizations.

Role of MCGM under the Act

The National Act has attempted to cover the entire country, having more than 600 districts, and in the process, has not taken care of Corporations in megacities like Mumbai or Delhi. Normally, the local authority falls within the jurisdiction of a district authority. However, this position is not valid in the case of municipal corporations in cities like Mumbai or Delhi. For instance, there are two districts in Mumbai and 9 districts in Delhi, all of which fall within the geographical coverage of municipal corporations. The Act is silent about the functions of corporations like MCGM or DMC. However, it does not prohibit actions to be taken by such entities for DRR or in a post-disaster scenario. The Act can be said to implicitly enjoin certain functions to MCGM or DMC. The actual status of MCGM, or for that matter, DMC is that while these bodies are subordinate to State Authority, they are actually above the district authority and have essentially subsumed the functions entrusted to the district authority as well as the local authority within the areas falling under their respective jurisdiction. The basis or rationale for this conclusion can be found in the following provisions of the Act as well as actions of state governments, as indicated below:

- The Statement of Objects and Reasons of the Act states that "*the government has decided to enact a law on disaster management to provide for requisite institutional mechanisms for drawing up and monitoring the implementation of the disaster management plans, ensuring measures for various wings of government for prevention and mitigating effects of disasters and for undertaking a holistic, coordinated and prompt response to any disaster situation.*" MCGM is a wing of the state government and is therefore responsible for the above functions as enshrined in the Statement of Objects and Reasons of the Act itself.

- One of the functions assigned to the State Executive Committee {clause (h) of sub- section (2) of section 22}is to " *give directions to any Department of the Government of the State or any other authority or body of the State regarding actions to be taken in response to any threatening disaster situation or disaster*" MCGM would fall in the category of "*any other authority or body of the State*" and shall be responsible to take such actions as may be directed by

the State Executive Committee. Similar provisions exist in clauses (e) and (f) of section 24 also.

- Section 32 of the Act states that every office of the Government of India and of the State Government at the district level and the local authority shall prepare a disaster management plan. MCGM is an office of the State Government and is therefore required to comply with this provision.

- Under section 38, the state government is required to take several measures. One of the measures is to take action on such other matters as it deems necessary or expedient for the purpose of securing effective implementation of the provisions of the Act. In other words, what is not explicitly covered in the Act, may be covered by the state government under this provision.

- If there is still any doubt, it has been set at rest by the State Government, or to be precise, Chief Minister, by appointing the Municipal Commissioner of MCGM as a member of the State Disaster Management Authority. {Municipal Commissioner of MCD has also been appointed as a member of the Delhi Disaster Management Authority}.

Civil Defense Act, 1968

The Civil Defense in India operates under the authority of the Civil Defense Act, 1968, applicable to the whole of India. The said Act aims at providing for continued maintenance of Civil Defense services which are already in position in the States and Union territories. It also enables the Central Government and the State Governments to extend the scope of Civil Defense if and when it may become necessary to do so. The Act came into force after the expiry of the Defense of India Act, 1962. Civil Defense has been defined under the Act as follows:

"Civil Defense" include any measures, not amounting to actual combat, for affording protection to any person, property, place or thing in India or any part of the territory thereof against any hostile attack, whether from air, land, sea or other places, or for depriving any such attack of the whole or part of its effect, whether such measures are taken before, during, at or at the time of such attack"

However, the role of Civil Defense has been restricted to a situation where there is a hostile attack, which has also been defined in the Act as "*any attack by any person or body of persons, whether during any war, external aggression, internal disturbances or otherwise which endangers the security of any life, property, place or thing in India or any part of the territory thereof.*" In other words, the mandate of Civil Defense did not extend to actions required to be taken in any threatening disaster situation or actual disaster. Therefore, the Government of India decided, pending amendment of the Act, to extend the role of Civil Defense in disaster situations. Accordingly, an Executive Order was issued in September 2000 to utilize

the services of Civil Defense Corps during all calamities, whether natural or man-made, in relief operations. Even before the issue of this order, Civil Defense was involved in relief operations during the Latur Earthquake and Orissa Super Cyclone. After the issuance of the Executive Order in 2000, Civil Defense was actively involved in organizing relief operations during the Bhuj Earthquake and Tsunami Disaster in Tamil Nadu and the Andaman and Nicobar Islands.

However, the Government was conscious of giving legislative support to the role of Civil Defense in disaster situations. This exercise could be initiated only after the enactment of the Disaster Management Act, 2005. It was initially envisaged to assign a formal role to Civil Defense under the DM Act. However, the legal opinion was that it would be inappropriate to do so unless the Civil Defense Act, 1968 was amended. Accordingly, an amendment to the Civil Defense Act, 1968 was moved through the Civil Defense(Amendment) Bill, 2009. The Statement of Objects and Reasons attached to the Bill states:

"***The Civil Defense under the aforesaid Act includes any measures, not amounting to actual combat, for affording protection to any person, property, place or thing in India against any hostile attack whether from air, land, sea and other places, whether such measures are taken before, during, at or after the time of such attack. The Civil Defense is intended to be organized primarily on voluntary basis as an integral part of the Defense of the country on a limited scale. Several measures have been initiated for revamping the Civil Defense organization so as to make it a vibrant institution capable of responding to various situations. Subsequently, the Disaster Management Act, 2005 has been enacted, inter alia, to provide for requisite institutional mechanisms for drawing up and monitoring the implementation of the disaster management plans, ensuring measures by various wings of Government for prevention and mitigating the effects of disasters and for undertaking a holistic, coordinated and prompt response to any disaster situation/disaster. It is felt that the Civil Defense can play a vital role in disaster management also and therefore it has been proposed to expand the role of the Civil Defense by amending the definition of "civil Defense" contained in clause (a) of section 2 of the Civil Defense Act, 1968 so as to bring within its scope the measures which may be taken for the purpose of disaster management during, at, before, or after any disaster.***"

It is now proposed in the Bill to amend the definition of "Civil Defense" as follows:

"**Civil Defense" includes any measures, not amounting to actual combat, for affording protection to any person, property, place or thing in India or any part of the territory thereof against any hostile attack, whether from air, land, sea or other places, or, for depriving any such attack of the whole or part of its effect, whether such measures are taken before, during, at or after the time of such attack** ***or any measure taken for the purpose of disaster management, before, during, at, or after any disaster***"

The proposed amendment also provides that "disaster" means a disaster as defined in clause (d) of section 2 of the Disaster Management Act, 2005; and "disaster management" means the disaster management as defined in **clause (e) of section 2** of the Disaster Management Act, 2005.'.

National Policy on Disaster Management

Background

Soon after the finalization of the National Disaster Management Framework (National Roadmap), an exercise for formulation of the National Policy on Disaster Management (NPDM) was initiated with the intention to release it simultaneously with the enactment of the Disaster Management Act, 2005. However, while the Disaster Management Bill, 2005 was still in the process of development, the National Disaster Management Authority was constituted by issue of an executive order in May 2005 and the Vice-Chairperson and a few Members were appointed in September 2005. Keeping in view the proposed provisions of the Bill, which provided that the National Authority shall have the responsibility to lay down policies on disaster management, the Ministry of Home Affairs referred the first draft of the National Policy to NDMA for detailed consideration. The National Authority held a series of consultations and discussions with the Ministry of Home Affairs before finalizing the draft NPDM and transmitted it to the Ministry of Home Affairs for undertaking the process of inter-ministerial consultations and obtaining the approval of the Cabinet. The National Policy on Disaster Management was finally approved by the Cabinet on 23rd October, 2009 and may presently be viewed on website www.mha.nic.in. ***The gist of the National Policy on Disaster Management has been extracted from the document approved by the NDMA and the Government.***

Vision of the Policy

The vision of NPDM, as articulated in the policy is "*to build a safe and disaster resilient India by developing a holistic, proactive, multi-disaster oriented and technology driven strategy through a culture of prevention, mitigation, preparedness and response*" The vision gives expression to the concepts enunciated by the High Power Committee on Disaster Management and is in line with the course of action laid down in the National Roadmap.

Approach

The National Policy states that a holistic and integrated approach will be evolved toward disaster management with emphasis on building strategic partnerships at various levels. The themes underpinning the policy are:

- Community based DM, including last mile integration of the policy, plans and execution;
- Capacity development in all spheres;
- Consolidation of past initiatives and best practices;
- Cooperation with agencies at national and international levels;
- Multi-sectoral synergy.

Salient Objectives of the Policy

The objectives of the national policy on disaster management are:

- Promoting a culture of prevention, preparedness and resilience at all levels through knowledge, innovation and education;
- Encouraging mitigation measures based on technology, traditional wisdom and environmental sustainability;
- Mainstreaming disaster management into the developmental planning process;
- Establishing institutional and techno-legal frameworks to create an enabling regulatory environment and a compliance regime;
- Ensuring efficient mechanism for identification, assessment and monitoring of disaster risks;
- Developing contemporary forecasting and early warning systems backed by responsive and failsafe communication with information technology support;
- Promoting a productive partnership with the media to create awareness and contributing towards capacity development;
- Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society;
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitat for ensuring safer living.

Important features of the Policy

The policy elaborates the institutional and funding mechanisms put in place through the Disaster Management Act, 2005, such as Disaster Management Authorities at national, state, district and local levels; Executive Committees at national and state levels; Disaster Mitigation and Response Funds at national, state and district levels; National Institute of Disaster Management, and the National Disaster Response Force. It also encompasses the existing institutional arrangements already in force before the enactment of the Act such as the Cabinet Committee on Natural Calamities, Cabinet Committee on Security, National Crisis Management Committee, Crisis Management Group, role of Central and State Governments and their Ministries and Departments, as well as the role of Armed Forces, Central Paramilitary Forces, State Police Forces, Civil Defense and Home Guards and Fire Services in response during disasters. It further affirms that States will be encouraged to create response capabilities from within their existing

resources. To start with, each state may aim at equipping and training one battalion of their respective State Disaster Response Force (SDRF), including women members. The SDRFs will be given training by the NDRF and its training institutes. It is also proposed to strengthen the youth-based organizations like National Cadet Corps (NCC), National Service Scheme (NSS) and Nehru Yuva Kendra Sangathan (NYKS). The potential of these youth-based organizations will be optimized to support all community-based initiatives and DM training would be included in their programs. Further, NDMA will ensure mainstreaming of disaster risk reduction in the developmental agenda of all existing and new developmental programs, and projects shall incorporate disaster resilient specifications in their design and construction. The Planning Commission will give due weight to these factors while allocating resources.

Mitigation measures

A separate chapter in the policy deals with disaster prevention, mitigation and preparedness measures. The policy advocates a multi-pronged approach to be adopted to undertake mitigation measures, detailed below:

- Building mitigation measures into all development projects;
- Initiating of national level mitigation projects by the NDMA, in high priority areas, with the help of the Central Ministries and Departments concerned and the States;
- Encouraging and assisting State level mitigation projects in accordance with the guidelines;
- Indigenous knowledge on disaster and coping mechanisms; particularly those adopted by various States will be given due weightage with special focus on protection of heritage structures;
- Hazard zonation, mapping and vulnerability analysis in a multi-hazard framework will be carried out utilizing Geographic Information System (GIS) based databases such as the National Database for Emergency Management (NDEM) and National Spatial Data Infrastructure (NSDI);
- Action plans for checking unplanned urbanization and ensuring safer human habitat against all forms of disasters will be recognized as priority areas;
- Critical infrastructure like dams, roads, bridges, flyovers, railway lines, power stations, water storage towers, irrigation canals, delta water distributor network, river and coastal embankments, ports and other civic utilities are to be constantly monitored for safety standards in consonance with worldwide safety benchmarks and strengthened, where deficient. The building standards for these infrastructures need to be aligned to the safety norms and concerned Departments/Authorities would ensure the requisite actions;
- Eco Systems of forests, islands, coastal areas, rivers, agricultural urban environment and industrial environment are to be considered for restoration

of ecological balances and sustainable development. Zonal regulations must ensure the preservation of natural habitats;

- There are definite indications that climate change would increase the frequency and intensity of natural disasters like cyclone, flood and drought in the coming years. In order to meet these challenges in a sustained and effective manner, synergies in our approach and strategies for climate change adaptation and disaster risk reduction shall be encouraged and promoted.

Preparedness measures

The policy also highlights preparedness measures which need to be taken, such as:

- States/UTs have to accord highest priority to building up their own DM capabilities. While the national plan will be prepared by the NEC, the disaster and domain-specific plans will be made by the respective central ministries and departments.
- State and District plans will be prepared for their specific disaster related vulnerabilities in accordance with the guidelines issued by NDMA.
- The participation of all stakeholders, communities and institutions in the preparation of these plans will inculcate a culture of preparedness. A bottom-up approach needs to be adopted for better understanding and operationalisation of these plans.
- It is essential to establish, upgrade and modernize the forecasting and early-warning systems for all types of disasters. The nodal agencies responsible for monitoring and carrying out surveillance, for specific natural disasters, will identify technological gaps and formulate projects for their upgrading, in a timebound manner.
- ICT tools need to be used for data receptions, forecasting and timely dissemination
- The basic communications and IT support requirements for disaster management correspond to the following three levels:

    - Decision makers and disaster managers at all levels;
    - Real time dissemination of advance warnings and information to the concerned authorities at various levels and threatened community;
    - Last mile connectivity at the disaster site for control and conduct of rescue and relief operations.

- A National Emergency Communication Network, involving the contemporary space and terrestrial-based technologies in a highly synergistic configuration and with considerable redundancy, will be developed. This Network will ensure real time dissemination of warnings and information up to the affected community and local authorities.

- The establishment of Emergency Operations Centers at the national, state, metro and district levels and equipping them with the contemporary technologies and communication facilities and their periodic upgrading, will be accorded priority. For the last mile connectivity and control of the operations at the disaster hit areas, availability of portable platforms will be provided for.
- The NDMA, in close coordination with the Ministry of Health and Family Welfare, states and premier medical research institutes will formulate policy guidelines to enhance capacity in emergency medical response and mass casualty management. DM plans for hospitals will include developing and training of medical teams and paramedics, capacity building, trauma and psycho-social care, mass casualty management and triage.
- Creation of mobile surgical teams, mobile hospitals and heli-ambulances for evacuation of patients is a crucial component of DM efforts.
- State Governments will be encouraged to plan a series of exercises for various types of disasters in collaboration with NDMA to enhance the response level of various stakeholders
- The efforts of the states/UTs for community participation for disaster preparedness will be encouraged. As first responders to any disaster, communities will be trained in the various aspects of response such as first-aid, search and rescue, management of community shelters, psycho-social counseling, distribution of relief and accessing support from government/agencies etc. Community plans will be dovetailed into the panchayat, block and district plans.
- Women and youth will be encouraged to participate in decision-making committees and action groups for management of disasters.
- The participation of civil society stakeholders and Public Private Partnership between the Government and private sector will be encouraged to empower the community and generate awareness through their respective institutional mechanisms.
- Effective partnership with the media will be worked out in the field of community awareness, early warning and dissemination and education.

Techno Legal Regime

In view of the construction boom and rapid urbanization, municipal regulations such as development control regulations, building by-laws and structural safety features need to be revisited. These regulations will be reviewed periodically to identify safety gaps from seismic, flood, landslide and other disasters and suitable modifications will be made to align them to revised building codes of the Bureau of Indian Standards (BIS).

Central Ministries and Departments concerned in consultation with scientific institutions will carry out analysis of environmental and hazard data for the formulation of alternative land use plans for different geographical and administrative areas through a holistic approach. This is more relevant to

megacities, metropolises and high-density urban settlements for safer location of habitat and other critical facilities. A review of master plans and their compliance will be essential and regarded as the paramount responsibility of the states/UTs. At the macro-level, there is a need for preparation of land use planning based on the inventory database of various uses. As far as urban settlements are concerned, the future land use is to be assessed, keeping in view the anticipated intensity of development.

The design and specification of houses being constructed, under the Indira Awas Yojana (IAY) and other government welfare and development schemes, will also be re-examined to ensure hazard safety. Building codes will be updated every five years as a mandatory requirement and also be put in the public domain. Observance of the National Building Code should be made mandatory in all the State/ Municipal building by-laws. The training of engineers, architects, small builders, construction managers and artisans has already been started and needs to be intensified at the state and district levels. Safe schools and hospitals (with large capacity) and national monuments, aside from other critical lifeline buildings, will be regarded as a national priority. Enabling provisions shall be made in all the Centrally Sponsored Schemes and school buildings/hostels shall be designed with earthquake-resilient features and be equipped with appropriate fire safety measures.

There is a need for putting in place a sound compliance regime, with binding consequences, to ensure the effectiveness of techno-legal and techno-financial provisions. It is important to ensure that monitoring, verification and compliance arrangements are in place at both the national and state levels. It will be the responsibility of all stakeholders concerned, to implement these provisions. Adoption of best management practices like self certification, social audit, and an external compliance regime including audit by professional agencies, need to be encouraged through the development and design of tools such as IT-enabled monitoring software to suit the DM systems in India, in consultation with various stakeholders and knowledge institutions for adoption after due trial and validation. After having put the techno-legal and compliance system in place, the states/UTs will also ensure their enforcement by establishing an effective mechanism, under the provisions of the Act.

Response

It is the primary responsibility of the State Governments/SDMAs to monitor and assess any developing situation and keep NDMA and NEC apprised of the same. They will also be responsible for constantly evaluating their own capabilities to handle such situations and project the anticipated requirements for the central resources. Inter-State assistance and cooperation will be encouraged. The States/UTs will also be responsible to develop their own response potential progressively and complete the process at the earliest. This will comprise training

and equipping of state response forces, community preparedness, training and creation of response caches at the district level. District level preparations will provide the cutting edge to all response activities. Local authorities, Panchayati Raj Institutions (PRIs) and Urban Local Bodies (ULBs) will play a significant role in the entire process, particularly in response and rescue operation, relief and rehabilitation, awareness generation and disaster preparedness, restoration of livelihood options and coordination with nongovernmental organisations and civil society.

All Central Ministries, State Governments, District Authorities and other stakeholders will prepare SOPs in consonance with the National and State Plans. The SOPs will be prescribed for activities like search and rescue, medical assistance and casualty management, evacuation, restoration of essential services and communication at disaster sites, etc. The other important activities are provision of food, drinking water, sanitation, clothing and management of relief camps. Detailed SOPs will also be devised by all concerned for dispatch, receipt and deployment of central resources.

The Incident Command System (ICS) is essentially a management system to organize various emergency functions in a standardized manner while responding to any disaster. It will provide for specialist incident management teams with an incident commander and officers trained in different aspects of incident management, such as logistics, operations, planning, safety, media management, etc. It also aims to put in place such teams in each district by imparting training in different facets of incident management to district level functionaries. The emphasis will be on the use of technologies and contemporary systems of planning and execution with connectivity to the joint operations room at all levels.

The voluntary deployment of the nearest medical resources to the disaster site, irrespective of the administrative boundaries, will be emphasized. Mobile medical hospitals and other resources available with the center will also be provided to the states/UTs in a proactive manner. The policy also emphasizes the need for animal care and dissemination of accurate information through electronic and print media.

Relief and Rehabilitation

The relief needs to be prompt, adequate and of approved standards. Guidelines defining minimum standards of relief are in the process of being prepared by the NDMA. The important features of relief and rehabilitation emphasized in the policy are briefly:

- Settlement of temporary relief camps
- Management of relief supplies
- Review of standards of relief

- Temporary Livelihood Options and Socio-Economic Rehabilitation, and
- Provision of intermediate relief centres

Reconstruction and Recovery

The approach to the reconstruction process has to be comprehensive so as to convert adversity into opportunity. Incorporating disaster resilient features to 'build back better' will be the guiding principle. This phase requires the most patient and painstaking effort by all concerned. The administration, the stakeholders and the communities need to stay focused on the needs of this phase as, with the passage of time, the sense of urgency diminishes. The project impact assessment needs to be carried out, coupled with the appropriate use of technology, to establish that the projects contemplated do not create any side effects on the physical, socio-cultural or economic environment of the communities in the affected areas. Systems for providing psycho-social support and trauma counseling need to be developed for implementation during the reconstruction and recovery phase. The salient aspects of reconstruction and recovery emphasized in the policy document are:

- Owner driven construction
- Speedy construction
- Linking Recovery with Safe Development, and
- Restoration of means of livelihood

Capacity Development

The approach to capacity development will include:

- According priority to training for developing community-based DM systems for their specific needs in view of the regional diversities and multi-hazard vulnerabilities;
- Conceptualization of community-based DM systems at the national level through a consultative process involving the states and other stakeholders with the state and local level authorities in charge of implementation;
- Identification of knowledge-based institutions with proven performance;
- Promotion of international and regional cooperation;
- Adoption of traditional and global best practices and technologies;
- Laying emphasis on table-top exercises, simulations, mock drills and development of skills to test the plans;
- Capacity analysis of different disaster response groups at State/ District/ Local levels.

In the field of capacity development, priority will be given to the training of DM officials, functionaries, trainers, elected representatives and communities. DM training and orientation of professionals like doctors, engineers, and architects will

also be given due importance. Further, expansion of DM training in educational institutions at all levels including schools, with orientation towards practical requirements, will likewise be given due weight. The NIDM will play an important role in developing and facilitating the implementation of the national training schedule for DM. It will also be the nodal institution for regional and international cooperation for training. There are a number of renowned institutes in various states, which are imparting training in DM. These will be strengthened with financial assistance and such efforts will be replicated by States/UTs. Also, the DM cells in all administrative training institutes, police academies, state institutes of rural development, the four paramilitary training centres of the NDRF and the National Training Academy will contribute significantly in developing DM-related skills. The capacity of existing institutes needs to be upgraded in accordance with regional and local requirements.

Training of communities will include awareness, sensitization, orientation and developing skills of communities and community leaders. Assistance from NDRF, Civil Defense and NGOs/ other voluntary organizations such as the Red Cross and Self-Help Groups will be encouraged. The overall responsibility to give impetus to leadership and motivation will rest with local authorities, PRIs and ULBs under the overall guidance of State and District authorities. As for professional technical education, the curricula of graduate and postgraduate level courses in architecture, engineering, earth sciences and medicine will be reviewed by the competent authorities to include the contemporary knowledge related to DM in their respective specialized fields. At the national level, the Ministry of Human Resource Development will encourage the development of DM as a distinct academic discipline in the universities and institutes of technical excellence. The introduction of the subject of DM, by the Ministry of Human Resource Development, in the curriculum through the Central Board of Secondary Education, will be extended to all schools through their Secondary Education Boards. State governments will also ensure the inclusion of Disaster Management in the curriculum through State School Boards. The educational content will inculcate skill-based training, psychological resilience and qualities of leadership. The role of NCC and Boys Scout may also be included in schools and colleges for disaster management-related work. Disaster education will aim at developing a culture of preparedness and safety, besides implementing school DM plans.

The upgrading of the skills of artisans is another crucial component of the capacity building process. The Central Ministries and Departments concerned will ensure the availability of resources for sustainable programs to train artisans. The States will be encouraged to promote this activity vigorously. The guidance of Indian Institutes of Technology (IITs) and National Institutes of Technology (NITs) will be sought to plan these programs. The implementation will be assisted by industrial training institutes (ITIs) and other Central, Regional and State vocational training institutes. Private builders, contractors and NGOs are expected to play a significant role in utilizing trained artisans. Other professional groups such as paramedics, social workers, plumbers, sanitary fitters and safety auditors also play a very

important role in community-based DM. These groups will also be provided training through suitable programs.

Other features of the Policy

The other salient features of the policy included in the document relate to:

- Synergetic Application of Science and Technology
- Knowledge Institutions
- Knowledge Dissemination through Information and Communication Technologies (ICT)
- Indigenous Technical Knowledge (ITK)
- India Disaster Resource Network (IDRN)
- India Disaster Knowledge Network (IDKN)
- Documentation of Best Practices and Research
- Identification of Needs and Promotion of Research

Road Ahead

In conclusion, while outlining future directions, the policy document mainly describes the future roadmap as follows:
"***The enunciation of this policy represents merely the first step in the new journey. It is an instrument that hopes to build the overarching edifice within which specific actions need to be taken by various institutions and individuals at all levels. The central theme is the belief that a disaster intelligent and resilient community, duly empowered by a newly created DM Structure, working in cohesion multi-sectorally, will help realize the national vision. This policy will have served its purpose, if those that are charged with the responsibility of carrying the task forward, find that their hands have received from it, the strength and direction that they need***."

Vulnerability profile of Maharashtra

Maharashtra is the second largest state in terms of population and the third largest in terms of area. As per the Census 2001, its population is 9.42% of the Indian population and is spread over 307,713 square kilometers. Maharashtra also has the country's second largest urban population, with about 43 persons out of every 100 living in towns and cities. It has a large migrant population. The per capita income of Maharashtra is almost 40% higher than the all-India average. Mumbai, the State's capital city, is the principal financial centre and a major commercial hub of the country.

The vulnerability profile of the State is multi-hazards prone. Floods, droughts, earthquakes, landslides, cyclones, fire incidents and industrial accidents are some of the major hazards. Besides, due to dense population, epidemics are also

a possible hazard. In addition, being the financial hub of the country, certain major cities like Mumbai have become a soft target for terrorists, as was vividly brought out by the terrorists attacks on 26th November 2008. The Latur earthquake in 1993 highlighted the vulnerability of the state to earthquakes, which resulted in the death of 9,475 people; about one million houses were damaged and over 8 million people were affected. Mitigation measures were undertaken but due to lack of adequate institutional and planning support, these were unfortunately not sustainable on a long term basis. The Mumbai floods of 2005 further underscored the need for proactive urban risk mitigation measures.

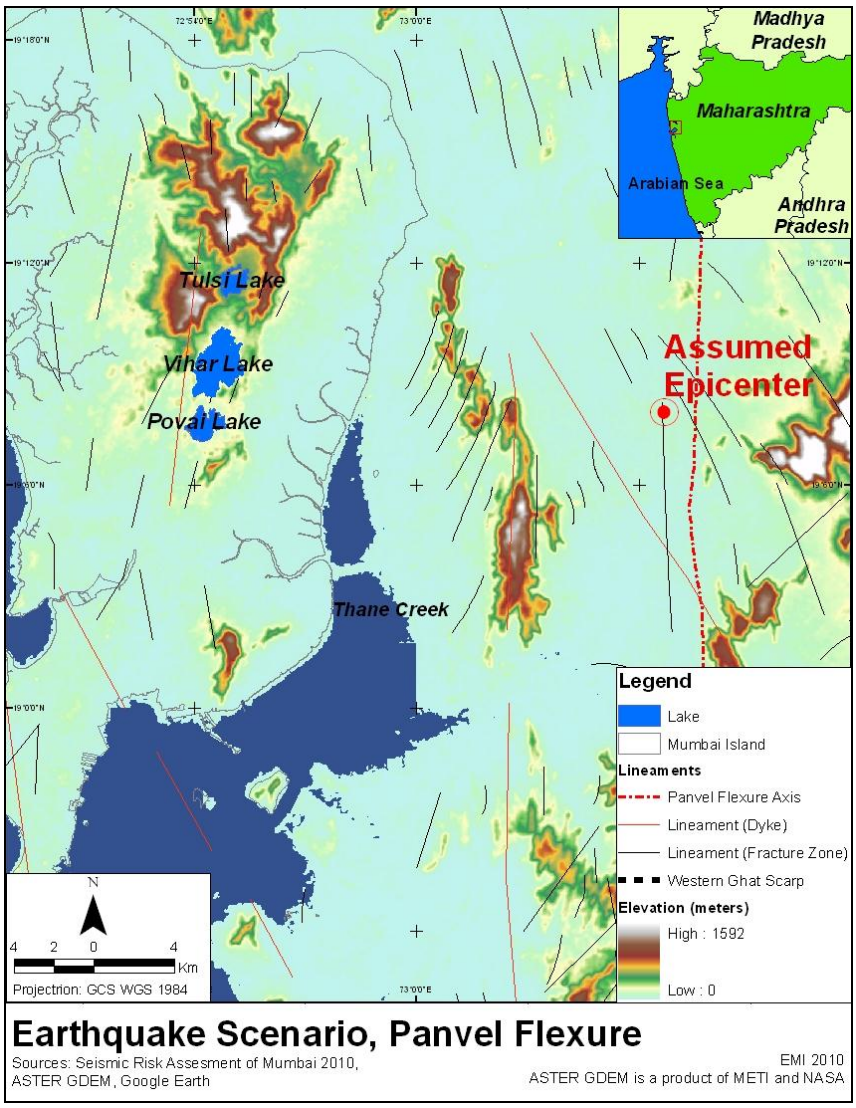
Deouskar Committee Report

The Deouskar committee report of 1995 presents the pattern of seismicity in Maharashtra. The study reports that:

- Earthquakes in Maharashtra show major alignment along the west coast and western ghats region. Seismic activity can be seen near Ratnagiri, along the western coast, Koyna Nagar, Bhatsa and Surya areas of Thane district.
- The north - south trend further continues deep inside Gujarat. The striking characteristic of this narrow region is its alignment with the hot spring belt. It appears that the off - coast activity is associated with submerged faults along the west coast of Maharashtra.
- In north Maharashtra, the seismic activity near Dhule, Akola, Jalgaon and Amravati could be due to movements on the faults present in the area associated with the complex system of Narmada, Tapi and Purna lineaments. However, the exact seismic status of these lineaments needs to be evaluated with extensive monitoring.
- In north - east corner of Maharashtra, the earthquake activity in Nagpur and Bhandara districts may be associated with Deolapar thrust or sheared and faulted zones of Ramtek and Sakoli Basins. This is, however a tentative finding and needs to be confirmed.
- Isolated activity is seen near Beed, Nanded, Ujjani and Solapur in eastern Maharashtra and Uran, Kolhapur and Sindhudurga in south-west Maharashtra. These activities may be due to movements on local faults in the basement.

  Seismicity is also seen near Bhatsanagar and Suryanagar. Recently, isolated activity also occurred in Latur-Osmanabad districts in south-east Maharashtra.

Figure 2: Earthquake Scenario, Panvel Flexure



The State Laws

The State Government has not enacted any law on disaster management. It is following the National Act, based on which the State Disaster Management Authority and State Executive Committee have been established. It has enacted several laws dealing with different organizations and related aspects, but these enactments do not deal with disaster management comprehensively. There are, however, few provisions in these enactments dealing with safety measures to be adopted by concerned organizations. Therefore, to assess the legal mandate vested in the state government, one has to primarily rely on the National Disaster Management Act, 2005

Maharashtra State Disaster Management Plan

The state Disaster Management Action Plan (DMAP) has been prepared for its implementation by various departments and agencies of the Government of Maharashtra and other nongovernmental agencies expected to participate in disaster management. This plan provides for institutional arrangements, roles and responsibilities of the various agencies, interlinks in disaster management and the scope of their activities. The objective of the state DM plan is to evolve a system to:

- Assess the status of existing resources and facilities available with the various departments and agencies involved in disaster management in the state;
- Assess their adequacies in dealing with a disaster;
- Identify the requirements for institutional strengthening, technological support, upgradation of information systems and data management for improving the quality of administrative response to disasters at the state level;
- Make the state DMAP an effective response mechanism as well as a policy and planning tool;
- The state DMAP addresses the state's response to demands from the district administration and in extraordinary emergency situations at multi-district levels. It is associated with disasters like road accidents, major fires, earthquakes, floods, cyclones, epidemics and off-site industrial accidents. The plan is a multi-disaster response plan for the disasters which outlines the institutional framework required for managing such situations.
- The state DMAP specifically focuses on the role of various governmental departments and agencies like the Emergency Operations Centre in case of any of the above mentioned disasters.

In essence, the Plan identifies the key tasks for disaster risk reduction as avoiding habitation in hazardous areas; developing structures resistant to the onslaught of hazards; developing the ability to rapidly evacuate hazardous areas or to shift residents to hazard-resistant structures, reducing or eliminating natural hazards through technological intervention and establishing, through preparedness, the means to quickly recover from disasters with minimal additional suffering and loss of life. The Plan also attempts to cover risk assessment and vulnerability analysis, multi disaster state response strategy, operating procedures and formats, and EOC warning manuals.

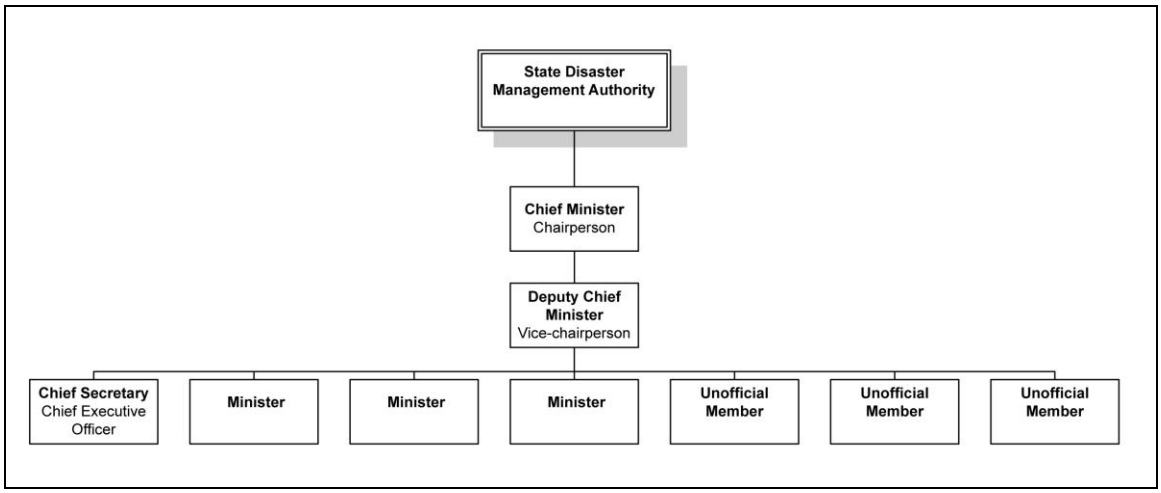
Although the Plan attempts to cover disaster mitigation and preparedness from the point of view of ensuring a prompt and effective response, it concentrates primarily on the response strategy. The plan does not enunciate long term prevention, mitigation and preparedness measures to achieve the objective of holistic disaster risk reduction and integrate it with development plans of the state government for inclusive development. The Plan needs to be comprehensively

revised keeping in view the provisions contained in section 23 of the Disaster Management Act, 2005 and the guidelines issued by the National Disaster Management Authority for formulation of State Disaster Management Plans.

State Disaster Management Authority

The Maharashtra State Disaster Management Authority was constituted on 24th May 2006 under section 14 of the Disaster Management Act, 2005, with the Chief Minister as Chairperson, Deputy Chief Minister as Vice-chairperson, three Ministers, three unofficial members and the Chief Secretary as the Chief Executive Officer. It was stated by the Director (SDMA) that all members of the Authority hold position in their ex officio capacity. However, this position is apparently not correct since three unofficial members have been appointed by name and not by designation on ex officio basis. There is, however, no legal infirmity in the constitution of the State Authority which is in accordance with the provisions of the Act.

Figure 3: SDMA Organizational Chart



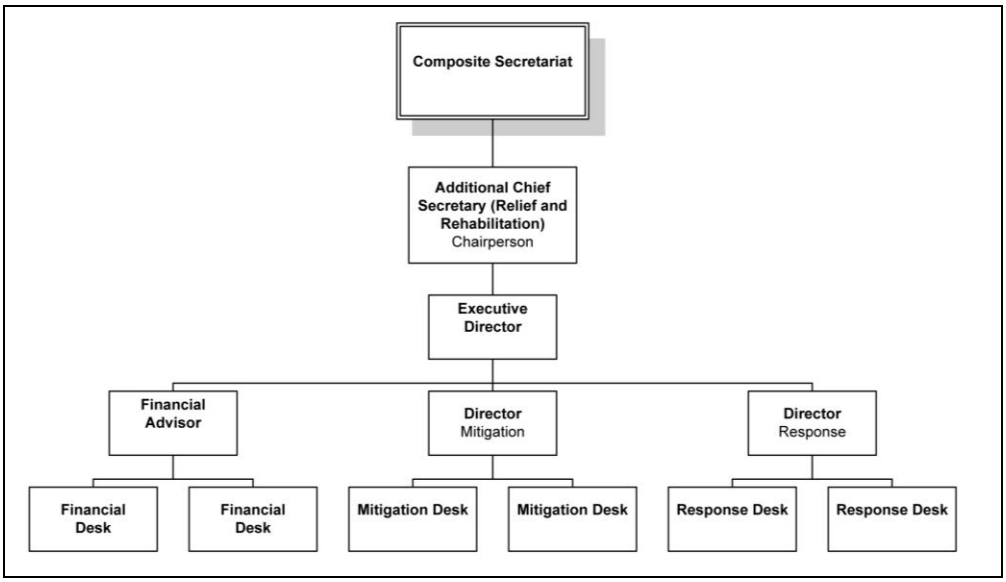
State Executive Committee

Simultaneously, a State Executive Committee (SEC) was also constituted with the Chief Secretary as the Chairperson and Additional Chief Secretary (Home), Additional Chief Secretary (Finance), Secretary (Public Health), Secretary (Relief and Rehabilitation) as Members and a retired General as Member Secretary.

A composite secretariat has been established for SDMA, as well as SEC, under the Chairmanship of Additional Chief Secretary (Relief and Rehabilitation). He is supported by a full time Executive Director with two full time Directors, one each for mitigation and response. A post of Financial Advisor is in the process of being created. Likewise, there are six Desks already in position, two each for mitigation,

response and finance. The total strength of the Secretariat is at present about 40 which is likely to be further increased to 60 by creation of four additional Desks, making up a total of 10 Desks - 4 for mitigation; 3 for response, 2 for finance and 1 technical desk. In addition, the Hazard Safety Cell, initially supported by the Ministry of Home Affairs, has been activated. The relevant provisions of the Disaster Management Act, 2005 have already been disseminated to concerned line departments. As for funding, a proposal for a district-level mitigation fund of INR 100 million and district-level response fund of INR 50 million for each district is under consideration by the state government. However, a final view in the matter will be taken based on the decision of the Government of India which is considering the modalities of establishment of these funds at national, state and district levels in consultation with the Planning Commission and the Finance Commission. The State Government have, however, decided to allocate INR 150 million to take the community-based disaster risk management program forward, which had been taken up since 2002 with the support of UNDP and Government of India and which was concluded recently on 30th June 2009, except the Urban Earthquake Vulnerability Reduction Project (UEVRP) which will be concluded on 31st December 2009.

Figure 4: Composite Secretariat



State Policy on Disaster Management

There is no State Policy on Disaster Management in Maharashtra as of now; nor is there a formal policy document for Greater Mumbai.

Nodal Agency for Greater Mumbai

It has been decided by the committee headed by the Additional Chief Secretary (R & R) that the nodal agency for Greater Mumbai for all aspects related to disaster management will be the Municipal Corporation of Greater Mumbai (MCGM). The role of MCGM is discussed in Part IV.

PART III. DRM RELATED INSTITUTIONAL SYSTEMS AND STRUCTURES

The institutional systems and structures directly vested with legal mandate from the Disaster Management Act, 2005 at national, state, district and local levels have been covered in Part II. In this chapter, the institutional systems and structures already in existence are discussed.

Disaster management is defined under the Disaster Management Act, 2005 as a continuous and integrated process of planning, organizing, coordinating, and implementing measures which are necessary or expedient for:

- Prevention of danger or threat of any disaster;
- Mitigation or reduction of risks of any disaster or its severity or consequences;
- Capacity building;
- Preparedness to deal with any disaster;
- Prompt response to any threatening disaster situation or disaster;
- Assessing the severity or magnitude of effects of any disaster;
- Evacuation, rescue and relief;
- Rehabilitation and reconstruction.

Participation in the planning process enables the agencies/ organizations at different levels to take part in developing the strategies for achieving the goals of disaster risk management. All sectors of society including national, state, district and local-level agencies, departments at national, state, district and local level which cover departments of urban local bodies including municipal corporations and panchayati raj institutions, academic institutions, scientific and professional organizations, transportation and utility organizations, public and private corporations, international and local humanitarian agencies, non-governmental organizations and the civil society have to share responsibilities in the area of disaster risk management. The agencies involved in one or more aspects of DRM at different levels are discussed below.

National Level

Civil Defense and Home Guards

The legal mandate of Civil Defense[6] has been discussed in Chapter II. The policies of the State Civil Defense emanate from the directives issued by the Government of India from time to time. The National Civil Defense College located at

[6] Reference: www.dgcd.nic.in

Nagpur is the apex-level training institution for Civil Defense and Home Guards personnel. In addition, Central Civil Defense Training Centers have been established in various states to impart training to both Civil Defense and Home Guards personnel. Civil Defense conducts training for volunteers and employees of establishments such as government offices, semi-government institutions, municipal corporations, vital installations, transport institutions, industries, commercial houses and educational institutions. The training may consist of individual, as well as team training, and is conducted at three levels; national level, where trainers' skills are developed and updated; state level, where advance trainingd is given and skills are developed among volunteers; and the local level, where basic training in all aspects of Disaster Relief Operations is imparted.

The Civil Defense Corps has twelve (12) services in which volunteers are trained. These are Headquarter Service; Warden Service; Communication Service; Casualty Service; Fire Fighting Service; Rescue Service; Welfare Service; Salvage Service; Corpse Disposal Service; Depot & Transport Service; Training Service; and Supply Service. Apart from carrying out training and demonstration of Civil Defense measures during peace time, Civil Defense volunteers are also deployed, on voluntary basis, in various constructive and nation building activities including assistance to the administration in relief and rescue work during natural calamities like flood, earthquake, cyclone and drought, etc. by the State Government/Union Territories

The Home Guards is a voluntary force, first established in India in December 1946, to assist the police in controlling civil disturbance and communal riots. Subsequently, the concept of the voluntary citizens' force was adopted by several States. After 1962, the Central Government advised the State and Union Territories to merge their existing voluntary organizations into one uniform voluntary force known as the Home Guards. The role of the Home Guards is to serve as an auxiliary to the police in the maintenance of internal security, assist the community in any kind of emergency such as an air raid, fire, cyclone, earthquake, epidemic, etc., help in the maintenance of essential services, promote communal harmony and assist the administration in protecting disadvantaged sectors, participate in socio-economic and welfare activities, and perform Civil Defense duties. Home Guards are of two types, rural and urban. In border States, Border Wing Home Guards Battalions have also been raised, which serve as an auxiliary to the Border Security Force. The organization is spread over all States and Union Territories, except in Kerala. Eighteen Border Wing Home Guards (BWHG) Battalions have been raised in the Border States to serve as an auxiliary to the Border Security Force for preventing infiltration on the international border/coastal areas, and guarding of lines of communication in vulnerable areas at the time of external aggression.

Home Guards are established under the Home Guards Acts and Rules of the States/Union Territories. They are recruited from various cross sections of the people such as doctors, engineers, lawyers, private sector organizations, college and university students, agricultural and industrial workers, etc. who give their spare

time to the organization for betterment of the community. All citizens of India, who are in the age group of 18-50, are eligible to become Home Guards. Normal tenure of membership in Home Guards is 3 to 5 years. Members of Home Guards with three years services in the organization are trained by the police in maintenance of law and order, prevention of crime, anti-decoity measures, border patrolling, prohibition, flood relief, fire fighting, election duties and social welfare activities. In the event of national emergency, some portions of Civil Defense work are also entrusted to the Home Guards.

The Ministry of Home Affairs formulates the policy with respect to the role, composition, establishment, training, equipping, establishment and other important matters of Home Guards Organization. Expenditure on the Home Guards is shared between the Central and State Governments.

Indian Coast Guard

The Indian Coast Guard[7] (ICG) was created on 18 August 1978 as an independent entity as per the Coast Guard Act. The ICG's organization is similar to that of other Paramilitary Forces of India. It is one of four branches of the Indian Armed Forces. It operates under the administrative control of the Ministry of Defense. The ICG's mission is to protect India's maritime interests, including its coastline, exclusive economic zone and shipping. It is also tasked with Indian maritime law enforcement relating to ocean resources, shipping, customs and revenue, maritime environment, protected species as well as narcotics. As for disaster risk management, the Coast Guard is the nodal agency for oil spill response in India's Exclusive Economic Zone (EEZ) under the national oil disaster contingency plan. The Coast Guard functions in close cooperation with the Indian Navy, Departments of Fisheries and Revenue (Customs) and the Central and State Police Forces. The ICG is generally headed by a naval officer of the rank of Vice-Admiral.

The Indian Coast Guard's national headquarters is at New Delhi and its operations are spread over three regions: Western Region headquartered at Mumbai, Eastern Region headquartered at Chennai, and the Andaman and Nicobar Region headquartered at Port Blair. Each of the regions is further divided into multiple districts, typically covering a coastal state or a union territory. Each region is headed by an Inspector General (IG) or a Deputy Inspector General (DIG). The IG and DIG are commissioned Coast Guard Officers, often graduates of the Indian Defense Service Colleges. It has a large number of fast craft including hovercrafts and hydrofoils that patrol the seas and river mouths. After the 2008 Mumbai attacks, the Government of India has initiated a program to expand the ICG Force, its assets and infrastructure.

[7] Reference: www.indiancoastguard.nic.in

Department of Atomic Energy

The Department of Atomic Energy[8] (DAE) was established on August 3, 1954 with headquarters at Bombay and a Branch Secretariat at New Delhi. It has a mandate to develop a nuclear power technology, to apply radiation and radio-isotope technology for the larger benefit of the society and to pursue basic research in frontier areas in Science and Technology. These functions are carried out in various research centers, public sector undertakings, industrial units and aided institutions under the administrative control of the Department of Atomic Energy. The Department, which is under the charge of the Prime Minister, is responsible for execution of the policies laid down by the Atomic Energy Commission (AEC), which has full powers of the Government of India, both administrative and financial, within the limits of budget allotted by the Parliament.

The vision of the Department of Atomic Energy is to empower India through technology, creation of more wealth and providing better quality of life to its citizens. This is to be achieved by making India energy independent, contributing to provision of sufficient, safe and nutritious food and better health care to people through development and deployment of nuclear and radiation technologies and their applications. It has been identified as the nodal agency in the country in respect of radiological emergencies.

Department of Drinking Water Supply

The Department of Drinking Water Supply[9] (DDWS) is the nodal department in the Ministry of Rural Development in Government of India providing scientific, technical, and financial assistance to the states in drinking water and sanitation sector. In 1999, DDWS was formed under the Ministry of Rural Development (MoRD) to give emphasis on rural water supply as well as on sanitation. In connection to the government's drought mitigation plan, the State Ministers agreed to "fully utilize" the funds available from DDWS for addition of drinking water resources and repairing the existing ones. The mitigation plan has an impact on the disaster response or recovery plans at the urban areas as many water resources are located outside their jurisdiction. During Tsunami, 2004, the department played a key role in facilitating drinking water supply to Andaman and Nicobar groups of Islands and de-salination of drinking water sources.

Department of Space

The Department of Space[10] undertakes all matters relating to Space Science, Space Technology and Space Applications, including research (including fundamental research) in matters connected with space and the development of its

[8] Reference: www.dae.gov.in
[9] Reference: www.ddws.gov.in
[10] Reference: www.isro.org

uses; Space Technology; Space Applications; development and use of outer Space, including projects and industries connected with the utilization of outer Space including commercial exploitation of Space; establishment, procurement and use of Space based systems; design, manufacture and launching of rockets and satellites. The Department provides technical inputs for assessment of disaster risk management aspects. India uses space technology for near real-time impact assessment of drought, flood and cyclones as a national program. Significant technological programs have been launched using the department of space technology for national agricultural drought assessments and monitoring. The flood incidence monitoring and inundation area assessment have been undertaken during the decade.

Department of Telecommunications

The Department of Telecommunications[11] (DoT) is part of the Ministry of Communications and Information Technology. The Department has been formulating developmental policies for the accelerated growth of the telecommunication services. It is also responsible for grant of licenses for various telecom services and frequency management in the field of radio communication in close coordination with the international bodies. It also enforces wireless regulatory measures by monitoring wireless transmission of users in the country. As for DRM related functions, the Department facilitates the Telecommunication Engineering Center (TEC). One of the missions of TEC is to evolve Technical standards for National Disaster Relief and Security Control for Telecom networks.

India Meteorological Department

The India Meteorological Department[12] was established in 1875. It is the National Meteorological Service of the country and the principal government agency in all matters relating to meteorology, seismology and allied subjects. IMD is the nodal government agency responsible for monitoring earthquake activity including detection and location of earthquakes and evaluation of seismic activity projections in and around the country for development projects. Its functions include meteorological observations and to provide current and forecast meteorological information for optimum operation of weather-sensitive activities like agriculture, irrigation, shipping, aviation, offshore oil explorations, to warn against severe weather phenomena like tropical cyclones, high wind velocity incidents, dust storms, heavy rains and snow, cold and heat waves, etc., which cause destruction of life and property. It also provides meteorological statistics required for agriculture, water resource management, industries, oil exploration and other nation-building activities. Besides, it conducts and promotes research in meteorology and allied disciplines.

[11] Reference: www.dot.gov.in
[12] Reference: www.imd.gov.in

International Institute for Population Sciences

The International Institute for Population Sciences[13] was declared a deemed university on August 15, 1985. It is an autonomous institution under the administrative control of the Ministry of Health and Family Welfare, Government of India. It also offers academic courses to strengthen reproductive health, research and training programs and provides consultancy to government and nongovernmental organizations and other academic institutions, including DRM-related issues.

Ministry of Agriculture

The Ministry of Agriculture[14] was first set up in the Government of India in June 1871 as the Department of Revenue and Agriculture and Commerce to deal with all matters affecting the practical improvement and development of the agricultural resources in the country. The Ministry is also mandated to formulate and administer the laws, rules and regulations relating to agriculture in India through its three departments – Department of Agriculture and Cooperation, Department of Agricultural Research and Education and Department of Animal Husbandry and Dairying. The Ministry of Agriculture is the nodal ministry for drought management. It works with NDMA to develop strategy and modalities for convergence of drought mitigation and DRM Programme. Moreover, the Ministry is tasked as one of the national coordinating body of disaster management along with the National Disaster Management Cell in the Ministry of Home Affairs.

Ministry of Defense

The responsibility for national defense rests with the Cabinet. This is discharged through the Ministry of Defense[15], which provides the policy framework and wherewithal to the Armed Forces to discharge their responsibilities in the context of the Defense of the country. The principal task of the Defense Ministry is to obtain policy directions of the Government on all defense and security related matters and communicate them for implementation to the Services Headquarters, Inter-Services Organizations, Production Establishments and Research and Development Organizations. It is also required to ensure effective implementation of the Government's policy directions and the execution of approved programs within the allocated resources. Ministry of Defense is comprised of four Departments: Department of Defense (DOD), Department of Defense Production (DDP), Department of Defense Research & Development (DDR&D) and Department of Ex-Servicemen Welfare and Finance Division.

[13] Reference: www.iipsindia.org
[14] Reference: www.agricoop.nic.in
[15] Reference: www.mod.nic.in

The Indian Armed Forces is a part of the government's disaster response mechanism and is the core of the government's response capacity. It tends to be one of the first professional responders of the government in a major disaster. Due to their ability to organize action in adverse ground circumstances, speed of operational response and the resources and capabilities at their disposal, the Armed Forces have historically played a major role in emergency support functions such as communications, search and rescue operations, health and medical facilities, transportation, power, food and civil supplies, public works and engineering, especially in the immediate aftermath of a disaster.

Ministry of Environment and Forest

The Ministry of Environment & Forests[16] (MoEF) is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and to oversee the implementation of India's environmental and forestry policies and programs. The primary concerns of the Ministry are implementation of policies and programs relating to conservation of the country's natural resources including its lakes and rivers, its biodiversity, forests and wildlife, ensuring the welfare of animals, and the prevention and abatement of pollution. While implementing these policies and programs, the Ministry is guided by the principle of sustainable development and enhancement of human well-being. MoEF has been identified to be the nodal ministry in respect with chemical disasters.

Ministry of Health and Family Welfare

The Ministry of Health and Family Welfare[17] (MHFW) is in charge of health policies in India. The ministry coordinates the functions of its three departments: the Department of Health, Department of Family Welfare, and Department of Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homoeopathy (AYUSH). As for DRM-related functions, a Health Sector Emergency Preparedness and Response Programme is in place since 1980 which was revised from time to time, with the last revision undertaken in 1996. The emergency health sector focal points of national, state and district levels are the integral part of the crisis management groups at the respective levels. In the central Ministry of Health and Family Welfare, the Emergency Medical Relief Division is the responsible technical unit. Specifically, MHFW is the main agency responsible for biological disasters.

Under the National Disaster Management's Disaster Prevention and Mitigation Strategy, it was concluded that there is an urgent need to address the problem of safety of existing life-line buildings/ establishments, where there is large congregation of people, such as hospitals and schools or buildings where people flock like cinema halls, places of worship, multi-storied apartments. The Ministry of

[16] Reference: www.moef.nic.in
[17] Reference: www.mohfw.nic.in

Home Affairs advised the States to have the aforementioned buildings assessed through detailed evaluation and, where necessary, take measures to have these buildings retrofitted. MHFW, along with the Ministries of Civil Aviation, Railways, Telecommunication and Power, has been advised to take necessary action for detailed evaluation and retrofitting of lifeline buildings located in seismically vulnerable zones and ensure that these are compliant with Bureau of Indian Standards (BIS) norms.

Ministry of Home Affairs

The Ministry of Home Affairs[18] (MHA) discharges a multitude of functions, chief among them being the maintenance of Internal Security. Though in terms of Entries No. 1 and 2 of List II ('State List') in the Seventh Schedule to the Constitution of India, 'public order' and 'police' are the responsibilities of States, Article 355 of the Constitution enjoins the Union to protect every State against external aggression and internal disturbance and to ensure that the government of every State is carried on in accordance with the provisions of the Constitution.

The Vision Statement of MHA states "*Peace and harmony are essential pre-requisites for development and blossoming of individual as well as social aspirations and building a strong and prosperous nation. To this end, it is envisaged that the Ministry of Home Affairs will strive to:*

- *Eliminate threats to internal security including militancy, insurgency and terrorism*
- *Preserve, protect and promote social harmony*
- *Enforce the rule of law and provide timely justice*
- *Provide the society an environment free from crime*
- *Uphold the principles of human rights*
- ***Mitigate the sufferings resulting from natural and man-made disasters."***

The Ministry of Home Affairs extends manpower and financial support, guidance and expertise to the State Governments for the maintenance of security, peace and harmony without trampling upon the constitutional rights of the States. Under the Government of India (Allocation of Business) Rules, 1961, the Ministry of Home Affairs has the following constituent Departments:

- Department of Border Management
- Department of Home
- Department of Internal Security
- Department of Jammu & Kashmir (J&K) Affairs
- Department of Official Language
- Department of States

[18] Reference: www.mha.gov.in or www.mha.nic.in

Divisions of the Ministry of Home Affairs, indicating major areas of their responsibility, are as follows:

- Administration Division
- Border Management Division
- Coordination Division
- Center-States Division
- **Disaster Management Division**
- Finance Division
- Foreigners Division
- Freedom Fighters & Rehabilitation Division
- Human Rights Division
- Internal Security-I Division
- Internal Security-II Division
- Jammu & Kashmir Division
- Judicial Division
- North East Division
- Naxal Management Division
- Police-I Division
- Police-II Division
- Police Modernization Division
- Policy Planning Division
- Union Territories' Division

The Ministry of Home Affairs is the nodal ministry for disaster management, both natural and man-made, in the country. The Disaster Management Division is responsible for response, relief and preparedness for natural calamities and man-made disasters (except drought and epidemics). The Division is also responsible for legislation, policy, capacity building, prevention, mitigation and long term rehabilitation. It is concerned with the National Institute of Disaster Management and Directorate General of Civil Defense. It functions in close coordination with the National Disaster Management Authority. MHA is also administratively in charge of the National Civil Defense College (NCDC) and National Fire Services College (NFSC). In addition, the country's National Disaster Response Force consisting of 8 battalions of Central Paramilitary Forces, is deployed in consultation with the Ministry of Home Affairs, which is also in charge of all Central Para Military Forces in the country. The Ministry has undertaken, in conjunction with UNDP, an ambitious program, known as Disaster Risk Management Program in 17 States covering 176 districts, 38 cities with a population of half a million and above and over 1.49 villages. The Ministry is now in the process of implementing a UNDP funded Urban Risk Mitigation Program and functions in close liaison with NDMA for the implementation of a UNDP funded national program for disaster risk reduction in the country.

MHA had also initiated the National Core Groups for earthquake risk mitigation, cyclone risk mitigation, flood mitigation, landslide risk mitigation,

training of engineers and architects for safer constructions, development of Information, Education and Communication (IEC) materials in cooperation with UNDP. It has provided support, advice and guidance to the States on various aspects of earthquake mitigation; developing/organizing the preparation of handbooks/pamphlets/type-designs for earthquake resistant construction; working out systems for assisting the States in the seismically vulnerable zones to adopt/integrate appropriate BIS codes in their building by-laws. In addition, the Disaster Management Division has prepared the proposed amendments in Town and Country Planning Legislations, Regulations for Land Use Zoning, Additional Provisions in Development Control Regulations for Safety & Additional Provisions in Building Regulations/By-Laws for Structural Safety in Natural Hazard Zones of India in 2004. These functions are now being carried forward by NDMA; with MHA being the administrative Ministry to deal with all facets of disaster management. MHA is also dealing with the Calamity Relief Fund (CRF) and National Calamity Contingency Fund (NCCF).

Ministry of Labor and Employment

The Ministry of Labor and Employment[19] (MoLE) is responsible for labor policies and legislation, safety, health, welfare and social security of labor and policies relating to special target groups such as women and child labor, among others. As for disaster-related functions, the Ministry is associated with chemical disaster management along with the NDMA, MoEF, MHA, Ministry of Agriculture, Ministry of Petroleum and Ministry of Industry.

Ministry of Power

The Ministry of Power[20] is concerned with perspective planning, policy formulation, processing of projects for investment decisions, monitoring of the implementation of power projects, training and manpower development, enactment and administration of legislation in regard to thermal, hydro power generation, transmission and distribution. As for DRM-related functions, these are concerned with restoration of power and organization of generator sets in case of disasters. Ministry of Power is one of the ministries which has been advised to evaluate existing lifeline buildings located in seismically vulnerable zones to ensure that these comply with BIS norms.

Ministry of Rural Development

The Ministry's main objective is to alleviate rural poverty and ensure improved quality of life for the rural population especially the economically disadvantaged segments of population living below the poverty line and socially disadvantaged groups. These objectives are achieved through formulation,

[19] Reference: www.labour.nic.in
[20] Reference: www.powermin.nic.in

development and implementation of programs relating to various spheres of rural life and activities, from income generation to environmental replenishment.

The Ministry of Rural Development[21] has been entrusted with the implementation of several National Flagship Programs such as National Rural Employment Guarantee Scheme (NREGS), Indira Awas Yojana (IAY) for rural housing for socially and economically disadvantaged, Pradhan Mantri Gramdoya Yojana for drinking water supply, housing and construction of rural roads, Sampoorna Grameen Rozgar Yojana (SGRY) for building community assets for vulnerable sections of the society. About 250, 000 small but compact housing units are constructed every year besides community assets such as community centres, recreation centres, etc. The Ministry of Home Affairs and NDMA are closely working with the Ministry of Rural Development for amending the IAY guidelines so that the houses constructed under Indira Awas Yojna or school buildings/community buildings constructed under Sampooran Grameen Rojgar Yojna (SGRY) are earthquake/cyclone/flood resilient; and further that the schemes addressing mitigation are given priority under SGRY. The Ministry of Rural Development has entrusted a detailed study for this purpose to the Central Building Research Institute (CBRI), Roorkee to incorporate the disaster resistant features in rural housing. This initiative, when implemented, would go a long way in popularization of seismically safe constructions at village/block level.

Ministry of Science and Technology

The Ministry of Science & Technology[22] plays a pivotal role in promotion of science & technology in the country. It is in charge of formulation and administration of laws, rules and regulations relating to science and technology in India. The department has wide ranging activities ranging from promoting high end basic research and development of cutting edge technologies on one hand to service the technological requirements of the common man through development of appropriate skills and technologies on the other. The Department's mandate includes the following:

- Formulation of policy statements and guidelines
- Co-ordination of areas of Science & Technology in which a number of Institutions/Departments have interests and capabilities
- Support to basic and applied research in National Institutions
- Support minimum Infrastructural facilities for Testing & Instrumentation
- Technology Development and Commercialization - Technology Development Board
- Autonomous Research Institutions
- Fostering International Cooperation in S&T

[21] Reference: www.rural.nic.in
[22] Reference: www.dst.gov.in

- Socially oriented S&T interventions for rural & weaker sections
- Support Science & Technology Entrepreneurship Development for promotion of knowledge Based Technology Driven Entrepreneurs
- Popularization of Science & Technology
- Promotion and Development of S&T in States
- Scientific surveys and services through Survey of India and National Atlas and Thematic Mapping Organization (NATMO)
- Management of Information Systems for Science & Technology

As for DRM-related functions, a National Core Group for landslide mitigation had been set up in 2004 by the Government of India under the Chairmanship of Secretary, Border Management, MHA and comprising of Secretary, Department of Science and Technology, Secretary, Road Transport & Highways, and the Heads of Geological Survey of India and National Remote Sensing Agency. The mandate of the National Core Group includes drawing up of strategies and plan of action for mitigating the impact of landslides, providing advice and guidance to the State Governments on various aspects of landslide mitigation, monitoring activities relating to landslide mitigation including landslide hazard-zonation and evolution of early warning systems and protocols for landslides/landslide risk reduction.

Ministry of Urban Development

The Ministry of Urban Development[23] is the apex body for formulation and administration of the laws, rules and regulations relating to the urban housing and development in India including urban slums. It is at present implementing a program related to Jawaharlal Nehru National Urban Renewal Mission (JNNURM). The objectives of the JNNURM include focused attention to integrated development of infrastructure services in cities covered under the Mission; establishment of linkages between asset-creation and asset-management through a slew of reforms for long-term project sustainability; ensuring adequate funds to meet the deficiencies in urban infrastructural services; planned development of identified cities including peri-urban areas, outgrowths and urban corridors leading to dispersed urbanization; scale-up delivery of civic amenities and provision of utilities with emphasis on universal access to the urban poor; special focus on urban renewal program for the old city areas to reduce congestion; and provision of basic services to the urban poor including security of tenure at affordable prices, improved housing, water supply and sanitation, and ensuring delivery of other existing universal services of the government for education, health and social security. The Ministry is one of the members of the Government's disaster response systems along with Ministries/Departments of Rural Development, Drinking Water Supply, Power, Telecommunications, and Health Urban Development, among others. It has a key role to play in urban risk mitigation by putting in place an implementation mechanism for latest building bye laws, amendments to Town and

[23] Reference: www.urbanindia.nic.in

Country Planning Laws, as well as amendments to Development Control and Building Regulations for safer habitat.

Ministry of Water Resources

In the reorganization of the Ministries of the Central Government in September 1985, the then Ministry of Irrigation and Power was bifurcated and the Department of Irrigation was re-constituted as the Ministry of Water Resources[24]. The Ministry is responsible for laying down policy guidelines and programs for the development and regulation of India's water resources and particularly to ensure that flood control measures are put in place.

As for DRM-related activities, The Ministry of Water Resources has been entrusted with the functions related to technical guidance, scrutiny, clearance and monitoring of the irrigation, flood control and multi-purpose projects through its Central Water Commission. The Central Water Commission, a premier Technical Organization in the field of Water Resources, presently functioning as an attached office of the Ministry of Water Resources. The Commission is entrusted with the general responsibilities of initiating, coordinating and implementing, in consultation with the concerned State Governments, schemes for control, conservation and utilization of water resources throughout the country, for purpose of Flood Control, Irrigation, Navigation, Drinking Water Supply and Hydrological Power Development, operation of the central network for flood forecasting and warning on inter-state rivers, the provision of central assistance for some State Schemes in special cases and preparation of flood control master plans for rivers Ganges and Brahmaputra.

Western Railway

Western Railway[25] in its present form came into existence on 5th November 1951 by the merger of its forerunner, the erstwhile Bombay, Baroda and Central India Railway (BB&CI), with other State Railways, namely Saurashtra, Rajputana and Jaipur. The BB&CI Railway was itself inaugurated in 1855, starting with the construction of a 29 mile broad gauge track from Ankleshwar to Utran in Gujarat state on the West Coast. In 1864, the railway was extended up to Mumbai. Today, of 14 million people traveling per day by the Indian Railways, more than 6 million people travel per day on Mumbai Suburban section alone. Of the 2,100 plus services run in Mumbai, 1,133 services which include 589 twelve car services are run by Western Railway. Western Railway carries more than 3 million passengers per day. It is the transportation lifeline in Mumbai.

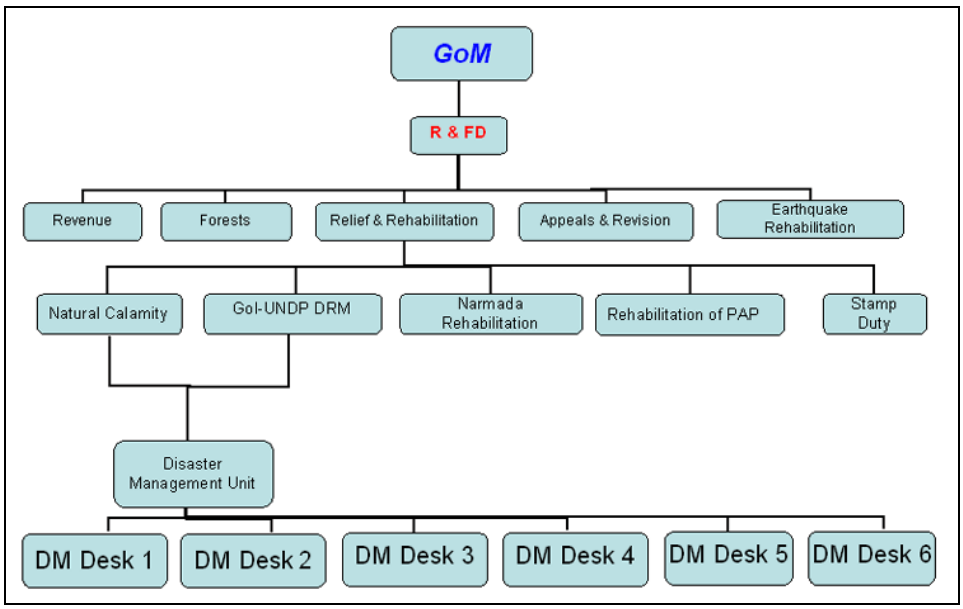
[24] Reference: www.wrmin.in
[25] Reference: www.wr.indianrail.gov.in

State of Maharashtra Level

Revenue and Forests Department

The Relief and Rehabilitation Division under the Revenue and Forest Department[26] in the Government of Maharashtra is the nodal agency for disaster management in the state. The Organizational Chart of R & F Department is given below:

Figure 5: Organizational Chart of Revenue & Forests Division



Source: http://forest.maharastra.gov.in

Bhabha Atomic Research Centre (BARC)

Bhabha Atomic Research Centre[27] is a premier multi-disciplinary nuclear research centre of India having excellent infrastructure for advanced research and development with expertise covering the entire spectrum of nuclear science and engineering and related areas. It functions under the Department of Atomic Energy (DAE). BARC has developed several spin-off technologies which find wide applications in a variety of sectors. The Centre has been passing on these technologies to the government, public and private sectors. It maintains a strong R & D base, a contingent of highly qualified and specialized manpower and a vast infrastructure consisting of ultra modern facilities and latest equipment, BARC provides consultancy and expert scientific services in hi-tech areas. BARC supports the achievement of DRM related objectives e.g. putting in place systems for

[26] Reference: http://mdmu.maharashtra.gov.in
[27] Reference: www.barc.ernet.in

radiological emergencies, establishment of Nuclear Power Plants for power generation, mitigation of the effects of climate change, etc. by sharing the outputs of its researches. Besides, the BARC progams have led to several societal benefits in the area of food and agriculture, human and animal health, urban and rural waste management, safe drinking water and several industrial applications. This enables BARC to carry forward its program with a human face. This, apart from work in the laboratories, requires engaging various segments of society and other stake holders to facilitate translation of laboratory development to the society.

Mumbai Metropolitan and Region Development Authority (MMRDA)

MMRDA[28] was set up on the 26th January 1975 under the Mumbai Metropolitan Region Development Authority Act, 1974 Government of Maharashtra as an apex body for planning and co-ordination of development activities in the Region. It prepares plans, formulates policies and programs and helps in directing investments in the Region. It conceives, promotes and monitors the key projects for developing new growth centres and brings about improvement in sectors like transport, housing, water supply and environment in the Region. Moreover, if a project is of particular significance, the MMRDA takes up the responsibility for its implementation. MMRDA functions in close coordination with MCGM. As for DRM related function, MMRDA considers the DRM plan while conducting review of the regional plan for the Mumbai Metropolitan Region, integrates risk reduction in the planning and implementation, e.g. recognition of proneness to natural hazards of each geographical location, site adaptation of construction, revision of building codes, etc.

Mahanagar Telephones Nigam Limited

The Mahanagar Telephone Nigam Limited[29] (NYSE: MTE) was set up by the Government of India on 1st April 1986. MTNL is an Indian Government-owned telephone service provider in the cities of Mumbai, Thane, Delhi, and Navi Mumbai in India. The company was a monopoly until 2000, when the telecom sector was opened to other service providers. The Mission of MTNL is to upgrade the quality of telecom services, expand the telecom network and introduce new services and to raise revenue for telecom development needs of India's key metros: Delhi and Mumbai. In the last two decades, MTNL has made rapid strides to emerge as India's leading and one of Asia's largest telecom operating companies. Besides having a strong financial base, MTNL has achieved a customer base of 8.06 million as on 31st March 2009. The company has also been in the forefront of technology induction by converting 100% of its telephone exchange network into the state-of-the-art digital mode. The Govt. of India currently holds 56.25% stake in the company. MTNL has had a disaster management plan in place since 2005. It conducts mock drills for each building where its offices/ operational plants are located 4 to 5 times in a year, in

[28] Reference: www.mmrdamumbai.org
[29] Reference: www.mtnl.net.in

conjunction with Civil Defense. One of the biggest risks which MTNL faces is possible fire hazards.

Maharashtra Housing and Area Development Authority (MHADA)

MHADA[30] was established by the State Government in 1977 through the Maharashtra Housing and Development Act, 1976. It had over 19,642 old dilapidated tenanted buildings and is concerned with repair of these buildings and development of alternate housing units where these buildings are beyond repairs and may collapse. The number of dilapidated buildings has since come down to about 16, 000. It is primarily engaged in constructing and selling housing units to low and middle income groups in urban and semi-urban areas. In Mumbai, it has constructed about 30,000 housing units. MHADA engineers conduct visual inspections of buildings to determine their structural safety and carry out repairs where necessary. MHADA also undertakes vulnerability assessment in the context of these old buildings.

Maharashtra Fire Services

The subject of Fire Services in the State of Maharashtra[31] is vested with the Urban Local Bodies. Accordingly, appropriate provisions exist in the Bombay Municipal Corporation Act, 1888, Maharashtra Provincial Municipal Corporation Act, 1949 maintained as the Maharashtra Regional Town and Industrial Township Planning Act 1966. In addition to this, as per the directives of the State Government, other Special Planning Authorities like MIDC & CIDCO manage the Fire Services for their areas. The Maharashtra Fire Prevention and Life Safety Measures Act was enacted in 2006 and notified on 6th December, 2008 in the areas of local authorities and planning authorities. The Service was initially expected to focus on fighting fires, and the law constrained what they could do. Since then, the role of the Fire Service has changed a great deal. As a result, under the new Act, Fire and rescue Authorities now have a range of statutory duties to:

- Promote Fire Safety;
- To prepare for fighting fires and protecting people and property from fires; rescuing people from Road Traffic Accidents; and dealing with other specific emergencies, such as flooding or terrorist attack which are set out by Statutory Order and can be amended in line with how the role of the Service may change in the future. In addition, all Fire and Rescue authorities will be able to do other things to respond to the particular needs of their communities and the risks they face. The Act achieves this through:

[30] Reference: www.mhada.maharashtra.gov.in
[31] Reference: www.maharashtrafireservices.org

- ensuring that Fire and Rescue authorities can do things that are not specifically set out in the Act but which will help them meet their statutory duties;
- giving authorities powers to prepare properly for other risks to life and the environment.

For example, they can buy equipment and train and deploy staff to undertake activities that they judge to pose a risk to life or the environment in their area; and allowing authorities, where they have capacity, to use staff and equipment they believe appropriate. This new framework of powers and duties will equip Fire and rescue authorities to meet the challenges of the 21st century. It puts prevention on an equal footing with intervention and enables individual Fire and Rescue authorities, for the first time, to decide in consultation with their communities how and where to deploy their resources. The Act therefore provides a stronger basis for Fire and Rescue Authorities' ability to respond to the range of risks set out in their Integrated Risk Management Plans
The Act recognizes the wider role the Service now plays and provides the flexibility to adapt to how the Service may change in the future. Therefore, the fire services in Maharashtra have now been converted in to all hazard response units with due emphasis on the prevention and mitigation aspects including generating awareness and training of community. It basically discharges the role of first responder in disaster situations.

Maharashtra State Road Development Corporation

Maharashtra State Road Development Corporation Limited[32] (MSRDC) was established on July 9, 1996 and incorporated as a public limited company under the Companies Act 1956 on August 2, 1996. MSRDC is a Public limited company fully owned by the Government of Maharashtra. It is responsible for developing, building and maintaining roads in Maharashtra. MSRDC is charged with the responsibility of planning, designing, constructing and managing select road projects, flyovers, bridges, light rail transit, sea links and water transport etc. in Maharashtra and integrated road development projects in selected cities of the state. It also provides roadside amenities and any other infrastructure tasks specifically assigned to it. MSRDC plays a pivotal role in disaster risk management by ensuring that the public infrastructure created by it is disaster resilient. By virtue of the nature of their work, all disaster mitigation measures are taken care of in MSRDC projects. The earthquake and disaster reduction techniques applied in some of the projects can serve as good practices for other departments.

[32] Reference: www.msrdc.org

Maharashtra State Electricity Board (MSEB) Mahavitran

MSEB Mahavitran[33] was constituted under the Indian Electricity Act, 1948. The Government of Maharashtra is the governing body of the company. As per the amendment to the Electricity Act in 2003, MSEB has been divided into 3 companies – Maha Genco, Maha Transco and Maha Disco. Genco is concerned with power generation, Transco with power transmission and Disco with electricity distribution and collection of electricity tariff from consumers. Subsequently, the Maharashtra State Electricity Distribution Company Limited (MSEDCL) came into existence on June 6, 2005 after the erstwhile Maharashtra State Electricity Board was divided into four companies. MSEDCL is also known as Mahavitaran or Mahadiscom. Mahadiscom is one of the largest public sector company engaged in the business of electricity distribution with annual turnover of INR 212,780 million. The main function of Mahadiscom is to serve customers by extending reliable and quality power supply at reasonable and competitive tariffs so as to boost agricultural, industrial and overall economic development of Maharashtra. MSEB Mahavitran serves 15.70 million consumers in Maharashtra State with a committed pool of over 75,000 employees. It extends support service in times of disasters. It is regulated by the Maharashtra Electricity Regulation Commission.

As a part of disaster prevention and mitigation measures, it undertakes the following activities:

- Pre-monsoon maintenance of the distribution lines;
- Operators working round-the-clock at all sub-stations during monsoon;
- Auto re-closure at the distribution centers in case of emergency;
- Disaster control room functional at all the depots;
- After 2005 flood, the transformers have been maintained and upgraded, the levels of underground wires have been raised and sub stations have been shifted to relatively high-rise area
- Good coordination between MCGM and Mahavitran

Mumbai Police

The Mumbai (erstwhile Bombay) Police[34] was constituted under the Bombay Police, 1951. The Mumbai Police (also known as Brihanmumbai Police) is the police force of the city of Mumbai. It has the primary responsibilities of law enforcement and investigation within the Mumbai metropolitan area. One of the major responsibilities of the Mumbai Police is to maintain law and order during festivals, elections, communal and social disturbances and natural and human induced calamities.

[33] Reference: www.mahadiscom.in
[34] Reference: www.mumbaipolice.org

Mumbai Port Trust (MPT)

The Mumbai port was declared a major port under the Indian Ports Act, 1908, which was enacted to consolidate separate enactments related to ports and port charges. Subsequently, the Major Port Trusts Act, 1963 was enacted to make provision for the constitution of port authorities for certain major ports in India and to vest the administration, control and management of such ports in such authorities and for matters connected therewith. The MPT[35] provides integrated sea-port facilities for handling, storage and delivery of cargo/container to customers' requirements The Control Room at MPT with hotline is in place for last 25 years. The Control Room also provides training programs to civil Defense. There are four fire stations under the MPT jurisdiction. MPT carries out inter-agency coordination with National Civil Defense College, Nagpur. Capacity building for disaster risk reduction is also being carried out at MPT. It is an invitee to Mutual Aid Group and Mutual Emergency Response Group (MERG). It extends requisite support services to MCGM and other agencies based at Mumbai in the event of disasters. More than 23,100 employees have been trained in Civil Defense and are available to discharge the responsibilities of civil Defense volunteers in case of an emergency. In fact, these employees have been deputed in the past disasters to carry out such responsibilities as responders.

Slum Rehabilitation Authority (SRA)

The Slum Rehabilitation Authority[36] was established under the Slum Rehabilitation Act, 1995 by an amendment to the Maharashtra Slum Area (Improvement, clearance and redevelopment) Act, 1971. SRA has been declared as a planning authority to function as a local authority for the area under its jurisdiction. The Slum Rehabilitation Authority (SRA) was established on December 15, 1995, to serve as the planning authority for all slum areas in Greater Mumbai and to facilitate the rehabilitation schemes. SRA's responsibilities are: to survey and review the existing position regarding slum areas in greater Mumbai; to formulate schemes for the rehabilitation of slum areas; to get the slum rehabilitation schemes implemented; to do all other such acts and things as may be necessary for achieving the objective of rehabilitation of slums. The objective of SRA's Slum Rehabilitation Scheme is to not only redevelop, but also rehabilitate the slum and its inhabitants. Through the scheme, rehabilitation flats are built free of cost to the slum dweller by cross-subsidy provided by free-sale flats. Developers are allowed to construct sale flats on slum land, whether it is government or private land, in exchange for the construction of flats for slum dwellers.

The DRM related functions of SRA include implementation of DRM guidelines in the rehabilitation of slum areas. SRA is also required to facilitiate the rescue

[35] Reference: www.mumbaiport.gov.in)
[36] Reference: www.sra.gov.in

efforts of fire fighters in slum areas. The occupants in slum areas post 1st January 1995 were earlier not eligible for allotment of tenements. However, this date has now been extended to 1st January 2006. The eligible people get 269 sq. ft. of carpet area in the new building. The property is transferred in the name of both husband and wife. It cannot be sold for 10 years from the date of occupancy. The modalities adopted for the process and regulation for allotment are as follows:

- Land is provided to the developer for development.
- A society is formed by the people to be rehabilitated.
- Developer constructs and develops the plot.
- Developer makes provision of providing 269 sq ft of carpet area to the rehabilitated family in the new building.
- Developer recovers its construction and other costs from additional FSI.
- Developer transfers INR 20,000/- to the account of each rehabilitated member so that they can take care of maintenance, etc.
- A nominal property tax has to be paid by the occupant – 10% of the property tax in the 1st year, 20% in 2nd year and so on to 100% in 10th year.
- There is no requirement of lifts in buildings up to 7 floors.

The involvement of SRA in the entire process is for the following functions:

- Verify the plans;
- Inspect site;
- Check development control regulations; during and after the construction
- While approving the plan by SRA engineers, disaster related features are to be taken care of like plinth height, open space etc.

Brihanmumbai Electric Supply and Transport (BEST)

Established in 1873, the BEST[37] (Brihanmumbai Electricity Supply and Transport) is Mumbai's public transport service and electricity provider. The BEST operates one of India's largest fleets of buses. Originally set up as a tramway company- Bombay Electric Supply & Tramways Company- the BEST set up a captive thermal power station at Wadi bunder, Bombay in November 1905 to generate electricity for its trams. It positioned it to also supply electricity to the City of Bombay. The BEST started operating motor buses since 1926. In 1947, a week prior to India gaining Independence, the BEST became an Undertaking of the Municipal Corporation of Greater Mumbai. It now operates as an autonomous body. It provides support services during disaster situations to facilitate transport services.

[37] Reference: www.bestundertaking.com

Indian Institutes of Technology (IIT) Mumbai

IIT Bombay[38], set up by an Act of Parliament, was established in 1958, at Powai, a northern suburb of Mumbai. Today the Institute is recognized as one of the centers of academic excellence in the country. Over the years, there has been dynamic progress at IIT Bombay in all academic and research activities, and a parallel improvement in facilities and infrastructure, to keep it on par with the best institutions in the world. Institutes in positions of excellence grow with time. The ideas and ideals on which such institutes are built evolve and change with national aspirations, national perspectives, and trends world - wide. IIT Bombay, too, is one such institution. The Indian Institute of Technology Act, 1961 was enacted to declare certain institutions of technology to be institutions of national importance and to provide for certain matters connected with such institutions IIT Mumbai is a body corporate and shall consist of a Chairman, a Director and other members of the Board.

The Departments in IIT, Mumbai include Aerospace Engineering, Biosciences and Bioengineering, Chemical Engineering, Chemistry, Civil Engineering, Computer Science & Engineering, Earth Sciences, Electrical Engineering, Energy Science and Engineering, Humanities & Social Science, Industrial Design Center, Mathematics, Mechanical Engineering, Metallurgical Engineering & Materials Science and Physics. The Department of Civil Engineering is primarily concerned with DRM functions related to earthquakes, landslides, floods, cyclones etc. It has organized, with the assistance of NGOs, several programmes and workshops for administrators, teachers, students, and citizens of Mumbai to enhance the quality and reach of awareness campaigns, partnerships with different national and international organizations on DM. IIT Mumbai is working closely with the Ministry of Home Affairs, National Disaster Management Authority, Government of Maharashtra, Municipal Corporation of Greater Mumbai and other associate organization in the field of disaster risk reduction.

Private Companies

The following is not a complete list of private companies that participate in DRM by way of assistance in disaster response, preparedness, research or provision of services during emergencies. At best, it may be considered as illustrative since several other private enterprises come in the forefront to assist the government agencies as well as community during disaster situations.

Hindustan Petroleum Corporation Limited

HPCL[39] is a Fortune 500 company, with a sales/income from operations of over US$ 25 million during FY 2008-09, having about 20% marketing share in India and a vibrant market infrastructure. HPCL commenced its operations in 1954. It was

[38] Reference: www.iitb.ac.in
[39] Reference: www.hindustanpetroleum.com

nationalized under an Act of Parliament in 1976. HPCL operates 2 major refineries producing a wide variety of petroleum fuels and specialties, one in Mumbai (West Coast) of 5.5 million metric tonnes per annum capacity and the other in Vishakapatnam, (East Coast) with a capacity of 7.5 million metric tonnes per annum capacity. HPCL also owns and operates the largest Lube Refinery in the country, producing Lube Base Oils of international standards, with a capacity of 335 TMT. This Lube Refinery accounts for over 40% of the India's total Lube Base Oil production. 70% of the HPCL products are transferred via pipeslines and remaining 30% by trucks. It is the largest supplier of aviation fuel.

HPCL is concerned with various relevant provisions of 15 statutes which inter alia cover provisions for safety etc. Mock drills are conducted regularly and DRR Plans are in existence in HPCL. The tankers are equipped with GPS systems. There is an Agreement between the oil companies that in case there is any road accident, the nearest oil company will respond to it. Each station has evacuation trucks which evacuates the content and stops leakages. There is trained manpower to deal with material content. Transit Engagement Response Cards are given to drivers who carry hazardous materials. These cards have directions to deal with disaster in case of leakages, etc. The drivers undergo 3 days of training given by HPCL, and are certified by RTO after going through required tests. Extensive training is given to employees and contractors. Contractors have to pass examinations laid out by Safety Department. Once in 3 years, refresher training is conducted. Employees in operations have to undergo live training process.

Reliance Infrastructure Ltd

Reliance Infrastructure Ltd[40] is India's one of largest private sector enterprise in power utility and the largest private sector player in many other infrastructure sectors of India. In the power sector, it is involved in generation, transmission, distribution and trading of electricity and construction of power plants. It distributes over 5,000 MW of power - the largest in the country. Reliance Energy and its affiliate companies power 2 out of 3 homes in Mumbai and 1 out of 2 in Delhi and has a consumer base of 5 million catering to an estimated population of 25 million in Mumbai, Delhi and Orissa. In the infrastructure development, the company is focused on roads and urban infrastructure and specialty real estate which include business districts, trade towers, convention centre and Special Economic Zones and non IT SEZ as well as free trade zones. It is part of Mutual Aids Response Group (MARG) which meets every quarter to discuss and share issues related to fire and disaster recovery. Resources are available with all the members of MARG and can be coordinated at times of disaster. Fire services and Civil Defense from MCGM are invitees in the meetings of MARG.

[40] Reference: www.rinfra.com

Tata Power Cos. Ltd.

Tata Power is India's one of largest private power utility. It was established in 1956. It has 8 Units with Unit 8 commissioned in January 2009. Units 1, 2 and 3 are no longer functional. The remaining 5 Units fall in BMC areas. It has 17 receiving stations, 2 Thermal power stations at Trombay and Chembur and 3 hydro stations at Bhira, Bhivpur and Kartan. It is part of Mutual Aids Response Group (MARG) which meets every quarter to discuss and share issues related to fire and disaster recovery. Resources are available with all the members of MARG and can be coordinated at times of disaster. Fire services and Civil Defense from MCGM are invitees in the meetings of MARG.

Tata Power[41] invests a large amount of resources to reduce workplace accidents and ensure a safe working environment. The company protects the interests of its employees by providing them with appropriate and up-to-date training and access to development programmes. Tata Power is part of a group of 46 leading international companies working together to develop a global policy framework to combat climate change. The 3C Initiative is a Global Opinion Group consisting of companies from a broad range of industries demanding integration of climate issues in markets and trade called Combat Climate Change (3C) and was launched on January 11, 2007. 3C commits itself to the following set of four actions to be undertaken to support development of the transparent policy framework:

- Sharing a deep understanding of the industries that Tata Power works with and to identify the measures with the most impact and the steps needed to gain their full effect;
- Working within respective sectors to influence colleagues and push the development of efficient technology;
- Working hard to reduce emissions in our businesses and to act as role models for other organizations;
- Contributing to minimizing market failures by being transparent and by helping customers make informed choices.

Tata Innovation is a program established with a mission which states "*To give businesses access to the world's most creative and innovative people, who work collaboratively to solve problems and develop innovations*". Every day, teams with Online Data Services Ltd., IdeaConnection.com, are working on solving challenges for Fortune 1000 companies. Formed in 2007, Idea Connection takes on Challenges from companies large and small. With diverse teams, world-class facilitators, and a high 'solve' rate, it aspires to solve problems ranging from nanotechnology, virtual reality, biochemistry, to marketing and sociology. IdeaConnection.com is all about innovation and creative solutions corporate problems and to problems that will benefit the Common Good.

[41] Reference: www.tatapower.com

All India Institute of Local Self Government (AIILSG)

Established in 1926, the All India Institute of Local Self Government[42], a non-governmental organization, strives to strengthen and improve the organization towards efficient governance. The AllLSG is well known as the anchor Institute for Urban Management. The main emphasis of the AIILSG is to enable local bodies to contribute effectively to the development process and provide citizens with a better quality of life. AIILSG is recognized as a national training institute. Its mission is "to promote All India Institute of Local Self Government as premier institute of excellence to strengthen and reinforce Urban Local Governance. To strive for giving quality education, training, conduct research and promote advocacy for empowering local governments and diligently make all out efforts towards transformation of the society for the betterment of human life".

AIILSG's work covers the following areas, including course/ training programmes on disaster management:

- Policy Research
- Customised Training and Capacity Building.
- Knowledge Management and Dissemination.
- Advisory Services.
- Information, Education and Communication (IEC).
- Community Based Interventions.
- Project Management.
- Training of Trainers (TOT).
- Study Visits.
- Human Resource Development (HRD)
- Preparing Audio - Visuals.
- Undertaking consultancy assignment in Fire Risk and Safety Management.
- Courses on Professional Empowerment.

[42] Reference: www.aiilsg.org

PART IV. MUNICIPAL CORPORATION OF GREATER MUMBAI

DRM LEGAL AND INSTITUTIONAL ARRANGEMENTS

Vulnerability profile of Greater Mumbai

Mumbai is one of the most densely populated mega-city in India. Spread over an area of 437.71 sq km, according to the 2001 census, the population of Mumbai was11.91 million. However, it is estimated by city officials that an additional 2-3 million 'floating population' also resides in Mumbai. The official population density of Mumbai is about 27,209 people per sq. km. which is one of the highest in the world. Roughly 55% of the population resides in informal settlements, commonly known as slum areas. In a one day mega-city workshop organized on August 23, 2004, with the support of the Government of Maharashtra (GoM), the Municipal Corporation of Greater Mumbai (MCGM), the Indian Institute of Technology (IIT), the Earthquake and Mega-cities Initiative (EMI) and the Earthquake Disaster Mitigation Research Center of Japan (EdM-NIED), the hazards which have had an impact or may potentially impact the city of Mumbai were identified as fire and industrial accidents, floods, earthquakes, chemical (transport, handling), biological, and nuclear hazards, cyclones, landslides and tidal surge. Besides, Mumbai is a soft target for human induced disasters such as bomb blasts, terrorism and riots.

The additional factors contributing to disaster risks are:

- Being an "Island city", the transport networks are in general poor.
- Inadequate road width vs. parking space
- Change of use of buildings from ordinary to critical functions without retrofitting or strengthening the building
- Utilities: water supply – lack of back-up system; inadequate sewerage systems
- Infrastructure: flyovers, hospitals in weak condition
- Power failures (interstate power grid)
- The extensive reclamation of sea-coast
- Existence of hazardous industries,
- Oil spills
- Presence of large floating population during office hours
- High population density in commercial areas and slums
- Improper and inadequate garbage collection and disposal.

Administrative Framework

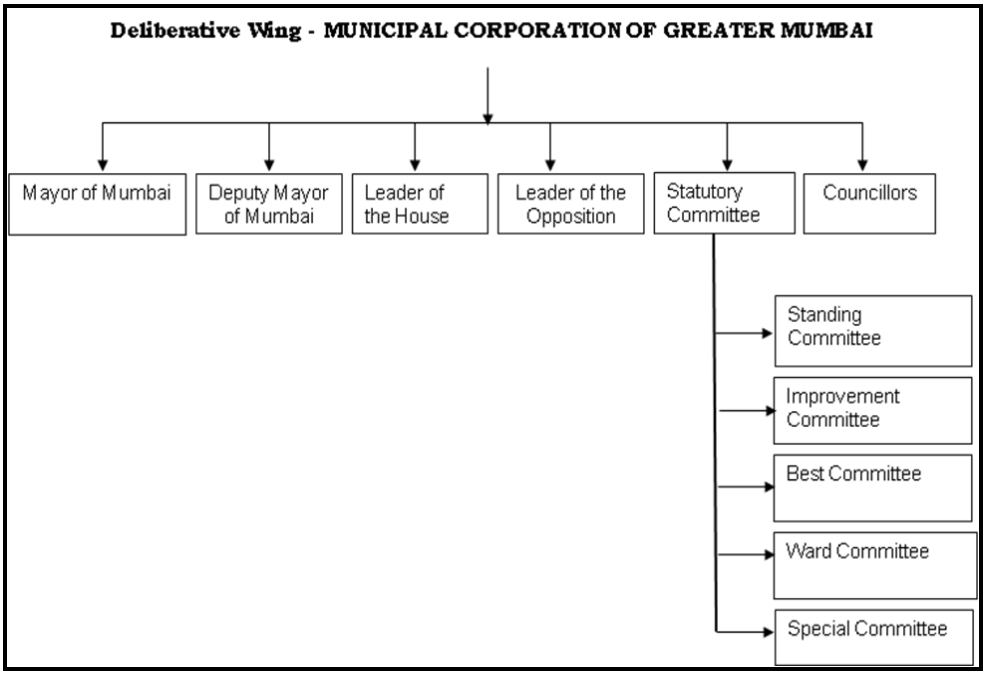
Greater Mumbai Metropolitan area is divided in two revenue districts: Mumbai City District (67.79 sq. km) and Mumbai Suburban District (370 sq km.) The downtown area extends from the southern tip of the peninsula to the Mahim and Sion Creeks in the north (Old Bombay). The suburban district is largely semi-

urban and lies to the north of old Mumbai. For administrative purposes, Greater Mumbai is divided into 6 zones, each consisting of 3 to 5 wards named alphabetically from A to T under the jurisdiction of Brihanmumbai Municipal Corporation (BMC). The Mumbai Metropolitan Region Development Authority Act of 1974 further treated Greater Mumbai with its rapidly growing hinterland as one region for development purposes under the name "Mumbai Metropolitan Region (MMR)". The region adds 3.887 sq km to the Greater Mumbai area of 468 sq km, while adding 5.90 million inhabitants to its 11.91 million population (2001 statistics).

Legal Mandate

The Municipal Corporation for Greater Mumbai was formed in 1865 as Mumbai's fully autonomous civic body responsible for medical services, education, transport, electricity supply, water supply, fire services, garbage disposal, markets, gardens, and engineering projects such as drainage development and the improvement of roads and street lighting. The Mumbai Municipal Corporation Act of 1888, which stated the framework of the Corporation and the Commissioner's functions, specifies nine statutory collateral authorities charged with the distinct responsibilities of city government. Each operates within the limitation set for it. Though the executive authority vests in the Municipal Commissioner, the 221 elected representatives, the Municipal Councilors, exercise general authority over civic affairs through budgetary and financial controls by determining taxes and allocating expenditure, approving contracts and other financial proposals and approving appointments to senior posts.

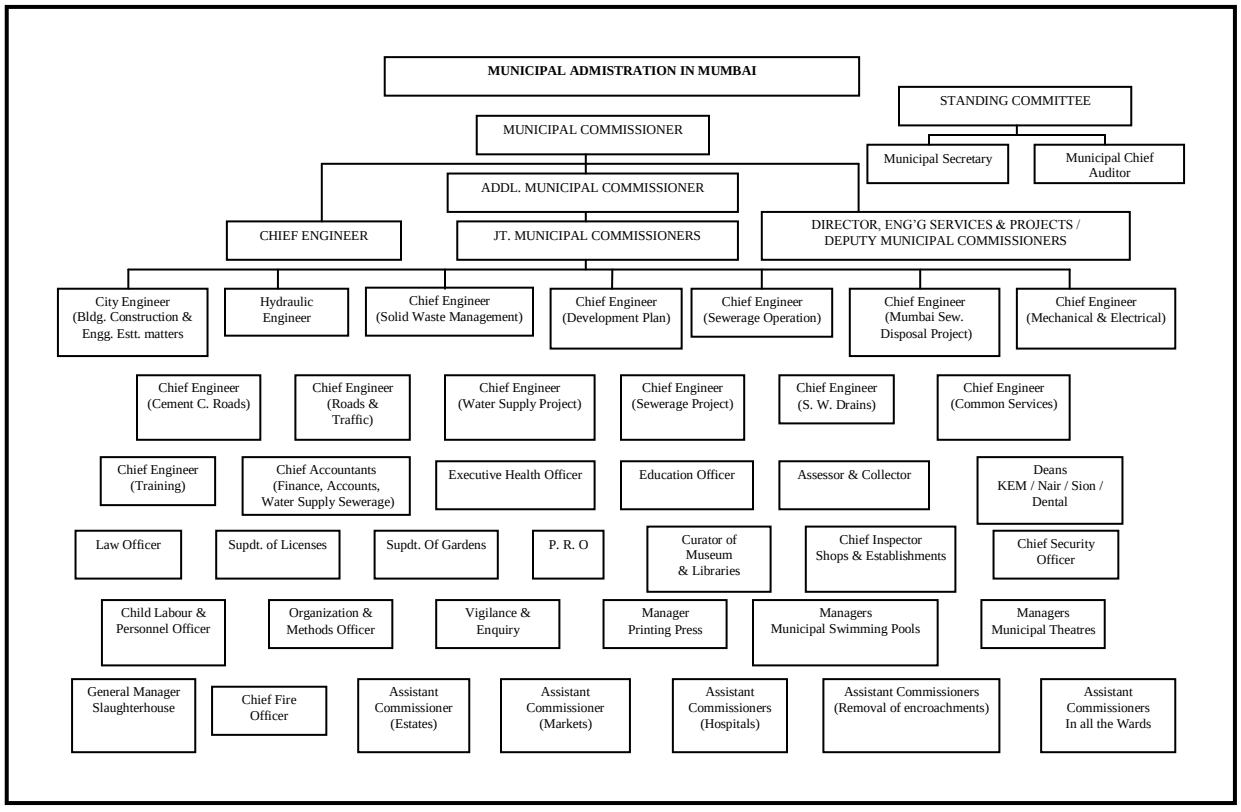
Figure 6: Deliberative Wing of MCGM



Source: Mumbai DMP 2005

The centralized administrative system was reorganized in 1964, when for the first time a decentralized pattern was introduced. The objective was to speed up disposal, improve efficiency and affect economy. In pursuance of this policy decision, the entire city is now divided into six administrative zones with twenty-four (24) wards. The six zones are supervised by a Deputy Municipal Commissioner with assistance from Ward Officers. In all there are thirteen Deputy Municipal Commissioners which include one post of Director (Engineering Services & Projects); two of these are designated Joint Municipal Commissioners. The Organizational Chart of MCGM is given below.

Figure 7: Administrative Wing of MCGM



Source: Mumbai DMP 2005

Functions of MCGM

MGCM is responsible for establishing DRM priorities in Greater Mumbai. The Commissioner is tasked to supervise and monitor disaster management and relief activities and enlist the services of Government of India (GOI), Government of Maharashtra (GOM) and expert institutions for specialized services, when necessary. The Commissioner shall also coordinate the activities of NGOs, aid

agencies, and is in charge of coordinating the activities of the Control Rooms in Greater Mumbai. Leading the coordination of DRM activities in Greater Mumbai is the MCGM Disaster Management Unit (DMU), formerly Emergency Operations Center, which manages the disaster management control room for the city. The other mandated functions of MCGM include responsibility for administering and providing basic infrastructure to the city such as:

- Building and Maintenance of roads, streets and flyovers
- Public Municipal schools
- Water purification and supply
- Public health and Hospitals
- Street lighting
- Maintenance of parks and open spaces
- Sewage treatment and disposal
- Garbage disposal and street cleanliness
- Assistance in the prevention of epidemic outbreaks through mass production of medicines at the Haffkine Institute
- Cemeteries and Crematoriums
- Registration of births and deaths.
- Lighthouses
- Removal of Encroachments
- Regulation of Markets, Shops and Establishments
- Security

Plan

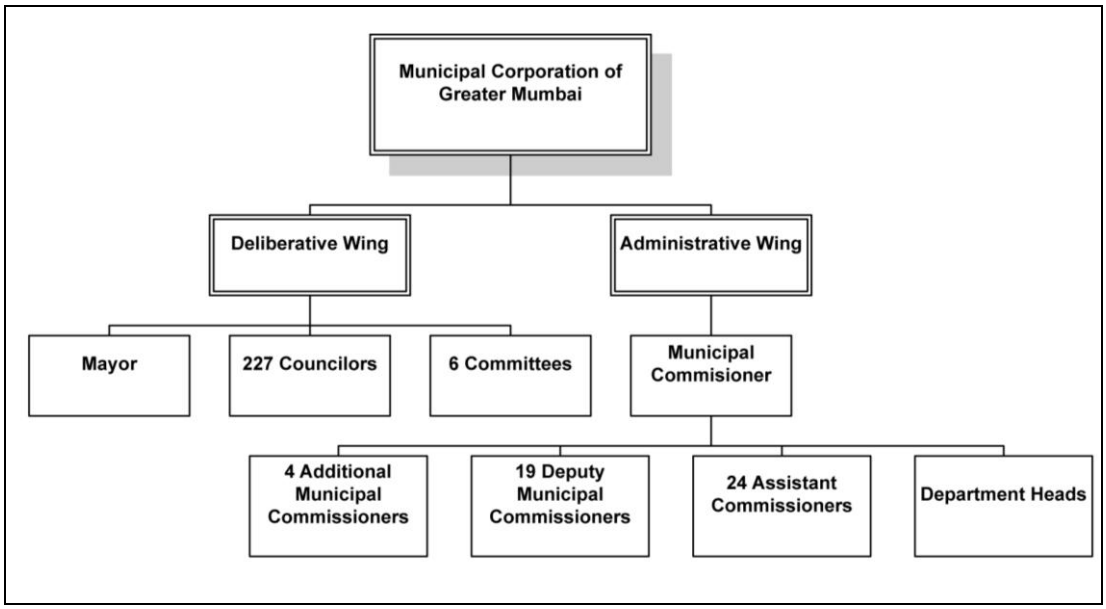
MCGM prepares a disaster management plan which provides disaster-related information, as well as plan of action for the city to prevent, avoid and reduce disaster risks and effectively respond to emergency events. Supporting the city-level disaster management plan are the ward level plans of all the 23 wards which specify the roles and responsibilities of ward officials in disaster risk management. When the disaster situation is localized and can be managed locally, the ward plan will come into full operation.

Organizational arrangements

MCGM is one of the largest local governments in Asia. It is composed of two wings; the deliberative wing is composed of the Mayor, the councilors and the committees and the administrative wing is composed of the Municipal Commissioner, appointed by Government of Maharashtra under section 54 of BMC Act. He is responsible for maintenance of various infrastructure of the city. He is assisted by Additional Municipal Commissioners, Deputy Municipal Commissioners, Assistant Commissioners and various heads of Departments in the discharge of his functions. The
Municipal Commissioner has been appointed as the District Disaster Officer for Greater Mumbai as per Order No.ENV/1093/DEA/ CR/36/TK dated February 16,

1994 (Mumbai Disaster Management Plan 2005). If the disasters fall within the managerial capacity of MCGM, the city government will manage the disaster situation without intervention from State authorities (Mumbai DMP, 2005). This is due to the fact that the impact of disasters is strongly felt at the local level and the local government is in the best position to undertake the broad spectrum of disaster risk management practices and processes as it is the closest level of organized government to the people (Fernandez et.al 2004).

Figure 8: MCGM Organizational Chart



Source: Mumbai DMP, 2005

The ward officer acts as the site officer responsible for the coordination of field activities of various line departments including coordination and providing support to line agencies so as to enable them to operate efficiently (Mumbai DMP, 2005). As the site officer, the ward officer would be in constant communication with the MCGM Control Room and the field officers from the police, traffic police, fire brigade, railways, BEST, BMC Hospitals, MTNL, BSES, TEC, revenue and state government when necessary. Disaster situations that encompass a large part of the city, would call for coordination of activities at the city level. Under such conditions the ward level plan of the affected wards would still be in operation along with the Mumbai Disaster Management Plan (Mumbai DMP, 2005). The ward officers maintain coordination functions and activities at the ward level while the inter-ward coordination is the responsibility of MCGM Control Room. It is only in the case of severe disasters of exceptionally large magnitude that the state and central government would step in especially if the situation requires coordination with a wide range of lateral agencies including central government agencies (Mumbai DMP, 2005). The Ministry of Home Affairs through the Additional Chief Secretary

coordinates and facilitates disaster management activities for Mumbai in such situations, by providing financial and logistic support.

At the city level, the Municipal Commissioner also coordinates the activities of all stakeholders and is in charge of coordinating the activities of the following Control Rooms in Greater Mumbai:

- Police Control Room
- BMC Control Room
- Fire Brigade Control Room
- BEST Control Room
- Central Railway Control Room
- Western Railway Control Room
- Konkan Railway Control Room
- District Control Room for Mumbai district
- District Control Room for Mumbai Suburban district
- Civil Defense Control Room

The two District Collectors in Greater Mumbai (Thane and Navi Mumbai) assist the Municipal Commissioner in all aspects of disaster management especially in coordinating with Thane District Control Room, Thane Municipal Corporation and Navi Mumbai Municipal Corporation (Mumbai DMP, 2005). Leading the coordination of DRM activities in Greater Mumbai is the MCGM Disaster Management Unit (DMU), formerly Emergency Operations Center, which manages the disaster management control room for the city.

Role of Senior Officers in MCGM

The Municipal Commissioner is a key figure in the overall local self-government setup that has developed in Mumbai over a century. He is one of the authorities under the BMC Act. He is responsible for maintenance of various infrastructure of the city like water supply, roads, storm water, drainage and efficient delivery of various services to the citizens of Mumbai. He deals with policy matters and matters having inter-departmental co-ordination and overall supervision of all departments; matters requiring special provision of funds, Sundry advances, special sanction for schemes/projects not provided for in the budget; development plans under the charge of Chief Engineer (Development Plans); Vigilance (Engineering Side), Test Audit and Vigilance Officer, Vigilance Officer (Special Duty), Chief Officer (Enquiry); and any other subject or department not specifically assigned to any Addl. Municipal Commissioner. He is assisted by Additional Municipal Commissioners, Deputy Municipal Commissioners, Assistant Commissioners and various heads of Department in discharge of his functions.

Additional Municipal Commissioners function as commissioners for departments which are deputed to them by Municipal Commissioner. At present there are four additional Municipal Commissioners looking after City, Western

Suburbs, Projects and E-subjects respectively. Joint/Deputy Municipal Commissioners assist Municipal Commissioner/Additional Municipal Commissioners in discharge of their responsibilities and are entrusted with departments assigned to each by the Municipal Commissioner. Assistant Commissioners are administrative heads of wards and play a key role in day to day service delivery to citizens. City has been divided in 24 Administrative Wards and each of them is headed by Assistant Commissioner. They are also known as Ward Officers, as earlier designated.

Departments of MCGM

Each department is headed by a Head of Department appointed by MCGM. The Departments in MCGM are:

Table 1: MCGM Departments

1.	Assessment & Collection	2.	Audit
3.	Chief Accountant (Finance)	4.	Chief Accountant (Stores)
5.	Chief Accountant (Treasury)	6.	Chief Accountant (W.S.S.D.)
7.	Chief Engineer (C.T.I. & R. C.)	8.	Chief Engineer (Mech & Eng)
9.	Chief Engineer (Road and Traffic)	10.	Chief Engineer (Sewage Project)
11.	Chief Engineer (Storm Water Drain)	12.	Chief Engineer (Water Supply Project)
13.	City Engineer	14.	Deonar Abattoir
15.	Development Plan	16.	Disaster Management, Control & Complaint Registration System
17.	Education	18.	Electronic Data Processing
19.	Enquiries	20.	Estate & Land Management
21.	Gardens & Zoos	22.	Hydraulic Engineering
23.	Labour Office	24.	Legal
25.	Licenses	26.	Markets
27.	Mumbai Fire Brigade	28.	Mumbai Hospitals and Medical College (Nair, KEM and LTMG)
29.	Mumbai Sewerage Disposal Project	30.	Municipal Printing Press
31.	Municipal Secretary	32.	Personnel
33.	Project Planning & Control Cell	34.	Protocol & Liaison

35.	Public Health	36.	Public Relations
37.	Removal of Encroachment	38.	Municipal Secretary
39.	Security	40.	Shops & Establishments
41	Solid Waste Management	42	Wards (23)

Source: Mumbai DMP, 2005

The functions of each department may be seen at the website www.mcgm.gov.in

Approach and Strategy for MCGM Departments

In evaluating the performance of each MCGM department, the approach and strategy may be to assess the authority, responsibility, accountability and capacity of each department with a view to institutionalizing and mainstreaming all facets of disaster management in the functions of each department. A mismatch in the above mentioned four components is bound to adversely affect the efficient discharge of its normal functions by the respective departments, making it even more difficult for these departments to efficiently discharge their functions and responsibilities assigned to them in a disaster situation. Formal delegation of powers to ensure responsibility and accountability go hand in hand with delegation of powers in general and legal authority vested in these departments in terms of MMC Act, 1888 or any other legislative back-up as may be deemed fit by the State Government in particular. Role clarity of each department in normal and, even more, in any unforeseen situation was essential. Where more than one department or agencies were involved, their respective role clarity as well as institutionalized coordination mechanism became even more crucial. The role of each MCGM department has been examined keeping the above parameters in view.

Disaster Management- State level Executive Sub Committee for Mumbai

A State level Executive Sub Committee for Mumbai has been set up through Government Resolution No: DMU-2007/CR-51/DM-1 Dated: April 05, 2007. Additional Chief Secretary (Home) is the Chairperson of the Sub Committee and the Municipal Commissioner of MCGM is the Vice-Chairperson of Sub Committee. The Additional Municipal Commissioner (Western Suburbs) is also a Member Secretary of State level Executive Sub Committee for Mumbai. The other members of the Sub Committee for Mumbai are:

- Secretary, Relief & Rehabilitation
- Secretary, Home (Law & Order)
- Secretary, Housing
- Secretary, Medical Education
- Secretary, Food & Civil Supplies
- Divisional Commissioner (Konkan)

- Transport Commissioner
- Police Commissioner
- General Manager, Central Railway.
- General Manager, Western Railway.
- General Manager, Konkan Railway.
- General Manager, BEST
- Deputy Director General, Meteorology
- Secretary, Industries
- Chairman, MBPT
- Director, MPCB
- Secretary, Public Works
- Director, AAI (Mumbai)
- GoC, Maharashtra & Gujarat Area
- Commander, Mumbai Sub-area
- Colonel General (Staff)
- Additional Municipal Commissioner (Western Suburbs), MCGM – Member Secretary

The terms of reference of the State level Executive Sub Committee for Mumbai are:

- To restrict any person to enter at emergency spot
- To carry out relief and rescue operation and also ensure to clean and shift garbage at other place
- To make a available and provide emergency shelter, food, water, medical services and other emergency goods to victims affected by disaster
- To issue an order to concern departments and agencies to carry our rescue operations
- To make a use of human and materials of other State Governments Departments and Agencies.
- To make available specialists services during emergency
- To provide all facilities and services to victims of disasters compare to other citizens
- To ensure all Non Governmental Organizations work in affected area without any biases.
- To provide information to citizens during emergency
- To obey the any other orders of Sate Government

This committee meets at least twice in a year to take a review of pre monsoon preparedness of line departments, Corporation and other State and Central Governments Departments. The State Executive Sub Committee for Mumbai reports to State Executive Committee constituted under section 20 of the Disaster Management Act, 2005.

Disaster Management Department

As stated above, The Municipal Commissioner, vide Order No. ENV/ 1093/ DEA/ CR/36/TK dated 16th February, 1994 is appointed as the District Disaster Officer for Greater Mumbai. It is anticipated the BMC will manage disaster situations without intervention from State authorities in most circumstances. Micro-level plans at ward level have been prepared for all the 23 wards incorporating specific responsibilities of ward officer who will act as Ward Disaster Manager. However, in cases of disasters of exceptionally large magnitude which require coordination with a wide range of lateral agencies including central government agencies, the Additional Chief Secretary (Home) within the state government will assume the responsibility of Disaster Manager for Mumbai. The tate level Executive Sub Committee for Mumbai would ensure effective inter-departmental coordination between all state departments, provide policy decisions, inform the central government about disaster situation, review disaster related activity reports received from MCGM Control Room, Police Control Room and Army Control Room and provide appropriate directions, coordinate the activities of lateral, and central government agencies such as Defense Services, SRP, CRPF, Coast Guards, CISF, MTNL, AAI, Port Trust, FCI, DD, AIR, Meteorology Dept, MPCB, BARC (Mumbai DMP, 2008). Help from the Armed Forces can be sought through specific request from the Additional Chief Secretary (Home), especially for evacuation, medical aid, provision of relief and establishment of relief camps communication aid, repair to damaged infrastructure, management of international relief etc (Mumbai DMP, 2008).

Below the Municipal Commissioner, a Joint Commissioner has been given the responsibility of looking after all aspects of disaster management including coordination of all measures related to disaster prevention, mitigation, preparedness, response and relief. The department is headed by the Chief Officer, supported by a Deputy Chief Officer, Disaster Management Control Room and other support staff.

The responsibilities assigned to the Disaster Management Control and Complaint Registration System Department are:

- To attend to complaints on telephone, internet and social welfare organizations and redress the same.
- To handle complaints received from Assistant Municipal Commisioner/Municipal Commissioner and submit the compliance report thereof.
- To handle watch cases received from the Assitant Municipal Commissioner/Municipal Commissioner and prepare report thereof.
- To maintain cordial relations with each department of Corporation.
- To give the location of disaster to the State Government.
- To maintain cordial relation between outside agencies such as Security, SRP, CRPF, Coast Guards and CISF, and
- To prepare the report of compliance which are accessible on online.

General Administration and Personnel Departments

These departments deal with all administrative and personnel matters. There was a general demand that the delegation of financial powers needed to be enhanced since earlier delegation was made about two decades back. The financial powers may be enhanced as proposed above. However, since procurements are of a routinely and repetitive nature, these departments may scrupulously follow the prescribed procedures.

Legal Department

The Legal Department is basically a support department. It is concerned with the litigation for and against the Corporation arising in the administration of the M.M.C. Act, 1888, and other Acts, such as Maharashtra Regional and Town Planning Act, 1966, The Bombay Shops and Establishments Act, 1948, The Prevention of Food Adulteration Act, 1954, The Maharashtra (Urban Areas) Preservation of Trees Act, 1975, D.C. Rules and other Bye-law etc. It also deals with the preparation of all types of Agreements, lease, Conveyance, Memorandum of understanding in respect of Municipal properties and matters and investigation of title of the properties to be taken over by the Corporation as per D.C. Regulations and M.R.T.P. Act and for giving housing

The litigations are both civil and criminal in nature spread over in different Courts of Law extending to the Writ Jurisdiction in the High Court and the Supreme Court and also in Small Causes Court, Tribunal Labour and Industrial Courts, Co-operative Courts, Consumer's Redresses Forum, Civil & Criminal Courts outside Mumbai, etc.

Municipal Secretary's Department

His department plays a pivotal role in the effective and constructive functioning of the deliberative wing (elected representatives) of the corporation. He is a high level advisor to the Presiding Authorities of the Corporation.

Labor Department

This department is primarily concerned with helping the administration to formulate labor policies and implementation of provision of labor laws. It also organizes quality of life training program as welfare centers for the benefit of civic employees, inter-ward/departmental drama competitions every year and welfare, recreation and educative activities conducted at various welfare centers.

Finance Departments

The Chief Accountant (Finance) functions as the Principal Financial Adviser to the Municipal Commissioner and also deals with preparation of estimate of Income and Expenditure (Budget), raising of loans /Advances from Public/Government, scrutiny of bills/financial proposals, liaison with Govt. of Maharashtra/Govt. of India/World Bank, investment of Surplus money in Specific funds and FDs and internal audit. The Chief Accountant (Stores) handles preparation of Schedules for various items of stores, assessing requirements of municipal departments in respect of store items and supply of store items to departments, invitation of tenders and finalization of schedule contractors. quality control of stores, items through various labs/analysts, action against defaulting contractors/suppliers, invitation of tenders in respect of non-schedule store items and finalization of contractors/suppliers and maintenance of Accounts (Advance Accounts). The Chief Accountant (Treasury) deals with collection and maintenance of accounts of income and expenditure, preparation of final account-income and expenditure/balance sheet, maintenance of accounts of various funds such as PF, sinking fund etc, scrutiny and payment of bills pertaining to MCGM (including establishment /pension & PF proposals except that of Water Supply and Sewage Departments (WSSD) and preparation of claims against Government for grant-in-aid as admissible for primary education, slum improvement and for rebate on urban immovable property tax in the city, house repairs and for share in entertainment tax. Finally, the Chief Accountant (WSSD) looks after maintenance of the accounts of the water and sewerage fund and the consolidated water supply disposal loan fund, collection of revenue in respect of section 92 (disposal of municipal property) and section 169 (water taxes and charges), preparation of estimate of income and expenditure (Budget), raising of loans/advances from the government, scrutiny of bills proposals/establishment proposals and payments thereof, liaison with Govt. of Maharashtra/Government of India/World Bank, investment of surplus money in Specific Funds (FDs) and internal audit. All these functions of CA (WSSD) are related to WSSD only.

The Chief Accountants (CAs) function as the respective heads of the Departments. Apparently, there is no post of Financial Advisor in the corporation to whom all CAs are responsible. The Organizational Chart of the Corporation also does not show linkage of CAs with a single senior officer. During interaction with the author of this report, it was conceded by the CAs that the delegation of powers to different officers was outdated and needed to be revised. However, the initiative for such revision had to be taken by the respective line departments. While the heads of line departments also felt that the existing delegation was woefully inadequate, they were not able to justify it clearly. Similarly, the CAs were also not able to state categorically their precise functions in respect to which enhanced powers needed to be delegated. It was obvious that each line department as well as the Chief Accountant was only working within his/her scope which resulted to inadequate coordination among different departments. As for the Chief Accountants, the

delegation of financial powers was last reviewed in 1987. Although all proposals for delegation of financial powers are required to be considered and appropriate orders issued by the respective Chief Accountants, these orders were not readily available at one place and could not be produced.

As for disaster risk reduction measures; the overall view was that Finance Departments were not directly concerned. It was confirmed that the proposals were not examined to ensure that disaster management components were incorporated therein. The Finance Department could do an audit on the proposals received from the Engineering and Health Departments, to ensure inclusion of DRR components in Development Plans, which is essential for mainstreaming DRR in development process. Ministry of Finance in GOI has issued instructions on 19 June, 2009 for incorporation of DRR components in all development proposals sent for approval. Instructions available on NDMA website

Engineering Departments

There are eleven (11) engineering departments, each headed by a Chief Engineer, dealing with Development Plans, Central Training Institute &Refresher Course, Mechanical & Electrical, Road and Traffic, Sewage Project, Storm Water Drainage, Water Supply Project, City, Hydraulic Engineering, Mumbai Sewerage Disposal Project and Solid Waste Management.

The Chief Engineer (Development Plans) deals with approval of building plan for development as per MMC Act/MRTP Act, approval of proposals for change in use, implementation of Development Control Regulations, draft amendments in rules of DCR's for consideration of Government, acquisition of lands for various proposals/Reservations, Implementation of Development Plans, approval of lay out/sub-division/amalgamation as per Development Control Regulations, 1991, approval of miscellaneous proposals for change of use, enclosure of balconies etc; and issue of development permission for public housing/density housing reservations and accommodation reservations, markets, welfare centers, dispensaries, maternity homes etc.

The Chief Engineer (Central Training Institute & Refresher Courses) handles imparting training to the staff of the MCGM in respect of Induction Training, Computer Training, Administrative and Financial Training, Technical Training, Management and Special Programs, scrutinizing the proposals for deputation of MCGM employees to external courses, implementing MIS for wards and hospitals and carry out Systems Improvement Studies; conducting national Refresher courses of Central Public Health Engineering and Environmental organization (CPHEO), Government of India for employees from Government, Semi-Government and other organizations from all over India in respect of Cathodes Protection, Sewer

Cleaning & Maintenance, Pipes & Conduits, Care & Use of Chlorinators, Preventive Maintenance & Leak Detection in Water Distribution System etc.

The Chief Engineer (Mechanical&Electrical) is concerned with attending repairs and maintenance of M & E works, electrification of newly constructed municipal buildings, supply, installation, testing & commissioning (S/I/T/C) of different types of (goods, passenger & stretcher) lifts, electric crematoria, swimming pools, S/I/T/C of various types of air-conditioning like central A.C. plant, window A.C .units, Package units, Central Plant, Refrigerators, Blood Bank, Mortuary, S/I/T/C of water pump sets for the municipal buildings, fire fighting system, EPABX System, Sound System, Video Projector, VCR, TV. fountains, railings, supply & installation of plant apparatus, beautification of gardens and illumination of gardens and playgrounds, fabrication and supply of Cast Iron Manhole Frames & Covers, M.S. Hand Carts, Dustbins, Tree guards etc. for various departments and ward offices, S/I/T/C of generator sets for operation theatres, I.C.U. in hospitals and repair and maintenance of various electrical and mechanical equipments.

The Chief Engineer(Roads and Traffic) deals with construction / improvement and maintenance of road network, maintaining traffic signals, prescribing road lines, providing dividers and road name boards, to implement pay and park schemes including maintenance through contractors, appoint agencies for maintenance work to be carried out by various wards, provide and maintain traffic signals, procure and supply the cautionary boards, cat eyes, scrutinize beautification proposals, design traffic islands, footpaths etc and study, planning and implementation of traffic related issues either on its own or in co-ordination with other agencies like MMRDA.

The Chief Engineer (Sewage Project) handles the provision of sewage treatment and disposal facilities, strengthening the capacity of MCGM's Water Supply and Sewerage Department (WSSD), sustaining the financial viability of the provision of Water Supply and Sewerage services in Greater Mumbai through direct charges to beneficiaries at appropriate levels and improving the health and environmental conditions including slum dwellers. The Chief Engineer (Storm Water Drainage) is responsible for planning, construction and maintenance of Sewage Waste Disposal (full) system of the city of Mumbai.

The Chief Engineer (Water Supply Project) is responsible for Planning, Designing & Execution of work that are required for implementation of Water Supply Schemes for augmentation of water supply, develop new sources of water as decided by the Expert Committee and make necessary arrangements for obtaining Government's permissions, construction of Dams, Conveyance Systems, Treatment Plants, Service Reservoirs, Pumping Stations, planning & designing of the water supply works with in house expertise as well as by appointing consultants. Identification of financial institutions for loan assistance and technical consultants for specialized works, obtaining financial approvals, inviting tenders and its

evaluation and obtaining approvals and long range planning for augmenting water supply in future, based on assessment of requirements.

The City Engineer is concerned with preparation of plans and estimates for construction / major repairs of various municipal properties/works, construction of Municipal Buildings, appointment of petty works contractors, preparation of various schedules related to works and registration of contractors.

The Hydraulic Engineer is responsible for construction, operation & maintenance of water supply system, generation of water & sewerage charges bills and affecting its recoveries, preparation of future plans and identification of capital works, framing of water charges rules & by-laws and obtaining its approval, grant of new water connection/ enhancement of existing water connections, testing of meters and issue of municipal meters, and maintenance and up- keep of gardens and properties under Hydraulic Engineer. The Chief Engineer (Mumbai Sewerage Disposal Project) is concerned with processing of the sewerage material and dispose of the same, maintenance of pumping stations, waste water treatment plants, and to attend to the slum cleanliness programs.

The Chief Engineer (Solid Waste Management) is responsible for management and coordination of conservancy, transport and environment of the solid waste management, maintaining general sanitation and providing conservancy services, improve technique of disposal of solid waste and to produce manure and energy from solid waste by incinerating the same, lay down procedure for the personnel of solid waste management department in consultation with Head Supervisor, Chief Labour Officer and Municipal Commissioner, and to implement LAD Committee's recommendations.

Table 2: Responsibilities of MCGM Engineering and Development Plan Departments

Name of Departments	Responsibilities
Development Plans	• Approval of building plans for development • implementation of Development Control Regulations • Draft amendments in rules of DCR's for consideration of Government • Acquisition of lands for various proposals/Reservations • Implementation of Development Plans; • Approval of lay out/sub-division/amalgamation • Approval of miscellaneous proposals for change of use, enclosure of balconies etc; • Issue of development permission for public housing/density housing reservations and accommodation reservations viz, markets, welfare centers, dispensaries, maternity homes etc.

Central Training Institute & Refresher Courses	• Training to the staff of the MCGM • Scrutinize the proposals for deputation of MCGM employees to external courses; • Implementing MIS for wards and hospitals and carry out Systems Improvement Studies; • Conducting national Refresher courses of Central Public Health Engineering and Environmental organization (CPHEO)
Mechanical & Electrical	• Repairs and maintenance of M & E works; • Electrification of newly constructed municipal buildings; • Supply, installation, testing, commissioning, repair, and maintenance of various electrical and mechanical equipments.
Roads and Traffic	• Deals with construction/improvement and maintenance of road network; • Maintaining traffic signals, prescribing road lines, providing dividers and road name boards, to implement pay and park schemes including maintenance through contractors; • Appoint agencies for maintenance work to be carried out by various wards; provide and maintain traffic signals; procure and supply the cautionary boards, cat eyes; • Scrutinize beautification proposals; design traffic islands, footpaths etc and study, planning and implementation of traffic related issues
Sewage Project	• Handles the provision of sewage treatment and disposal facilities; • Strengthening the capacity of MCGM's Water Supply and Sewerage Department (WSSD); • Sustaining the financial viability of the provision of Water Supply and Sewerage services in Greater Mumbai through direct charges to beneficiaries at appropriate levels and improving the health and environmental conditions including slum dwellers. • (Storm Water Drainage) Planning, construction and maintenance of Sewage Waste Disposal (full) system of the city of Mumbai.
Water Supply Project	• Planning, Designing & Execution of work that are required for implementation of Water Supply Schemes • Develop new sources of water • Arrangements for obtaining Government's permissions, construction of Dams, Conveyance Systems, Treatment Plants, Service Reservoirs, Pumping Stations; • Planning & designing of the water supply works

	• Identification of financial institutions for loan assistance and technical consultants for specialized works, obtaining financial approvals; • Inviting tenders and its evaluation and obtaining approvals and long range planning for augmenting water supply in future, based on assessment of requirements.
City Engineer	• Preparation of plans and estimates for construction/major repairs of various municipal properties/works • Construction of Municipal Buildings • Appointment of petty works contractors • Preparation of various schedules related to works and registration of contractors
Hydraulic Engineer	• Construction, operation & maintenance of water supply system; • Generation of water & sewerage charges bills • Preparation of future plans and identification of capital works • Framing of water charges rules & by-laws and obtaining its approval • Grant of new water connection/ enhancement of existing water connections; testing of meters and issue of municipal meters; and maintenance and up- keep of gardens and properties under Hydraulic Engineer. • The Chief Engineer (Mumbai Sewerage Disposal Project) is concerned with processing of the sewerage material and dispose of the same; maintenance of pumping stations, waste water treatment plants and to attend to the slum cleanliness programs
Solid Waste Management	• Management and coordination of conservancy, transport and environment of the solid waste management; • Maintaining general sanitation and providing conservancy services; improve technique of disposal of solid waste and to produce manure and energy from solid waste by incinerating the same • Lay down procedure for the personnel of solid waste management department in consultation with Head Supervisor, Chief Labour Officer and Municipal Commissioner • Implement LAD Committee's recommendations.

Source: Mumbai DMP, 2005

Public Relations Department

The Public Relation Officer is the head of this department. The functions of the department include scanning daily selected newspapers in English and vernaculars for marking important and relevant news items, comments etc. and putting up to MC daily the newspaper clipping in a consolidated from and replying to comments, as directed, arranging publicity in respect of various municipal services, new projects, activities etc. through media, such as press releases printed publications, posters, films, exhibitions, editing publishing and managing "Bombay Civic Journal" as a part of the publicity department, and arranging for the preparations of the itinerary for the visitors to see municipal installations according to their interest, making arrangements for their transport and group discussions with officers and supplying the information and materials required.

Health Management-MCGM Hospitals

There are three (3) MCGM hospitals- KEM, Sion and Nair with bed strength of 1800, 1400 and 1400 respectively, besides 16 sub-urban hospitals. The total bed-strength of all MCGM hospitals including three major hospitals is 10,700 only. The health management is supported by several private hospitals which are primarily utilized by upper middle and rich segments of population. In case of a major disaster, about 25% beds can be made available in government hospitals by discharging less serious patients and treating them as OPD patients. The same arrangement may hold good for ICU patients also where about 25% patients could be shifted to wards. At the same time, it was admitted that the bed-strength of government hospitals as well as capacity to treat OPD patients is inadequate. KEM hospital at present treats about 5,700 patients daily and the intake of OPD patients could be increased significantly in a disaster situation. There is also uneven distribution of hospitals in Greater Mumbai. Although the suburbs are densely populated, the major hospitals are mainly located in South Mumbai.

The major calamities which at present put pressure on health infrastructure are collapse of buildings in old Mumbai, fire incidents in slum areas and multi-storied buildings. It was admitted that a major earthquake could become a potential disaster from health infrastructure point of view. An Emergency Response Centre (ERC) has been set up at KEM Hospital which has two Operation Theatres, one each for orthopedic and trauma management, with a bed strength of 20 beds only. KEM Hospital admitted that it was not up to the task and may not make a very significant dent in a major disaster.

Fire Services

The Mumbai Fire Brigade functions under the control of Chief Fire Officer. Its functions include attending to emergency calls such as fire calls, house collapse, rescue operations and other services, issue of various NOCs for trade activities to

ensure prevention of fire incidents, issue of NOCs for construction of high rise buildings, commercial and residential, (above 24 Meters) and special buildings used for public assembly e.g. cinema theatres, auditorium, commercial premises and industries, impart training to various agencies as and when demanded such as schools, banks, railways etc, inspection of high rise buildings by the High Rise Cell of Fire Brigade Department, and maintenance of fire hydrants. Presently there are 35 fire stations with 2500 fire men – 4 multiple fire stations, 15 double fire station and 16 single fire stations, as against the international norm of one fire station for 4 sq. km or 50,000 people. There is also shortage of high rise firefighting equipment. Equipment to reach up to 60 meters high is insufficient and its transportation poses a major problem in case of emergencies. The fire services need to be converted to an all hazard response unit with the addition of a rescue tender and water tender. A proposal for this purpose had been initiated by the Ministry of Home Affairs at the cost of about INR 36,000 million but it got bogged down due to the reluctance of the state government to create about 1800 to 2000 posts of firemen. Even now, the firemen respond to all types of hazards but there is need for more intensive training to make them functional as an all hazard response unit which is at not practical unless the number of firemen is increased significantly.

The Fire Services Control Room is functional and messages are sent to field stations through wireless technology. The major problem areas in Mumbai are temporary structures in slum areas, building collapse and traffic congestion. The present response time is about 15 minutes as against the international norm of 3 minutes. In case of fires in high rise buildings, the response time is even more due to problem of moving the high rise fire fighting equipments. The Standard Operating Procedures (SOPs) are still not fully developed and made operational although the prescribed drills are by and large followed. There is a captive training centre for imparting training to firemen for six months but it is not adequately developed; training provided is obsolete and there is lack of adequate career plan. As for officers, the only training institute available on a national scale is the National Fire Service College, Nagpur, which is deficient.

Municipal Security Force

The total strength of the Security Force is around 4,000 and the total officers/installations covered under their security network is around 950. The functions of the Security Force include guarding municipal properties and important installations, proper organization, control and maintenance of the required standard of vigilance among the member of the force, ensure that the security guards are posted at strategic and vulnerable points in the premises of various Municipal Institutions & Establishment like offices, workshops, stores, hospitals, pumping stations/ installations at the reservoir, lakes and dams; and undertake regular surprise visits & night rounds. The Security Force has one training center. Training is primarily imparted on physical fitness, first aid, basic training in fire fighting and access control. It is an unarmed force with a small

section of armed security personnel. The number of women personnel is marginal at about 200. The security personnel function for eight hours at a stretch and there are no shift duties for shorter stretches even at sensitive installations. There are no Standard Operating Procedures (SOPs) in place and no risk assessment of offices and other installations has been carried out. There is no disaster management plan in place. It lacks any institutional support for risk assessment, extensive training or specialized training for vital installations.

Estate and Land Management (ELM) Department

ELM Department is headed by an Assistant Commissioner The main functions of the department include recoveries of tenanted properties and staff quarters; registration of tenancy agreements; repairs and maintenance of estate properties; allotment of tenants to project affected persons; proposals for redevelopment received from the wards; scrutiny of proposal in respect of lease of municipal plots, renewal of lease, transfer matters of lease plots, levy and recovery of lease rent and extra ground rent, execution of lease, license and deeds; obtain approval/sanction of competent authority to the leasehold plots to be redeveloped/allotted and renewals and issue of 'No Objection Certificates' for advertisements and hoardings etc. Staff quarters and tenanted properties are maintained and repaired at ward level, lease property is centralized and the ELM department is concerned with plots only. There are several departments involved in demolition /reconstruction such as planning and design, building and construction & building and proposal departments. Pre-monsoon review is also conducted at ward level by deputy chief engineer (building and proposal department).

Markets Department

There are about 145 markets on municipal land having about 15,000 shops. The main functions of Markets Department are to run the municipal markets within the city limits; collection of stall charges, slaughter fees, rent and compensation charges, license fees, premium etc. from the licensees of the markets; maintain the markets and to keep the markets clean from sanitary and hygienic point of view; maintain the data regarding all the shops, stalls; issue licenses for outside meat shops and private markets and to control illegal import of animals for unauthorized slaughter; allotment of stalls, shops in the municipal markets; set the charges for stall shops, spaces, etc. with the sanction of the Standing Committee; set the license fee with the sanction of the Corporation; carry out repair works of markets; and initiate proposals for development/re-development of markets. Shops are given on license although ownership is with MCGM.

Project Planning and Control Department

The department, headed by an Assistant Commissioner, deals with the formulation and evaluation of annual schemes; maintain coordination between

MCGM and Collector of the Mumbai suburban district; sanction of proposals received under Swarna Jayanti Shahari Rojgar Yojana; work as Member Secretary and District Project Officer for District Urban Development Authority; and sanction of various proposals/bills in respect of various schemes undertaken. The department also deals with implementation and monitoring of district plan schemes related to beautification of roads, cemetery development, modernization of hospitals and coordination of works under MP LAD Scheme. It was admitted that the coordination is primarily undertaken at ward level; no instances of specific coordination undertaken at headquarters at department level could be given. It was further mentioned that the department was not concerned with disaster risk reduction. The department felt that delegation of powers was adequate since financial powers are exercised by District Planning Council, which was quite appropriate.

Licensing Department

The Department functions under the Superintendent of Licensing. It is a regulating department under the decentralized set up. However, all the functions are carried out by the respective ward offices and only policy decisions are taken at Central Office with the approval of Deputy/Additional/Municipal Commissioner. It also deals with issue of P.C.O. Licenses to the handicapped persons; issue of cobbler pitch licenses; and taking action against unauthorized hawkers; issue of projection licenses; policy guidelines for giving permission for advertisement hoarding and glow signboards by ward offices; grant of licenses for trades and storages, under One Window Scheme at the Ward level by obtaining Chief Fire Officer's NOC against unauthorized trades and storages and fixing schedule of license and permit fees.

Gardens and Zoos Department

The department is headed by Superintendent of Gardens. The responsibilities of the department include maintenance of VJ Bhosle Udayan-Zoo as a public Botanic garden and zoo; conservation of rare/exotic species of flora; procuring new variety of flora; provide plant materials for educational purposes; propagation and sale of plants; maintenance of gardens (210), parks(25), playgrounds (294), recreation grounds (352), trees (about 1.9 million), which has increased considerably over the last two decades; construction of new gardens; preservation and plantation of trees at various roads and open spaces throughout Greater Mumbai limit; making available plants to the public on large scale at marginal rate for plantation purpose; preparation of Budget for Tree Authority; and implementation of decisions taken in Central Zoo Authority Meetings. The department also undertakes trimming of trees in pre monsoon period to maintain the balance of trees which may otherwise be uprooted.

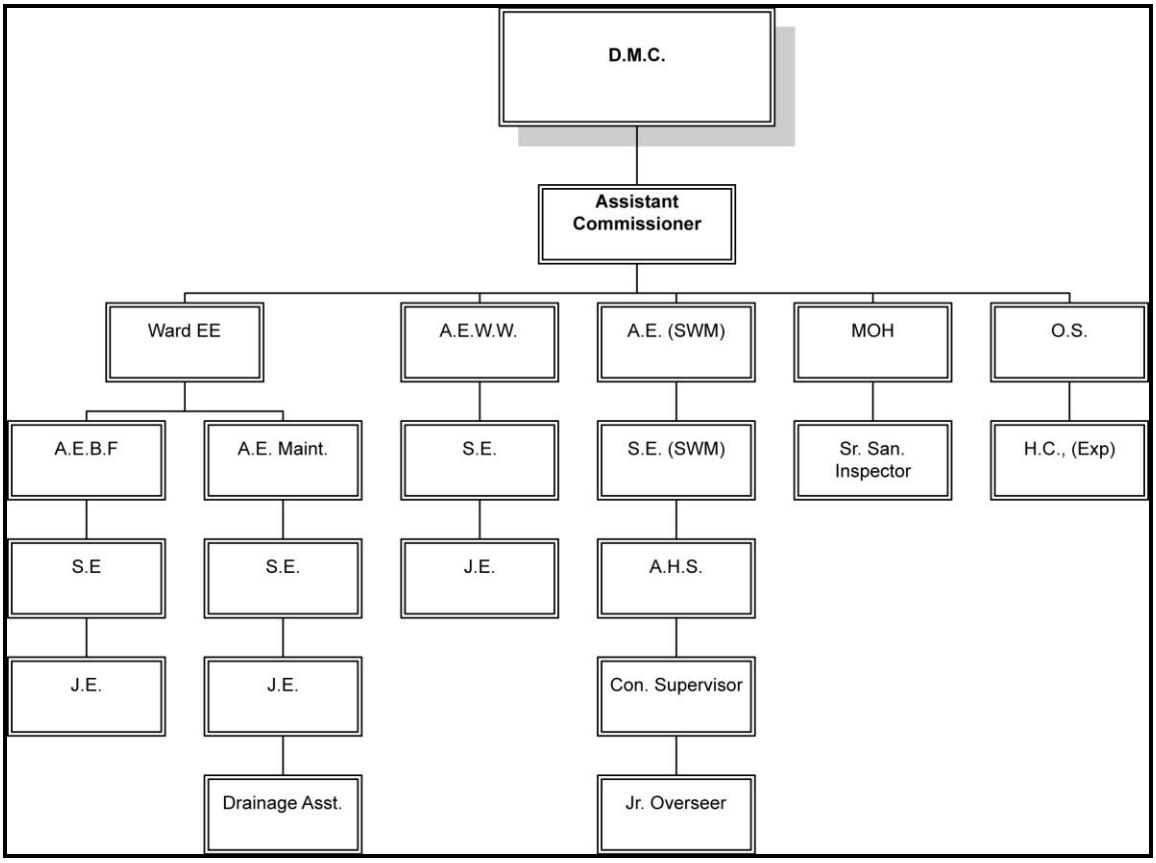
Shops and Establishment Department

The department is headed by a Chief Inspector. The main responsibility of the department is to prevent laborers of unorganized sector from exploitation by enforcing different provisions of the Bombay Shops and Establishment act 1948; the Payment of Wages Act, 1936; the Minimum Wages Act 1948; the Maternity Benefit Act 1961; and the Child Labor (Prohibition and Regulation) Act, 1986. It ensures that each and every business-conducting establishment amenable to the Act is registered under the Bombay Shops & Establishment Act, 1948 as also periodical renewal of registration certificates. The department prosecutes the employers for non-observance of the provisions of the acts and rules framed there under; and assists MCGM in collecting trade refuse charges. It is also engaged in registration of business, (banks, offices, theaters, hotels, loading homes), for implementation of labor laws and laws related to prohibition of child labor, sexual abuse and AIDS. With registration of 282 thousand shops and over 200 thousand commercial establishments, a substantial part of unorganized labor has in a way been brought in the category of organized labor. The department maintains interaction with labor in shops and establishments and educates on above mentioned issues.

Ward Offices

The Ward Offices are the field offices which implement the functions of MCGM at ground level. There are 23 wards in Greater Mumbai, each headed by an Assistant Commissioner. He is head of ward administration and key figure in efficient delivery of services to citizens. He is also the approving authority for granting licenses to hawkers and stationery handcarts and approving sites for advertisement hoardings and granting the requisite permits, granting exemptions from advertisement fees as per provisions of the MMC Act, 1888 and the Rules framed there under. The author of this report could visit only one ward-K (West) and therefore the position reflected relates to that ward, which may be taken as illustrative but may not strictly be meticulously accurate in respect of all other wards.

Figure 9: Ward Office Organizational Chart



Source: Mumbai DMP, 2005

The population of K-West ward is estimated at about 850 thousand, of which about 400 to 450 thousand reside in unauthorized or slum areas. The wards are responsible to provide all types of civic amenities in their respective areas. Different line departments have their officials posted in each ward. Each ward has about 17-18 departments. While these officers and employees are administratively under the control of Assistant Commissioner, in charge of the ward, the concerned officers have direct access to their respective line departments at HQ, which in turn lays down the policy guidelines and approves proposals beyond the delegated powers of ward officers.

A ward office deals with construction/maintenance of roads, garbage collection, segregation and disposal, water supply, licensing of shops and establishments, drainage, de-silting operations, construction and maintenance of municipal properties, checks on un-authorized works, permission for factories, checks on use of hazardous materials, pest control supervision of municipal schools etc. There are about 60 municipal schools in K-West ward. The Education Department at ward level looks after the quality of education being imparted as also the mid-day meal program. The annual budget at ward level is allocated by respective line departments at HQ. Mock drills are conducted depending on the

vulnerability profile of each ward; mainly in building collapse, flooding, landslides and fire incidents. Low lying areas are identified in each ward (11 in K-West) and pumps are installed for drainage of water, which function is outsourced. There is an effort to maintain inventory of resources. Disaster Response Plans were stated to be in place.

PART V. SECTORAL INSTITUTIONAL ARRANGEMENTS

The legal, policy, institutional and regulatory framework at national, state, district and local level has been discussed in the preceding parts. However, it is desirable to establish linkages for each sector such as Disaster and Emergency Management, Land-use Planning, Urban Development and Redevelopment, Construction Regulations i.e. building, adoption, implementation and enforcement, Housing and Shelter (including slum rehabilitation), Health and Healthcare Delivery, Education, Water Supply Delivery, Sanitation, Waste Water Drainage, Solid Waste Management, Transport, Power and Communications.

Disaster and Emergency Management

While disaster management encompasses the entire cycle or phases from prevention and mitigation to rehabilitation and re-construction, emergency management has primarily dealt with immediate response, rescue, relief and evacuation, though globally it is now perceived to include prevention, mitigation, preparedness, response and recovery planning including risk reduction.. Disaster management is defined under the Disaster Management Act, 2005 as a continuous and integrated process of planning, organizing, coordinating, and implementing measures which are necessary or expedient for:

- Prevention of danger or threat of any disaster;
- Mitigation or reduction of risks of any disaster or its severity or consequences;
- Capacity building;
- Preparedness to deal with any disaster;
- Prompt response to any threatening disaster situation or disaster;
- Assessing the severity or magnitude of effects of any disaster;
- Evacuation, rescue and relief;
- Rehabilitation ad reconstruction.

The function of Emergency Management includes broad responsibilities such as:

- Crisis Management,
- Emergency Response,
- Post-event Rehabilitation and Recovery,
- Pre-event Planning,
- Capacity Building,
- Awareness and preparedness Activities, and
- Inter-sectoral and inter-institutional coordination pre-event, post-event and during an event.

Emergency Management therefore goes well beyond the traditional function of managing response (Draft EM Framework, DRMMP project). Similarly, a Disaster

Management Plan is a holistic plan covering all aspects of disaster management and also includes the Response Plan and Procedures in the event of a disaster, providing for---

- Allocation of responsibilities to the departments of the Government at the district level and the local authorities in the district;
- Prompt response to disaster and relief thereof;
- Procurement of essential resources;
- Establishment of communication links;
- Dissemination of information to the public; and
- Such other matters as may be required by the State Authority.

Inter-agency coordination among all relevant stakeholders is crucial in all facets of disaster management including emergency management. At the national level, the **National Crisis Management Committee** under the Cabinet Secretary, Crisis Management Group and the newly constituted **National Executive Committee** under Home Secretary oversee the coordination mechanism for prompt response and relief in case of a major disaster. At the State level, the **State Crisis Management Committee** and the **State Executive Committee** under the Chief Secretary are responsible to coordinate and extend requisite support for prompt and effective response. In Greater Mumbai, while the nodal agency for response is MCGM, it has to function in conjunction with other agencies such as Fire Services, Civil Defense and Home Guards, Armed Forces, National Disaster Response Force, State Specialist Response Teams, Civil Society, Youth Organizations, and above all, the community. There are specialized agencies to look after various allied sector in any disaster; MTNL and other telecom service providers for communication; civil Defense trained staff of MPT for first aid and search and rescue; MSEB, Tata Power and Reliance Energy for power generation including generator sets for affected areas, Health sector including both government and private hospitals as well as doctors and paramedics for health services and transportation through ambulances of injured and HPCL in emergencies like oil spills and accidents.

A state-of-the-art emergency management system:

- Uses a systematic approach and unified framework for managing disaster risk and preparing for, responding to, and recovering from emergency incidents;
- Provides for well-integrated and effectively coordinated emergency response and recovery operations, with clearly defined roles and responsibilities and seamless collaboration with governmental and non-governmental entities at every level; and
- Applies a core set of concepts, principles, standard operating procedures, organizational processes, common terminology, and standard requirements applicable to the range of participants in emergency management.

Specific elements or components of the system include but are not limited to: institutional framework, Incident Command System, Multi-agency Coordination System, Management Information System, Public Education, and Emergency Public

Information System. The Emergency Management Standard[43] provides a set of standards for 16 elements[44] which are considered necessary components of a viable emergency management program:

1. Program Management
2. Administration and Finance
3. Laws and Authorities
4. Hazard Identification, Risk Assessment and Consequence Analysis
5. Hazard Mitigation
6. Prevention and Security
7. Planning
8. Incident Management
9. Resource Management and Logistics
10. Mutual Aid
11. Communications and Warning
12. Operations and Procedures
13. Facilities
14. Training
15. Exercises, Evaluations and Corrective Action
16. Crisis Communications, Public Education and Information

.

For specific disasters like radiological, chemical and biological emergencies, specialized agencies have to be associated; Department of Atomic Energy, Bhabha Atomic Research Centre and specialist response teams of NDRF trained in NBC emergencies for radiological disasters; Department of Chemicals for chemical disasters and Health Department for biological disasters. It is therefore necessary that, for each specific disaster, a Coordination Committee of concerned stakeholders is set up and meet at regular intervals as well as jointly conduct mock drills to ensure adequate level of preparedness to meet such situations. The sectoral Standard Operating Procedures (SOPs) need to be put in place for role clarity of each stakeholder, based on the guidelines issued by NDMA for specific disasters.

It is in this background that disaster management is now internationally accepted as a multi-sector, multi-disciplinary and multi-agency inclusive activity and is no more perceived as a function of government agencies alone.

Land-Use Planning

The population growth in Greater Mumbai without corresponding increase in additional availability of land has been an area of major concern. The fact that about 55% of the population is located in slum areas has further compounded the problem. MMRDA is primarily concerned with land use planning and growth

43 International Association of Emergency Managers (EMAP)

44 Reference: Draft EM Framework, DRMMP Project

development in Greater Mumbai and works in close coordination with MCGM. The Regional Plan for MMR Region 1996-2011, provides a basic framework for the land use policies and indicates the directions for planning. The Regional Plan 1996-2011 was approved by Govt. of Maharashtra (Urban Development Department) in 1999. The MMRDA is responsible for implementation and monitoring of the Plan. It works in conjunction with MCGM. The MMRDA is responsible for the development of Mumbai Metropolitan Region (MMR) which comprises Megacity of Mumbai and rapidly growing hinterland. It is responsible for preparation of perspective plans, promotion of alternative growth centers, strengthening of infrastructure facilities and provision of development finance. Within the context of the policy framework incorporated in this document and the priorities listed, the following would possibly fall within the purview of the mitigation strategy:

- Safe sites
- Improvement and protection of landfill sites
- Control on land reclamation
- Shifting of storages and hazardous units from residential areas
- Decongestion

Prevailing urban planning practices follow the traditional techniques of land use zoning classifying disaster-prone areas as unsuitable for development. However, it is precisely along such tracts of zoned land that informal settlements mushroom, living in temporary and unsafe structures with little or no facilities for sanitation, drinking water, electricity and solid waste disposal. Even a hazard of low intensity attains disastrous proportions when it strikes communities living in such risky conditions. This scenario typifies the limitations of conventional planning techniques to control disasters in urban communities. The conventional city Master Plan is patterned on the demographic projection and decision on the levels at which the population will be contained; allocation of population to various zones depending on existing density level, infrastructure capacity and future density levels; land-use zoning to achieve the desired allocation of population and activities in various zones as projected; and large-scale acquisition of land with a view to ensuring planned development. The Strategy for Action may appropriately include reducing vulnerability at the level of the city, recognizing informal settlements in land use planning, reducing vulnerability at the level of the settlements within a city through mitigation measures: monitoring local land use changes, and directing effort to prevent mushrooming of new settlements in environmentally sensitive lands through putting available land to suitable alternate use. The currents trends can potentially be reversed provided a conscious strategy is adopted wherein informal settlements are incorporated as an essential component of the urban fabric. Land use decisions at local level need to recognize their presence and elicit their participation in monitoring. (Extracted from Paper on “Land Use Planning and Urban Risk Mitigation by Manu Gupta & Anshu Sharma of SEEDS, India). The potentials of regional dispersions in the MMR need to be further pursued by concerted strategies as proposed above.

Urban development and re-development

Mumbai's vision is to transform into a world class city[45] in the next two decades through inclusive economic and infrastructure development and significant improvement in equitable quality of life encompassing the entire population including economically and socially disadvantaged segments, which account for more than half of the population of the city. The McKinsey Study has emphasized vast improvement in six core area to achieve this objective—economic growth, transportation, housing, infrastructure development comprising safety, environment, water, sanitation, education and health care, financing and governance. Considering the dilapidated habitat across the entire city, re-development of such habitat has become an inescapable goal for the holistic urban development of the city.

An ambitious program has been undertaken for development of Greater Mumbai under the Jawaharlal Nehru National Urban Renewal Mission[46] (JNNURM), which aims at encouraging reforms and fast track planned development of the city. The focus is on efficiency in urban infrastructure and service delivery mechanisms, community participation, and accountability of ULBs/Parastatal agencies towards citizens. JNNURM comprises of two Sub-Missions, one for urban infrastructure and governance and the other for providing basic services to urban poor. The main thrust of the first Sub-Mission is on infrastructure projects related to water supply and sanitation, sewerage, solid waste management, road network, urban transport and redevelopment of old city areas with a view to upgrading infrastructure therein, shifting industrial and commercial establishments to conforming areas, etc. The thrust of the second Sub-Mission is on integrated development of slums through projects for providing shelter, basic services and other related civic amenities with a view to providing utilities to the urban poor. Disaster risk reduction needs to be integrated with all the components of the projects being taken up under JNNURM. The existing institutional and coordination mechanism need to be strengthened to incorporate these elements through proactive involvement of all concerned stakeholders including MHADA, MMRDA, SRA, MTNL and other telecom service providers for communication network, MSEB, Tata Power and Reliance Energy for electricity generation, transmission and distribution, MPT and Local Self Government systems. This will necessitate putting in place techno legal regime to make the existing infrastructure and habitat safer, training and capacity building, public-private partnerships and community participation and expeditious and lasting solutions to the problems of migrant population.

[45] Reference: Vision Mumbai: Transforming Mumbai into a world-class city, McKinsey Report, September 2003

46 Reference: http://jnnurm.nic.in/nurmudweb/toolkit/Overview.pdf

Construction Regulations

There has been deep concern about unsafe building constructions, particularly in urban areas. It has been recognized that rapid urbanization has resulted in accelerated constructions, which are not always in accordance with the municipal regulations such as development control regulations, building by-laws, Town and Country Planning Acts and building regulations with the result that structural safety features are often ignored resulting in unsafe construction practices. The National Disaster Management Framework had emphasized, as early as in 2002, the need to put in place a sound techno legal regime by the respective state governments. The salient features which had to be paid adequate attention were:

- Regular review of building codes and its dissemination (Action: Bureau of Indian
  Standards/Ministry of urban Development)
- Construction in seismic zones III, IV and V to be as per BIS codes/National Building Codes. (Action: State Urban Development Department/Urban Local Bodies)
- Construction in areas vulnerable to cyclones to be so designed as to withstand the wind hazard as per BIS codes/National Building Codes.(Action: State Urban Development Department/Urban Local Bodies)
- Comprehensive review and compliance of:
  - Town and Country Planning Acts
  - Development Control Regulations
  - Planning and Building Standards Regulations

  (Action: State Urban Development Department/Urban Local Bodies)
- Put in place appropriate techno financial regime (Action: State Urban Development Department/Urban Local Bodies)
- Capacity enhancement of Urban Local Bodies to enforce compliance of techno legal regimes (Action: State Governments)

This aspect has been particularly stressed in the Disaster Management Act, 2005, when one of the functions assigned to the Local Authorities is "to ensure all construction projects under it or within its jurisdiction conform to the standards and specifications laid down for prevention of disasters and mitigation by the National Authority, State Authority and the District Authority".

The National Guidelines issued by NDMA in April 2007 on Management of Earthquakes stress on the need for making all new constructions earthquake resistant; compliance with earthquake-resistant building codes and the modified techno-legal regime including the revised town planning by-laws, land use zoning, development control regulations and building codes by 30 June 2007; institutionalization of earthquake-resistant designs and constructions; compliance review; and time frame for compliance for different activities to put in place the revised techno-legal regime by December 2008. The National Policy on Disaster

Management brought out recently (October 2009) has further reiterated this aspect. It states that *"These (municipal) regulations will be reviewed periodically to identify safety gaps from seismic, flood, landslide and other disasters and suitable modifications will be made to align them to revised building codes of the Bureau of Indian Standards (BIS). Undesirable practices compromising safety during disasters, that tend to crop up from time to time, will need to be addressed in the regulations."* It even goes a step further when it states that *"The utilization of unsuitable areas for construction, without necessary safeguards further enhances vulnerability and needs to be guarded against through appropriate compliance mechanisms. Similarly, the introduction of suitable regulations for rural areas will also be emphasized. If required, local bodies shall be provided with suitable financial incentives for the preparation of appropriate regulations. This process will involve an all inclusive exercise involving due sensitization of governmental organizations at all levels, local authorities and the community at large to accrue maximum results thereof."*

Despite these statutory provisions and administrative directions, the modified construction regulations have not been put in place in entirety. Regulatory mechanism is somewhat weak since engineers in MCGM are neither trained nor has it been taken as a conscious responsibility by the respective engineering departments. No inspection of constructions is carried out by MCGM engineers and clearance is invariably given on the basis of private structural engineers/architects' certification, except in such cases where formal complaints are received. Besides MCGM, state agencies like MHADA, MMRDA, SRA, MSRDC and other agencies involved in constructions need to scrupulously follow the above mentioned mandatory provisions. The guidelines for JNNURM also need to be revised so as to include these provisions in mandatory reforms. At present, these requirements do not find a place even in optional reforms. This clearly brings out lack of coordination among different concerned Ministries even at national level. In Greater Mumbai, unless a vibrant monitoring and enforcement mechanism is put in place where all agencies involved function in a well-coordinated manner, the unsafe building stock is likely to proliferate further negating the structural measures being taken and making them unproductive, enhancing the disaster risks in constructions.

Housing and Shelter including slum rehabilitation

The housing shortage for middle income and economically weaker segments of population is well known. The key agencies responsible for providing low income housing as well as slum rehabilitation are SRA, MHADA and MCGM in Greater Mumbai. Of the estimated population of 13 million, about 55% is settled in slum areas. MHADA is at present responsible for rehabilitation and redevelopment of over 16,000 old and dilapidated buildings, down from 19,642 buildings which were entrusted to MHADA at the time of its establishment in mid-1970s. Over 16,500 of these 19,642 buildings are pre-1940 constructions. Needless to say, these buildings are located in the heart of the city, when it had hardly expanded. Most of these buildings are tenanted buildings, with nominal rents being paid by tenants and hardly any expenditure incurred on their maintenance. The structural designs of

these buildings are no more available and demolitions are also difficult unless a cluster of buildings are demolished and the entire habitat re-developed together. This again is not a very viable option since tenants are not prepared to be re-located to suburbs. This is probably one reason why their number has reduced by less than 20% over more than three decades. If a fresh survey of the post 1969 constructed buildings is now carried out, the number of dilapidated buildings could be very high. Building collapse is not an uncommon occurrence in Mumbai. A viable and realistic solution has to be found to complete the stupendous task of making these buildings structurally safe, by demolition and redevelopment in most of the cases.

Slum areas have come up over a period of several decades. Mumbai has the dubious distinction of having the largest slum 'Dharavi' in Asia. Over a period of time, a large number of the hutments *(Jhuggies)* have been converted into brick and mud constructions, unregulated and unauthorized, posing a grave risk of casualties even in minor disasters. Re-location in far flung areas is not a viable solution. It had been tried in Delhi few decades back when a sizable number of slum areas in Central and South Delhi were re-located in East Delhi in Trilokpuri/ Jahangirpuri in trans-yamuna colonies, with subsidized transport facilities. The *pucca* dwelling units allotted to them were disposed of by slum dwellers and fresh slums cropped up again in the same areas from where these had been re-located due to nature of work being undertaken by the slum dwellers which did not conform to conventional working hours (domestic servants, drivers, rickshaw pullers, construction workers and others working in small establishments in unorganized sector like dhabas. It has to be kept in view that in a city where almost 55% of the population lives in slums and belong to economically and socially disadvantaged sections of population and include migrants from other states or villages in the same state, such drastic "solutions" are not implementable. It is a complex problem which has to be solved with a humane approach with viable and practical options. An in situ rehabilitation program through re-development with temporary re-location for a short period in a phased manner may probably be workable provided it aims at inclusive development including development of basic infrastructure like water, power, sanitation, drainage etc. SRA, in conjunction with MCGM, has to evolve imaginative options. There is need to explore re-location in vacant lands available with government including railways, located in close proximity. Therefore, there has to be a well coordinated multi-sector approach involving agencies responsible for all the above mentioned sectors.

Health and Health Care Delivery

The MCGM has a key role to play in providing health care services in Greater Mumbai, besides the facilities provided by the state government and private sector. Of the total approximate bed strength of about 40,000, MCGM hospitals provide about 28%, State Government about 22% and the private hospitals about 50%. The bed strength is woefully inadequate, considering that the international norm is one bed for 550 people whereas in Greater Mumbai, it works out to one bed for about 3000 people. When seen in the background of the economically and socially

disadvantaged population and the high rates of private hospitals, except few charitable clinics, the health care facilities show a major gap in demand and availability. The same dismal position exists in case of OPD patients. The government hospitals are not as well equipped, both in terms of men and material resources, as required considering the pressure on health services. If this is the situation in normal times, it would be too difficult for government health care facilities to cater to the additional pressure in disaster situations.

The three major hospitals, KEM, SION and NAIR and 16 suburban hospitals have a bed strength of about 10, 700. During an emergency, about 25% of beds could be made available by discharging less serious patients. In addition, there is acute shortage of para-medical staff. Besides, doctors and paramedics in these hospitals are not trained to handle radiological, biological and chemical emergencies. These are few salient gaps which need to be bridged with further development of health care infrastructure as well as training and capacity building.

The main responsibilities of the Municipal Health Department in a disaster situation may be summarily categorized as follows:

- Organize emergency supplies of medicines and blood;
- Organize provision of ambulances, including heli-ambulances;
- Organize on-site treatment of injured with tagging and triage and their transport to hospitals;
- Provide treatment to the injured at hospitals;
- Organize post-mortem examination and corpse disposal;
- Undertake epidemic prevention measures;
- Involve and coordinate with Government and private hospitals and medical entities in the discharge of above functions;
- Pre-contract arrangements with private hospitals;
- Set up information centre for sharing of information with the media and the public.

Advanced arrangements need to be made during preparedness stage so as to facilitate the above measures in a disaster situation. The Municipal Health Department need to put in place an effective coordination mechanism with other stakeholders well in advance to ensure that the actions mentioned above could be taken immediately as a trigger mechanism in case of an emergency.

Education

Creation of public awareness through community education is an essential pre-requisite. Civil Defense, Civil Society, National Cadet Corps (NCC) and National Service Scheme (NSS) can play a useful role in promoting community's response in a well-coordinated manner. MCGM has been entrusted with the task of imparting free primary education to the children enrolled in its schools, which are managed and maintained by MCGM. In addition, MCGM also supports private schools through

its support program subject to eligibility and norms adopted by such schools. At present, almost 500 thousand students are being imparted education in 1188 municipal schools through different medium of instructions including Marathi, English and Hindi. The children need to be imparted elementary knowledge of applied aspects of disaster management in these schools such as do's and don'ts for specific disasters to which Mumbai is vulnerable; organized evacuation from schools so as to avoid stampede and ensure safety of younger children through conduct of mock drills, organization of essay/painting/debate competitions and elementary training in first aid and search and rescue to older children.

School safety programs may include both structural and non-structural measures. The municipal schools need to be inspected initially through Rapid Visual Screening (RVS) system and evaluated to enable MCGM to undertake retrofitting of schools at risk in a phased manner. MCGM may take advantage of Sarva Shiksha Abhiyan (SSA) (Education for all), a Government of India's flagship program for achievement of Universalization of Elementary Education (UEE) in a time bound manner for children of 6-14 years age group. The program seeks to open new schools in those habitations which do not have schooling facilities and strengthen existing school infrastructure through provision of additional class rooms, toilets, drinking water, maintenance grant and school improvement grants. Existing schools with inadequate teacher strength are provided with additional teachers, while the capacity of existing teachers is being strengthened by extensive training, grants for developing teaching-learning materials and strengthening of the academic support structure at cluster, block and district level. SSA seeks to provide quality elementary education including life skills. It has a special focus on girl's education and children with special needs. It also seeks to provide computer education to bridge the digital divide. SSA also seeks to bridge social, regional and gender gaps, with the active participation of the community in the management of schools.

MCGM needs to incorporate these features in all municipal schools to ensure quality education through active involvement of parents, non-governmental organizations, elected representatives, corporate sector and other stakeholders. Ward offices and other agencies should be closely associated to ensure well-coordinated and synergic approach.

Water Supply Delivery

The Hydraulic Engineering Department of MCGM is responsible for water supply in Greater Mumbai. There are two rivers in Greater Mumbai, Dahiser River and Mithi River. . There are no rivers in Mumbai City District. There are three dams in Mumbai Suburban District namely, Tulsi, Vihar and Powai. All the above three dams are impoundage on lakes. Mumbai receives its water supply through these dams and other dams located in Thane district. The total requirement of water, residential, commercial and industrial taken together, projected for 2011 is 4526 MLD (Million Litres per day). However, the total supply available to the city at present is about 3100 MLD. Several schemes have been taken up to augment the

water supply but it is doubtful these would be able to keep pace with the increasing population. Despite the fact that, of the total 242 thousand metered connections, over 162 thousand metered connections have been provided in slum areas, there are still over 75 thousand un-metered connections. Due to the fact that demand exceeds supply, an intermittent supply regime is operated whereby each supply zone is 'charged' for 2 to 6 hours per day. This is the root cause of contamination due to ingress of foul water during non-supply hours through joints, disused connections, tampered mains, faulty fittings etc. (Source: City Development Plan, Mumbai, prepared under JNNURM)

One of the immediate functions of MCGM during a disaster, coordinated through the DM Control Room with the support of all other control rooms for the activities of their respective organizations/ departments is emergency supplies of water and cooked food. This will require mobilization of large number of water tankers. Besides repairs of water sources/pipelines, where damaged, at the earliest, is crucial. In case of fire incidents, it has to be ensured that there is uninterrupted water supply through fire hydrants, which need to be functional at all times. A detailed SOP needs to be put in place for this purpose by the Hydraulic Engineering Department of MCGM in close coordination with Fire Services Department. Lack of coordination at field level between these two organizations has already been identified as a major gap which impedes fire fighting arrangements.

Sanitation & Solid Waste Management

Sanitation is a part of health management as also solid waste management. Cleanliness, even in small cities, is a major problem due to lack of civic sense and living conditions. In mega-cities like Mumbai, it approaches alarming proportions due to slum areas and lack of sanitation facilities including adequate number of clean toilets. Mumbai does not have adequate number of way-side toilets and urinals which further add to an already complex problem. MCGM is responsible to ensure proper civic amenities for the inhabitants. However, even with state of the art facilities, the desired level of sanitation cannot be achieved without the cooperation of people which requires an aggressive strategy encompassing awareness and education coupled with deterrent measures. When one considers the population of Mumbai, over 55% living in slums and the culture of urinating on the road side and dumping of garbage, spitting, pan-chewing, etc, no easy solutions are in sight.

Conscious of these complex issues, an Advanced Locality Management[47] (ALM) program was initiated by MCGM in 1998 with the Partnership between Citizens for sustainable & environment friendly waste management. It was launched at Joshi Lane and to date there are 658 ALMs in all 24 wards of Mumbai. Under this program, the citizens take an initiative to form a committee of selected

47 Reference: http://www.cleanupmumbaicity.org/cleanup/peoplepart.php

representatives from the different apartments, lanes and get it registered with the ward office. Officer on Special Duty appointed by MCGM explains the concept and the role of MCGM & ALM in the public meeting. ALM is a volunteer service wherein citizens organize meeting in their neighborhood to create awareness about segregation of waste, cleanliness and also take steps to prevent littering, spitting & other encroachment by hawkers & vendors; encourage waste pickers organizations in collection and processing of dry waste; take up cleanliness drives in their neighborhood; and support MCGM in introducing gate to gate collection.

As a mentor-partner, MCGM supports the ALMs by appointing nodal officer in their respective areas to monitor the grievances of the neighborhood. It conducts monthly meetings with various representatives of ALMs at ward level to sort out civic issues related to their neighborhood. MCGM also provides technical know how about composting & vermin composting; resolve grievances of citizens regarding waste and street management, generate awareness and organize publicity in co-operative Societies, residential welfare Association, schools, colleges, hotels and institutes about the ALM concept.

ALMs neighborhoods have taken up waste management at source and at neighborhood level which have resulted in garbage and bin free street, clean drains, better cleanliness, sanitation and hygienic conditions. ALM has good volunteers for vigilance, safety and prevents illegal hawking on high-priority areas. Tree planting on streets and lanes is taken up in large scale. ALMs are working beyond waste management on other environmental issues and are practicing environment friendly activities such as water harvesting, composting, and recycling of dry waste and harvesting solar energy; educating and mobilizing citizen's neighborhood areas for carrying the ALM activities. ALM supports MCGM by supervising utility services such as electric supply cables and offences are brought to the notice of the concerned authorities which partly reduce expenditure of public money due to proper waste management. No financial support is provided, but incentives are given to ALMs in terms of Privilege Cards, awards at ward level.

There is no doubt that ALM has proved to be an excellent program for creating awareness, ensuring sanitation and proper measures for solid waste management in the areas where it has been implemented. It has also been replicated in Delhi and Bangalore. It has also been deeply appreciated by delegates from Japan, South Africa, Nepal and Sri Lanka. It is also recognized as one of the better programs in the City Management Association. Organization such as World Bank, UNDP, CEE, UNICEF & UNEP have appreciated ALM program.

Despite its success, it calls for some introspection. Its outreach is limited even in Greater Mumbai, the city which conceived it. The potential of the program has probably not been realized fully. This Scheme goes beyond sanitation, cleanliness, solid waste management and similar other initiatives. This scheme has the potential of the involvement of the community in all facets of disaster management. The program needs to be given wide publicity and extended to all

nooks and corners of Mumbai. Media needs to be involved fully in the operation of the program. Can we make "sanitation" a household theme? It depends on how far MCGM, stakeholders and the community are motivated to take forward this program.

Yet another progressive scheme undertaken by MCGM is Slum Adoption Scheme[48] (SAS). Over 55% of the population of Mumbai resides in slum areas due to housing problems. These slums are characterized by unhygienic and poor sanitation conditions. MCGM initiated a cleanliness scheme in 2001 in those slum areas where cleanliness services were not provided by the MCGM. The scheme is popularly known as Slum Adoption Scheme i.e. (Dattak Vasti Yojna). The participants included registered local groups of Slum dwellers as CBOs under Charity Commissioner's Office of Cooperative Register Office. The CBO should be at least two years old. CBOs apply to the concerned Asst. Commissioner of their respective ward along with the population covered, certified by the Health Department of concerned ward and maps of proposed Slum Pockets with the supporting documents. Asst. Commissioner issues the work order for implementation of SAS to the CBO within defined geographical area of slum and specific number of population.(i.e. one unit consisting of 200 house-holds or 1000 population). The Cleanliness Activities expected by the CBOs under SAS are:

- Door to door garbage collection;
- Cleaning of Nallas and Gutters
- Cleaning of Pathway by lanes internal roads and public places.
- Cleaning of Pathway by lanes internal roads and public places.
- Cleaning of Public Toilets & improving overall cleanliness in slum areas
- Encouraging Slum Dwellers for Segregation of garbage.
- Creating awareness amongst the Slum Dwellers regarding cleanliness and role of being a responsible Citizen.

MCGM extends the following support to CBOs under SAS:

- Financial assistance to the CBOs with a budget of INR 320 million.
- Overall monitoring and evaluation of SAS.
- Capacity building of CBO's such as Training and providing know how to the CBOs
- Encourage Slum Dwellers to pay charges to the CBOs at Rs.10/- per family per month.

The positive outcome of SAS may be summarized as given below:

- Scope of Cleanliness Services has been enhanced in the non-service areas of Slum Pockets, where the cleanliness services were absent.
- At present SAS is being implemented through the 419 CBOs and provides cleanliness services to approximately 700 thousand Slum Population

[48] Reference: http://www.cleanupmumbaicity.org/cleanup/peoplepart.php

- To undertake Solid Waste Management Activities in the critical areas such Slums, a process of social mobilization is initiated.
- There is improvement in the overall cleanliness and hygiene in slum areas.
- Awareness increased about the cleanliness in the slum areas.
- SAS has been appreciated on number of occasions by the Delegations of International Organizations such United Nations (World Habitat), World Bank, and UNICEF.
- SAS has received 'GREEN LEAF' award presented by Hyderabad based Exnora.
- Formed partnership with various International NGOs such as UNICEF, United Way, CEE, FORCE, Garbage Concern and other like minded NGO's and Corporate Bodies.

The Municipal Corporation of Greater Mumbai has framed by-laws under section 461 of MMC Act for Regulating all matters and things connected with the collection, removal and disposal of solid waste. These by-laws shall be known as Greater Mumbai cleanliness and sanitation by-laws, 2006. These by-laws inter alia provide for prohibition of littering, and other nuisances and ensuring "Clean Aangan[49]". It prohibits littering in any public place, any private property, throwing litter from vehicles, carrying litter in unauthorized vehicles, creating public nuisance by cooking, bathing, spitting, urinating or defecating in public places.

The by-laws provide that every generator of Municipal Solid Waste shall separate the waste at source of waste generation into the following six categories and shall store separately, without mixing it for delivery in authorized private/ public receptacles:

- Bio-degradable (wet) waste,
- Specified hazardous waste,
- Bio-medical waste,
- Construction and demolition waste,
- Bulk garden and horticulture waste including recyclable tree
- trimmings,
- All other no biodegradable (dry) waste including recyclable and non-recyclable.

The Municipal Commissioner may separately notify different stages for implementation by initially limiting these above categories taking into account the level of awareness among generators of waste as well as availability of infrastructural support in the city. He shall separately notify from time to time the mandatory color coding and other specifications of receptacles prescribed for storage and delivery of different types of solid waste to enable safe and easy collection without any manual handling or spillage of waste, which generators of

[49] Aangan" means the public place in front of, or adjacent to any premises, extending to the kerb side and including the footpath kerb and water table

different types of solid waste shall have to adhere to. Besides, It shall be the duty of every generator of municipal solid waste, either owner or occupier of every land and building to collect or cause to be collected from their respective land and building, the segregated waste and to store and deliver the same to either municipal worker or vehicle deployed by MCGM for the purpose. Segregated Bio-degradable Municipal Solid Waste, if not composted by the generator, shall be stored by generators of such waste within their premises and its delivery shall be ensured by every such generator to the ghanta-gadi or to the bio-degradable waste collection vehicle provided for specified commercial generators of bulk bio-degradable waste. Local composting of waste shall be promoted to minimize transportation of waste.

Specified household hazardous waste shall be stored and delivered by every generator of waste to the collection vehicle, which shall be provided weekly/periodically by MCGM or any other Agency authorized by the Maharashtra Pollution Control Board (MPCB) for collection of such waste, or to a center designed for collection of such waste for disposal in a manner that is mandated by the Government of Maharashtra or the Maharashtra Pollution Control Board. Untreated bio-medical waste shall be collected & stored in specified type of covered receptacles and delivered by every generator of such waste to the collection vehicle which shall be provided weekly/periodically by MCGM or any other Agency authorized by the Maharashtra Pollution Control Board, or to a center designated for collection of such waste, for disposal in manner that is mandated by Maharashtra Pollution Control Board in accordance with the Bio-Medical Waste (Management & Handling) Rules, 1998. Construction and Demolition waste shall be stored and delivered separately at such spot and at such time as notified by MCGM or its agent for collection of such waste. Small generators (household level) shall be responsible to segregate the construction & demolition waste at source by contacting a local help-line of MCGM or the Agent who shall then send a vehicle to pick up such segregated construction & demolition waste on payment of necessary charges and transport this waste to a processing centre. All other Non-biodegradable ("Dry") waste – both recyclable and non-recyclable – shall be stored and delivered by every generator of waste to the dry waste collection vehicle or to the licensed dry waste sorting centers Non bio-degradable waste shall be handled as per the Rule 3 (2) (i) of Maharashtra Non Bio-degradable Solid Waste (Proper & Scientific Collection, Storing & disposal in the areas of Municipal Corporation) Rules, 2006.

As for bulk garden and horticultural waste, it shall be kept un-mixed and composted at source. The Superintendent of Gardens or the concerned Assistant Commissioners shall notify Instructions/ guidelines with regard to pruning of trees and storage and delivery of tree trimmings including collection schedules. MCGM shall continue to collect and transport segregated garden and horticultural waste by charging suitable fees as notified by it from time to time. Disposal by burning of any type of solid waste at roadsides, or any private or public property is prohibited. MCGM shall provide for the collection of municipal solid waste from premises of a building or group of buildings from waste storage receptacles kept on the premises to which MCGM vehicles / workers shall be provided access. MCGM shall release

publicly, the monthly data about the quantity of waste going to the different landfills and waste processing sites. Such information shall be available at the Ward Office and on MCGM website. MCGM shall also provide and maintain suitable community bins on public roads or other public spaces, as determined by MCGM. It shall also make provision for collection at source or point-to-point collection by ghanta-gadis at the required frequencies and shall notify the same on MCGM website from time to time. The Chief Engineer of Solid Waste Management Department, shall strengthen the existing system of Nuisance Detectors by providing suitable uniforms and vehicles to Nuisance Detectors. MCGM shall publicize the provision of the by-laws through the media of signs, advertisement, leaflets, announcement on radio and televisions, newspaper articles and through any other appropriate means, so that all citizens are made aware about their legal duties and about MCGM's recycling, refuse & anti-litter services and fines[50].

Though these by-laws have been put in place, MCGM's capacity to deal with the issue of solid waste management is somewhat limited. At present, over 7,000 MTs of waste is generated every day. Besides, MCGM is required to undertake daily sweeping of roads. It has about 400 vehicles, supplemented by about 600 private vehicles. The number of vehicles needs to be augmented. Besides, supervision of daily sweeping of roads and collection of waste material itself is a colossal task. Besides, the three dumping sites, which have been in use ranging from 18 to 51 years, have almost outlived their carrying capacity and fresh dumping sites need to be identified. Technological innovations need to be introduced so as to minimize the amount of waste to be land filled. This being the situation in normal times, waste management would present several complexities in a disaster situation as is observed during floods or heavy rainfall almost every year. During the floods due to torrential rainfall of almost 100 cms. within 24 hours in 2005, carcass disposal had posed a major problem. In case of a major earthquake, the problem would be compounded many-fold for disposal of dead bodies, keeping proper records for identification purposes and having regard to the sentiments of different religious groups. Decomposition of dead bodies and carcasses may result in major health hazards through spread of epidemics. A pro-active Roadmap with supporting SOP therefore needs to be put in place well in advance with the involvement of other stakeholders since it is not a function which can be discharged by MCGM alone. Armed Forces normally do not assume the responsibility of disposal of dead bodies and carcasses. The role of Civil Defense and voluntary organizations therefore assumes critical importance to deal with such situations for which there is need to impart adequate training and build capacity.

Waste Water Drainage

The first sections of sewerage system for Mumbai City were developed in 1860 after the first piped water supply from Vihar Lake was established. At that time, the sewage was simply discharged into the harbor. The first marine outfall was

[50] Reference: www.mcgm.gov.in and *City Development Plan, Mumbai, prepared under JNNURM*

constructed at Worli in 1880 and by 1900, much of the city flow was directed to Lovegrove. As the city expanded, the system was developed further and, before Second World War, Dadar sewage treatment plant was constructed. After Independence, relief works were constructed but it was based on very low population forecast. Pumping stations were developed at Khar and Kurla in 1955, at versova in 1959, at Dharavi in 1964 and at Kherwadi in 1971. Over the years, 28 pump stations and 11 ejector stations in 1079 were increased to 56 pump stations including 4 private pump stations.

At present, the collection and disposal of waste water and sewage in Mumbai is divided into seven zones, viz., Colaba, Worli, Bandra, Versova, Malad, Bhandup and Ghatkopar. From each of these, sewage and waste water is conveyed to the respective final discharge points for disposal through marine outfalls. There are 56 pumping stations for pumping the sewage/waste water from lower level to higher level and 54,000 manholes for maintenance of 1,400 km long network of the sewerage system. The Department of Sewerage Operations of the MCGM is responsible for collection, conveyance and disposal of sewage/waste water generated in the residential, commercial and industrial premises in Mumbai. The underground drainage pipes of the sewerage system in Mumbai are more than 100 years old and need renovation. In congested parts, the sewerage lines and water pipelines run together and leakages contaminate drinking water. The growth of the city at rapid pace, sometimes unplanned and unauthorized has made it difficult to replace old sewerage lines. The problem of sewer lines of small diameters getting choked due to solid waste and silt entering them is rampant. The result is that instead of getting drained, sewage overflows to the surface. The problem has become more complex since a large percentage of the city's population has no access to even this already overloaded system. While toilets in the buildings and establishments are connected to the underground sewerage system, this facility is not available to at least 50% of slum dwellers. When one takes into account that about 3.5 to 4 million slum dwellers have no option but to ease themselves in the open spaces, along roads, highways, railway tracks, parks, playgrounds, open plots and beaches, the enormity of the problem becomes self-obvious. During monsoons, the excreta flows through open drains and nallas into the storm water drains and gets discharged right near the coast.

Around the mid-1990s, the Mumbai Sewerage Disposal Project (MSDP) was undertaken under the World Bank (WB) funding of INR 1,2000 million to improve the sewerage system of the city. This was used to set up the Bandra and Worli marine outfall systems and improving old sewage lines. Since slums did not have the facility of underground drainage, it was later decided that the population in the slums needed to be provided with underground drainage system. Although this project commenced in 1997, it did not make much progress since slum residents were expected to form a society with a contribution of Rs100 per household, which did not materialize adequately. Since then, it has gradually picked up and 193 toilet blocks have been constructed and are functional, while work is going on for construction of additional 307 toilet blocks. This effort is at least a beginning. On the

other hand, an ambitious plan has to be worked out for providing underground drainage connectivity to slum areas as well as modernizing the drainage system.

The key issues and concerns to be addressed, as identified in the City Development Plan, Mumbai, prepared under JNNURM, are:

- Though the capacity of sewerage network and treatment plants to handle the sewage volume is fairly high, 60% capture of sewage is inadequate.
- Sewer lines in most places are over 100 years old and in dilapidated condition, which needs to be modernized in a phased manner.
- Sewage conveyance to the terminal pumping stations/ treatment plants for final disposal, which ranges between 50 to 60 per cent at present, is insufficient.
- There is need to provide new sewerage network to collect the sewage, improve/extend sewage conveyance system, pumping stations, treatment and disposal facilities for population projection for 2025.
- Slum areas have to be connected to the updated sewerage system.
- Public awareness has to be generated among slum dwellers so that there is no problem in providing the facilities at the earliest.

The MCGM already propose to take up Phase II of the Master Plan to take care of these issues. It has to be kept in view that if this situation prevails in normal times, the position is likely to be worst in disaster situations. One option may be to pre-identify the open places where evacuated population, post major disaster, may be temporarily settled in relief camps and provide these facilities at such places in anticipation. In any case, these facilities may be utilized in normal time also since there is already lot of pressure on existing facilities for waste water management and sewerage system. This will need a coordinated approach involving, besides MCGM, SRA, MMRDA, MPT, MSRDC, Western and Central Railways (they might have open spaces under their control), elected representatives and civil society volunteers.

Transport

Public transport requirements in Mumbai are primarily met through the suburban railway system and road transport facilities provided by BEST, which is coordinated with the Railways Transport System. The travel demand in Mumbai is estimated at about 200 million person trips daily, of which over 85% are undertaken through mass transport system- suburban railways and buses. The remaining 15% trips are undertaken through taxis, Auto-rickshaws and private vehicles. Although the passenger traffic using local train system has increased almost six times since its inception, the capacity of suburban train system has been enhanced to about 2.3 times, leading to congestion in trains, particularly at peak hours. The road transport carries about 4.2 million passengers per day. It also provides support services from railway stations to the interior of the colonies.

MCGM, Railways, BEST and MMRDA function in close coordination to provide optimum transport facilities.

Mumbai has probably the most efficient public transport system among all metropolitan cities in India. Despite this fact, it is increasingly finding it difficult to cope with increased demand. As a result each train on an average carries passengers more than 2.5 times its capacity, leading to acute congestion. The position of traveling in buses, particularly at peak hours, is equally bad. The main reason is that the rail and road systems of the city have not been able to keep pace with the rapid growth in traffic. The major bottlenecks are:

- Inadequate capacity of main arterial roads, the Eastern and Western Express Highways,, to meet increasing traffic volumes
- Poor riding surfaces in internal roads, particularly during post-monsoon periods
- Traffic bottlenecks resulting in slow traffic and environmental pollution
- Overburdened suburban rail system
- Outdated intermediate public transport vehicles like taxis and auto-rickshaws
- Encroachment on road-sides by hawkers and shoppers, particularly at evening peak hours

Some of the key projects undertaken/proposed to improve the urban road infrastructure and transport system in Greater Mumbai include, Mumbai Urban Transport Project I and II; Mumbai Metro Rail Project; Development of Western Sea Link; Development of Eastern, Western Highways and Link Road; Development of Mumbai Trans Harbor Link; Introduction of High capacity Bus Transit System and Dedicated Bus Lanes; Passenger Water Transport both on East and West Coast; and up-gradation of Taxi Services. MMRDA is carrying out a fresh comprehensive transport study for the entire Mumbai Metropolitan Region aimed at formulation of a transport strategy, identification of a planned program of transport investment and recommendation for transport improvements as part of the long term strategy. (Reference: City Development Plan, Mumbai, prepared under JNNURM)

According to a World Bank report, the main objectives of the Mumbai Urban Transport Project in India are to ease traffic congestion and develop an environmentally responsible transport system in the city of Mumbai to:

- Rehabilitate the Mumbai Metropolitan Region (MMR) transport system;
- Reduce vehicle admissions and improve air quality;
- Strengthen capacity within the transport sector to better plan, develop and implement transport policies, strategies and investments;
- Build institutional capacity and operational procedures to resettle people negatively affected by the changes to the transport system; and
- Prepare feasibility studies and engineering plans for future investments and institutional changes.

While these objectives will no doubt be taken into consideration while formulating projects for transport sector in Greater Mumbai, it is observed that neither the Mumbai City Development Plan nor its appraisal under JNNURM, or, for that matter, the World Bank report extracted above, pays particular attention to the transport bottlenecks which may arise in disaster situations, particularly if main arterial roads are breached or obstructed. The Flood Situation in 2005 has already highlighted this complex issue. The JNNURM has not included disaster risk reduction either as a mandatory or optional reform. It is considered that, while developing the DPRs, this gap will be recognized and action taken to develop the strategy to provide alternate systems for movement of operational teams and equipments and transport of injured to hospitals.

Power

The electricity requirements of Greater Mumbai are met by the Tata Hydro-Electric system through three distribution agencies; namely the Brihan Mumbai Electric Supply and Transport Undertaking (BEST) in the island of Mumbai, the Brihinmumbai Suburban Reliance Energy covering areas of the western suburbs and southern parts of eastern suburbs and the Maharashtra State Electricity Board (MSEB) covering the northern areas of the eastern suburbs. The BEST is supplying electricity in Mumbai City area from Colaba to Sion/Mahim, over the area of 60 sq.kms. The BEST Undertaking is purchasing the electricity from Tata Electric Companies (TEC) and distributing the same in Mumbai City. They are purchasing electricity from TEC at four points located in Mumbai City area, namely, Carnac, Parel, Mahalaxmi and Dharavi Receiving Stations. In all, there are 42 receiving stations. Electricity distribution is undertaken through the network of 1927 substations and HV & LV underground cables. The substations are located at different locations in the entire area of their supply. There are two control centers. All these 42 receiving stations, 1927 substations and two control centers are very important installations from the point of view of distribution and supply of electricity.

While the overall electric supply position in Mumbai is quite satisfactory, care has to be taken to put in place alternate systems in case of disruption of electric supply in a disaster situation. Adequate number of Generator Sets may be maintained to meet the emergent operational requirements in case of disruption in electric supply in the event of a disaster.

Communications

One of the key components of the National Disaster Management Framework (National Roadmap), based on which state governments were advised to develop their respective State Roadmaps, was to ensure that communication linkages which will be functional even post-disaster, are put in place from national, state, district down to the village/ ward level. It is well known that in any major disaster, normal

communication channels are invariably the first casualty. The National Policy on Disaster Management has, among others, highlighted the following objectives:

- Developing contemporary forecasting and early warning systems backed by responsive and failsafe communication with information technology support.
- Promoting a productive partnership with the media to create awareness and contributing towards capacity development.

The National Policy further states "*It is most essential to establish, upgrade and modernize the forecasting and early-warning systems for all types of disasters. The nodal agencies responsible for monitoring and carrying out surveillance, for specific natural disasters, will identify technological gaps and formulate projects for their up-gradation, in a time bound manner. All States should provide to India Meteorological Department the required infrastructure for upgrading/establishment of meteorological observation systems. Partnership with the World Meteorological Organization (WMO), Pacific Tsunami Warning System and other regional and global institutions may also be considered. ICT tools need to be used for data receptions, forecasting and timely dissemination."* It goes on to elaborate further that " *Communication and sharing of upto-date information using state-of the art IT infrastructure remain at the heart of effective implementation of the disaster management strategy. Reliable, up-to-date and faster sharing of geo-spatial information acquired from the field or the affected areas is a pre-requisite for effective implementation of disaster management strategies. Efforts should be made for setting up IT infrastructures consisting of required IT processes, architecture and skills for quick up-gradation and up-dation of data sets from the Panchayati Raj Institutions or the Urban Local Bodies. A National Emergency Communication Network, involving the contemporary space and terrestrial-based technologies in a highly synergistic configuration and with considerable redundancy, will be developed. This Network will ensure real time dissemination of warnings and information up to the affected community and local authorities*"

In Mumbai, there is a multiplicity of Control Rooms or Emergency Operation Centers, as indicated below:

- Police Control Room
- BMC Control Room
- Fire Brigade Control Room
- Central Railway Control Room
- Western Railway Control Room
- Konkan Railway Control Room
- District Control Room for Greater Mumbai district
- District Control Room for Mumbai Suburban district
- Civil Defense Control Room

There is need to have in-built linkages so that these control rooms function in a well-coordinated manner. In fact, the MCGM or Police Control Room should

assume the function of the nodal control room so that people have just one common number to report any emergency or seek essential services including health services like ambulances; except perhaps railways which again may have a common number for public interaction. An Instant Alert Messaging System also needs to be put in place to disseminate early warnings and up-dates to all concerned on real time basis.

The Communication Network may have triple redundancy so that in the event of failure of one channel of communication, the other channels are functional. In addition to the conventional communication channels, the linkages with POLNET, NICNET and SPACENET could be provided to improve the existing communication mechanism.

Inter-Agency Coordination

Disaster management implies a multi-disciplinary and multi-sector approach. There are several stakeholders in Greater Mumbai, besides MCGM, which have to discharge key responsibilities such as Fire Brigade, BEST, MMRDA, Mumbai Police, Traffic Police, Home Guards and Civil Defense, District Collectorates (City & Suburban), India Meteorological Department (Regional Office), Railways (Central & Western), M.T.N.L, Electric supply agencies and several other agencies including Armed Forces, NDRF, Civil Society to name a few.(see Annex 1 for the list of 119 Stakeholders). A multi-sectoral institutional arrangement, linking these agencies on sector-wise functional basis is a pre-requisite for prompt and efficient discharge of functions assigned to each agency, while avoiding duplication of efforts. An Inter-agency coordination committee for each sector, if put in place, may go a long way to ensure synergy of action in normal as well as disaster situations. For this purpose, each organization need to designate a Nodal Officer as an alternate Nodal Officer to participate in the sector-wise meetings, assist in organizing mock drills and report on pro-active actions taken by each organization. This would work as an effective institutional arrangement for each sector.

PART VI. DRM INSTITUTIONAL LINKAGES IN GREATER MUMBAI

DRM Activities

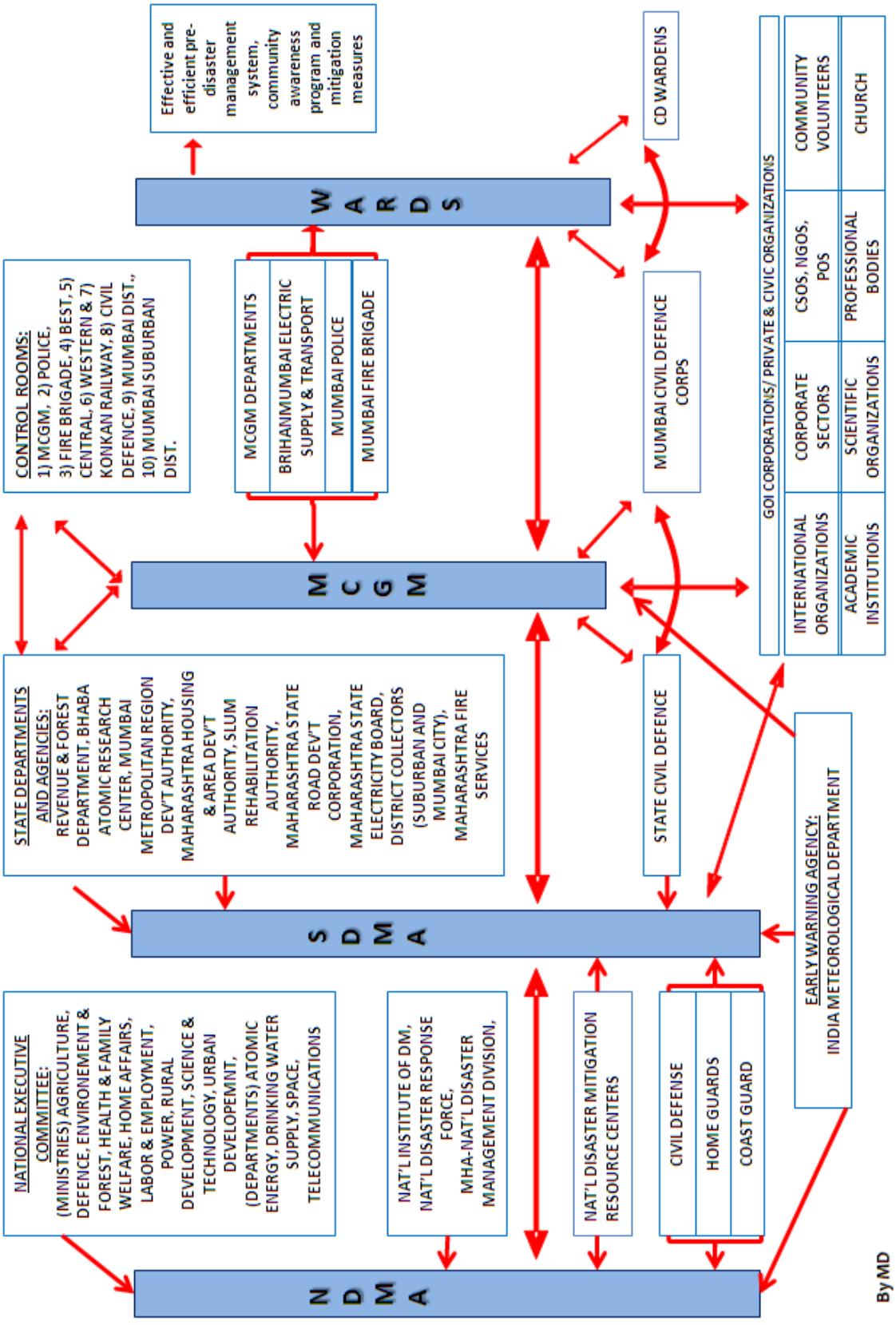
Disaster Risk Management is the systematic process of using decisions, organization, skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural and human-made disasters (UNISDR, 2005). DRM activities comprise of a wide range of actions that aims to prevent and mitigate hazards and prepares the city for potential disasters. These activities include measures to minimize the impacts of hazards, reduce vulnerabilities of people and places and increase social resilience. Some of the actions and initiatives performed by authorities and institutions in Greater Mumbai are explicitly categorized as disaster risk management activities such as but not limited to contingency planning and emergency preparedness. Other activities however, like land use planning, reinforcement of vital facilities (e.g. communication lines), flood proofing of roads and other public works are important measures undertaken to reduce disaster risks and improve resiliency of the city.

The responsibility for carrying out all the activities and tasks of disaster risk management does not fall under one single institution. DRM traverses the lines of responsibility of several government, private, academic, and non-government organizations. Government institutions in all levels are mandated by law to formulate a Disaster Management Plan following a set of guidelines provided by NDMA and taking account their respective area and scope of responsibility. Likewise, private institutions, particularly those that provide vital services such as health, electricity, water and communications are encouraged to have a DMP that covers their facilities, resources and emergency operating procedures. Academic institutions and non-government organizations also provide research results, insights and, depending on the nature of the organization, resources to augment/assist emergency and rescue operations. At times, the performance of these activities requires inter-institutional coordination in order to share technical expertise, roles and mandates, and pooling of resources.

DRM institutions

Disaster Risk Management for Greater Mumbai entails the participation and active involvement of different institutions during emergencies and in the conduct of disaster risk reduction activities. As key stakeholders, the role of these institutions in disaster risk management maybe direct or indirect, minimal or substantial. Figure 10 below provides a picture of the network of DRM institutions affecting Greater Mumbai. It shows the dynamics of institutions conducting DRM related functions in Greater Mumbai.

Figure 10: Institutional Dynamics for DRM in Greater Mumbai



The enactment of the Disaster Management Act of 2005, creating Disaster Management Authorities at the national, state and local levels and the NIDM and NDRF, is expected to bring about a unified, coordinated and multi-disciplinary approach to disaster risk management. NDMA takes care of inter-departmental coordination among central government agencies whose functions ranges from health; water resources, agriculture, environment and forest; energy and telecommunications; science, technology and space; urban and rural development; labor; defense; and internal affairs. Supporting the NDMA are its research and training arm (i.e. NIDM), its rapid response force (i.e. NDRF) and the DMAs from the States and Districts. The National Disaster Management Division, under the Ministry of Home Affairs, also conducted DRM activities in collaboration with the NDMA.

The Central Government participates in disaster response operations only if the gravity of the disaster requires a massive scale of relief operations that needs central government assistance to augment the financial and logistical resources at the disposal of the state and city governments. The Central Relief Commissioner (CRC) in the MHA is the nodal officer to coordinate relief operations for natural disasters through a Crisis Management Group (CMG), which also coordinates with the nodal officers in each concerned Ministry, Department and Organization to manage an emergency situation. Through the National Disaster Mitigation Resource Centers, embedded with the NDRF Battalions, the relief goods from these repositories are distributed to the affected States. The Home Guards and Coast Guards are on monitoring status and will be summoned and join the Civil Defense during disasters. Early warning of a natural calamity is given by the India Meteorological Department to the CRC.

The NDMA also reviews the status of warning systems, mitigation measure and disaster preparedness as part of its monitoring and advisory functions. In recent years the approach of the central agencies is gradually shifting from mere emergency management to encompass risks reduction, mitigation, vulnerability assessment, communication and improvement of coordination among agencies concerned with DRM. However, most of the important aspects of disaster risk management under the present legal regime however are vested in State officials. The laws with respect to relief works for the victims of natural calamities are likewise within the purview of State responsibilities.

The State Government of Maharashtra prepares a comprehensive State Disaster Management Plan and undertakes risk assessment and vulnerability analysis. These studies address the vulnerability of various districts, blocks, talukas and clusters of villages to earthquakes, floods and cyclones, epidemics, road accidents, fire, and chemical and industrial disasters. This initiative is under the auspices of The Relief and Rehabilitation Division (under the Revenue and Forest Department in the Government of Maharashtra) as the nodal agency for disaster management in the state.

Most Maharashtra State agencies and institutions also play key roles in the DRM activities in Greater Mumbai. As a local unit, MCGM departments and agencies also has coordination mechanisms with these State level institutions (Mumbai DMP 2005). SRA conducts survey of slums and provides information to MCGM on conditions in slum areas. It also formulates and implements slum rehabilitation schemes, improvement clearance and redevelopment of slums. MHADA conducts structural assessment, structural retrofitting, formulates contingency plans, emergency plans and evacuation plans for MHADA buildings in Greater Mumbai, and informs at-risk households by publishing results of their findings. MHADA and MMRDA also maintain resources for rescue, relief and evacuation that can be mobilized in the event of a disaster. MMRDA maintains equipments for disaster relief and response to MCGM. MMRDA and Civil Defense provide information as well as technical support to MCGM mitigation activities. Civil Defense conducts regular preparedness trainings, youth program, awareness campaign, evacuation drills, and action planning. MSRDC ensures that the public infrastructure that it is building is disaster resilient. MSEB extends support service in times of disasters. BARC crafted systems for radiological emergencies.

In cases of disasters of exceptionally large magnitude which require co-ordination with wide range of lateral agencies including central government agencies, the Additional Chief Secretary (Home) will assume the responsibility of Disaster Manager for Mumbai. In this situation, the Maharashtra Fire Services will be involved and will join the first responders like the Mumbai Police and Civil Defense.

The Municipal Corporation of Greater Mumbai (MCGM) is at the center of disaster risk management network in Greater Mumbai. The local government (city, municipality) is the principal leader and supporter of local development and risk management structure because it has the legal responsibility for promoting local development and land use planning (UNDP, 2005). The local government is also located at the first line of response to events of a localized nature and has the potential to better recognize and address disaster risk accumulation in their respective habitat. The U.N. International Strategy for Disaster Reduction also recommends that disaster preparedness, early warning systems and risk reduction is most effectively undertaken at the local level.

In Greater Mumbai, the Municipal Commissioner is tasked to ensure that disaster response drills are conducted by the ward officers and other agencies on a regular basis, especially in the disaster prone areas to maintain the readiness of communities and departments. MCGM maintains an Emergency Operations Center (MCGM Control Room) which is equipped with state-of-the-art communication system and computer network system. In addition, communication linkages from state to village level need to be put in place with adequate redundancies to ensure real time communication of warnings and up-dates. At grass root level, a Public Information System, which may be functional on 24x7 basis may be put in place in each village. In Greater Mumbai, there could be a tie up with mobile service

providers for dissemination of warnings as also with all public and private TV channels, which should take it up as a social corporate responsibility.

Relief in the event of calamities is the principal focus of disaster management actions of the government, and has been treated primarily as a responsibility of the state government. MCGM is the main agency in terms of disaster response in Greater Mumbai with the Disaster Management Unit playing the lead role in coordination of response actions and resources. MCGM DMU maintains close coordination with the state government, civil Defense, fire brigade, police, railways, BEST, BMC hospitals, MTNL, TEC, revenue, among others. The city's search and rescue (SAR) Task Force includes 26 members from various city departments which has undergone basic SAR training. The Civil Defense maintains trigger mechanisms with almost 22,303 civil defense volunteer corps in Mumbai including search and rescue personnel and casualty medical service.

Partnerships of the city government with different national and international organizations such as UNICEF, UNDP, EMI, AIILSG, NGOs, and others have been developed to enhance disaster preparedness and awareness of communities. The Indian Institute of Technology-Mumbai located at Powai and different NGOs have organized several programs and workshops for administrators, teachers, students, and citizens of Mumbai. Media also plays a key role in public awareness programs, although it can be improved further vastly. Private Sector units, NGOs and other organizations have been identified as resource groups for involvement in community preparedness measures. These organizations include: YASHADA, Apnalaya, AVEHI, Bombay Environmental Action Group (BEAG), Foundation for Research in Community Health, Jagruti Kendra, Mohalla Committee Movement Trust, Nirmala Niketan School of Social Work, Parisar Asha, Save Bombay Committee, SIDDHI, Slum Rehabilitation Society, SPARC, Tata Institute of Social Sciences, YUVA, YWCA etc.

The corporate sector which includes energy, water, communication and transportation has significant roles and responsibilities as well as stakes in disaster risk management activities, as the essential service providers for the city. Maintenance of facilities, ensuring the integrity of infrastructure and making it resilient to disasters are standard preparations conducted by institutions, such as MNTL, HPCL, Reliance Infrastructure Ltd, Tata Power Cos. Ltd. And Mumbai Port Trust. Likewise, speedy repair and rebuilding of damaged structures are also expected from them. Similarly, the utilities sector also includes health and education sectors, food production and delivery, and some other sectors, which have significant and important responsibilities to discharge in the event of a disaster.

Academic and scientific institutions such as AIILSG and the International Institute for Population Sciences also provide technical assistance through the conduct of consultations, research and training. AIILSG conducts trainings for fire

fighters and provides information and resources for community preparedness to disasters.

MCGM and its 23 wards have undertaken assessment of the extent of vulnerability to hazards of the city, its people and properties. In terms of flood for example, each ward is responsible for collecting ward-wise details of flooding locations in their area and these flooding points have been listed in the ward plans. Civil Defense and the CD Wardens provide regular information and support to MCGM and other institutions in terms of the hazards and vulnerabilities in the city.

PART VII. IDENTIFICATION AND ANALYSIS of GAPS, CONCLUSIONS AND RECOMMENDATIONS

In this Part, based on the study of various issues at national, state and city level, an exercise for the identification and analysis of gaps, conclusions and recommendations has been carried out.

Recommendations related to different departments of MCGM have been placed together since the focus of these recommendations is on actions to be taken by MCGM to make its departments and services more responsive in normal as well as disaster situations. The rationale for this approach is that if services for which MCGM is responsible cannot be provided through efficient delivery tools in normal situations, it may be unrealistic to expect that the Corporation would be able to discharge its responsibilities effectively in disaster situations, which not only assumes optimum efficiency in normal situations but also involves significant additional efforts in disaster situations with more or less same human and material resources available within the Corporation.

Similarly, sectoral recommendations have also been grouped together since these policy directions seek to focus on the future holistic and integrated strategy to be adopted for a combined optimum response from all stakeholders, avoiding duplication of efforts.

National/State Level

1. Legislative back up for MCGM

1.1. Maharashtra State Government to enact its own DRM Law specific to the State.

While the Disaster Management Act, 2005 provides the broad legal framework for the entire country, it does not restrict the State Governments from enacting their respective legislations so far as these are not contradictory to the provisions contained in the national Act. It is also true that a national legislation cannot comprehensively cover all micro aspects in different phases of disaster management in different states with diverse vulnerabilities. These aspects need to be covered by respective states by making appropriate rules under section 78 of the Act. However, the scope of section 78 is somewhat limited “to carry out the provisions of the Act”. Therefore, in respect of matters related to disaster management which, in the opinion of the state government, mandate legislative back up, the state governments may enact their own law.

1.2. Amendments to the DMA 2005 should be proposed; the proposed amendments should include the status/role of Municipal Corporations on DRM.

On the other hand, matters, which are not specific to one state, and need to be provided legislative back up, the central government, may be requested to provide for it by amending the Disaster Management Act, 2005. For instance, the National Act is silent about the functions of corporations in mega-cities like MCGM. However, it does not prohibit actions to be taken by such entities for Disaster Risk Reduction or in a post disaster scenario. The Act, if not explicitly but implicitly, enjoins certain functions to MCGM. The status of MCGM, or for that matter, Delhi Municipal Corporation legally is that these are local authorities. However, de facto, the position is that while these bodies are subordinate to State Authority, they are above the district authority and have essentially to subsume the functions entrusted to the district authority as well as the local authority within the area falling in their respective jurisdiction. Despite the above position, the fact remains that the Disaster Management Act, 2005 does not specifically extend the legal mandate to mega-city Corporations like MCGM. Legally, as a local authority, MCGM has to function "subject to the directions of the district authority" On the other hand; the district authorities in Greater Mumbai are de facto subordinate to MCGM. The role of MCGM, which has been entrusted with the functions of disaster risk management in Greater Mumbai and has to subsume the functions of both district and local authorities for urban risk mitigation in Greater Mumbai, need to be legally mandated under the Act or by issue of an executive order under section 22 directing MCGM to take all measures and assume all responsibilities as entrusted to district authority and the local authority under the Act in respect of areas falling in its jurisdiction through issue of a self-contained speaking order. Such an order can also be issued by the state government under clause (l) of sub-section (2) of section 38 of the Act. Eventually, to set all doubts at rest, it would be appropriate to make suitable provision for megacity Corporations in the Disaster Management Act, 2005. It is recommended that the matter may be taken up by the State Government with the Central Government accordingly.

2. Civil Defense

2.1. The State Government to issue Government Regulations as considered necessary to strengthen the Civil Defense and Home Guards systems in the state and to comply with the recent CDA Amendment 2009 and DMA 2005.

The Civil Defense (Amendment) Act has been enacted by the Parliament in the Winter Session in December, 2009. With the proposed amendment, civil defense will have a key role to perform in all facets of disaster management

with requisite legislative back up and also bring about convergence between the Disaster Management Act, 2005 and the Civil Defense Act, 1968, which was long overdue. This was a gap in the functions legally assigned to the Civil Defense which has since been bridged. Hopefully, Civil Defense and Home Guards mechanism would be adequately strengthened to effectively discharge the additional responsibility now legally entrusted to it. In order to ensure that civil defense takes up the responsibilities now legally assigned to it, the State Government may issue such Government Regulations as considered necessary and also chalk out a program for strengthening Civil Defense and Home Guards systems in the state to comply with the recent legal mandate.

3. State Executive Committee

3.1. The constitution of the SEC needs to be revised, in accordance with the provisions stipulated in the DMA 2005.

The State Executive Committee (SEC) has been constituted by the State Government with Chief Secretary as the Chairperson and Additional Chief Secretary (Home), Additional Chief Secretary (Finance), Secretary (Public Health), Secretary (Relief and Rehabilitation) as Members and a retired General as Member Secretary. The constitution of the State Executive Committee is at variance with the constitution prescribed under the Act which provides for Chief Secretary as Chairperson with four Secretaries as members on ex officio basis. There is no legal provision to nominate a non-official as member-secretary of SEC. To this extent, the constitution of the SEC needs to be revised, in accordance with the provisions of the Act, as otherwise it would be contrary to the legal mandate extended by the National Act for constitution of State Executive Committees in States.

4. State Disaster Management Policy

4.1. There is a need for the State Disaster Management Authority to initiate the exercise to lay down the State DM Policy within a given timeframe.

Sub section (2) of section 18 of the Disaster Management Act inter alia enjoins on the State Authority to lay down the State Disaster Management Policy. Based on the principles enunciated in the National Policy on Disaster Management, there is a need for the State Disaster Management Authority to initiate the exercise to lay down the State DM Policy within a given time frame. The policy may clearly bring out the role and modalities to be followed by MCGM for urban risk mitigation in Greater Mumbai.

4.2. Arrangements similar to the instructions issued by Ministry of Finance may be put in place by the state government and made applicable to all departments and organizations.

The instructions issued by Ministry of Finance [No. 37(4)/PFII/2003 dated June 19, 2009, 12.04.2010 & 26.05.2010] for addressing of DRR concerns in the development proposals sent for approval of Expenditure Finance Committee may be considered and similar arrangements may be put in place by the state government, made applicable to all departments and organizations. These instructions may be seen at NDMA Website.

Sectoral Level

5. Inter-Agency Coordination

5.1. An Inter-agency coordination committee for each sector should be instituted to ensure synergy of action in normal as well as disaster situations.

Disaster management implies a multi-disciplinary and multi-sector approach. There are several stakeholders in Greater Mumbai, besides MCGM, which have to discharge key responsibilities such as Fire Brigade, BEST, MMRDA, Mumbai Police, Traffic Police, Home Guards and Civil Defence, District Collectorates (City & Suburban), India Meteorological Department (Regional Office), Railways (Central & Western), M.T.N.L, Power supply agencies and several other agencies including Armed Forces, NDRF, Civil Society etc. An Inter-agency coordination committee for each sector, if put in place, may go a long way to ensure synergy of action in normal as well as disaster situations. For this purpose, each organization needs to designate a Nodal Officer also as an alternate Nodal Officer to participate in the sector-wise meetings, assist in organizing mock drills and report on pro-active actions taken by each organization. This would work as an effective institutional arrangement for each sector.

6. Land Use Planning

6.1. Informal Settlements, decongestion, landfill sites, hazardous units and control on land reclamation should be considered in drafting land use plans.

The Strategy for Action may appropriately recognize informal settlements in land use planning, reducing vulnerability at the level of the settlements within a city through mitigation measures: and monitoring local land use changes. The currents trends can potentially be reversed provided a

conscious strategy is adopted wherein informal settlements are incorporated as an essential component of the urban planning. The mitigation strategy in-built under land use planning should take into account important aspects related to safe sites, improvement and protection of landfill sites, control on land reclamation, shifting of storages and hazardous units from residential areas and decongestion.

7. Urban development and re-development

7.1. The core areas in the McKinsey Study need to be paid focused attention in the conduct of urban development and redevelopment.

The core areas emphasized in the McKinsey Study—economic growth, transportation, housing, infrastructure development comprising safety, environment, water, sanitation, education and health care, financing and governance need to be paid focused attention while undertaking urban development and re-development.

7.2. Disaster risk reduction needs to be integrated with all the components of the projects being taken up under JNNURM.

The existing institutional and coordination mechanism need to be strengthened to incorporate these elements through proactive involvement of all concerned stakeholders including MHADA, MMRDA, SRA, MTNL and other telecom service providers for communication network, MSEB, Tata Power and Reliance Energy for power generation, transmission and distribution, MPT and Local Self Government systems.

8. Construction Regulations

8.1. A Roadmap on construction standards and specifications need to be drawn up to ensure compliance among construction agencies.

A Roadmap may be drawn up to ensure compliance with all construction standards and specifications such as BIS codes/National Building Codes, Town and Country Planning Act, Development Control Regulations, Planning and Building Standards Regulations by all concerned state construction agencies in a time bound manner

9. Education

9.1. The school safety programs should include both structural and non-structural measures.

The municipal schools may be inspected initially through RVS system and evaluated to enable MCGM to undertake retrofitting of schools at risk in a phased manner through active involvement of parents, non-governmental organizations, elected representatives, corporate sector and other stakeholders. Ward offices and other agencies should be closely associated to ensure well-coordinated and synergic approach.

10. Solid Waste Management

10.1. There must be sanitation programs (e.g. dealing with human waste) that encompasses Greater Mumbai.

Cleanliness, in Mumbai approaches alarming proportions due to slum areas and lack of sanitation facilities including adequate number of odorless clean toilets. Mumbai does not have adequate number of way-side toilets and urinals which further add to a complex problem. MCGM is responsible to ensure proper civic amenities for the inhabitants. However, even with state of the art facilities, the desired level of sanitation cannot be achieved without the cooperation of people which requires an aggressive strategy encompassing awareness and education coupled with deterrent measures. Though Advance Locality Management (ALM) Program and Slum Adoption Scheme (SAS) have been undertaken, its outreach is limited. The potential of the programs has not been realized fully. The programs need to be given wide publicity and extended to all nooks and corners of Mumbai.

10.2. The number of vehicles conducting daily sweeping of roads needs to be augmented.

Though bye laws for solid waste management have been put in place, MCGM's capacity to deal with the problem is somewhat limited. At present, over 7,000 Metric Tons of waste is generated every day. Besides, MCGM is required to undertake daily sweeping of roads. It has about 400 vehicles, supplemented by about 600 private vehicles. The number of vehicles needs to be augmented. Besides, the three dumping sites, which have been in use ranging from 18 to 51 years, have almost outlived their carrying capacity and fresh dumping sites need to be identified. Technological innovations need to be introduced so as to minimize the amount of waste to be land filled.

10.3. A pro-active Roadmap with supporting SOP therefore needs to be established in advance with the involvement of other stakeholders.

Waste management would present several complexities in a disaster situation such as disposal of dead bodies, keeping proper records for identification purposes and having regard to the sentiments of different

religious groups. Decomposition of dead bodies and carcasses may result in major health hazards through spread of epidemics. A pro-active Roadmap with supporting SOP therefore needs to be put in place well in advance with the involvement of other stakeholders since it is not a function which can be discharged by MCGM alone. Armed Forces normally do not assume the responsibility of disposal of dead bodies and carcasses. The role of Civil Defense and voluntary organizations therefore assumes critical importance to deal with such situations for which there is need to impart adequate training and build capacity.

11. Waste Water Drainage

11.1. The sewerage system underground drainage pipes in Greater Mumbai needs renovation and a plan in providing underground drainage connectivity to slum areas needs to materialize.

MCGM is responsible for collection, conveyance and disposal of sewage/waste water generated in the residential, commercial and industrial premises in Mumbai. The underground drainage pipes of the sewerage system in Mumbai are more than 100 years old and need renovation. In congested parts, the sewerage lines and water pipelines run together and leakages contaminate drinking water. The problem of sewer lines of small diameters getting choked due to solid waste and silt entering them is rampant. The result is that instead of getting drained, sewage overflows to the surface. The problem has become more complex since a large percentage of the city's population has no access to even this already overloaded system. The facility of toilets connected to the underground sewerage system is not available to at least 50% of slum dwellers and they have no option but to ease themselves in the open spaces, along roads, highways, railway tracks, parks, playgrounds, open plots and beaches, During monsoons, the excreta flows through open drains into the storm water drains and gets discharged right near the coast. A program has been undertaken to provide toilet blocks to slum dwellers. About 193 toilet blocks have been constructed and are functional, while work is going on for construction of additional 307 toilet blocks. This effort is at least a beginning. On the other hand, an ambitious plan has to be worked out for providing underground drainage connectivity to slum areas as well as modernizing the drainage system.

11.2. (1) The need to provide new sewerage network and (2) pre-identify open places during disasters for evacuation where disaster victims may be temporarily settled in relief camps with proper waste disposal facilities.

Besides, there are several other gaps which need to be covered. The key issues and concerns are about 60% capture of sewage only; over 100 years old sewer lines in most places in dilapidated condition, sewage conveyance to the terminal pumping stations/ treatment plants for final disposal ranges between 50 to 60 per cent at present; need to provide new sewerage network to collect the

sewage, improvement/extension of sewage conveyance system, pumping stations, treatment and disposal facilities for population projection for 2025; linkage of slum areas to the updated sewerage system; and generation of awareness; among slum dwellers. The MCGM already propose to take up Phase II of the Master Plan to take care of these issues. However, if this is the situation in normal time, the position is likely to be worst in disaster situations. One option may be to pre-identify the open places where evacuated population, post major disaster, may be temporarily settled in relief camps and provide these facilities at such places in anticipation. In any case, these facilities may be utilized in normal time also since there is already lot of pressure on existing facilities for waste water management and sewerage system. This will need a coordinated approach involving, besides MCGM, SRA, MMRDA, MPT, MSRDC, Western and Central Railways (they might have open spaces under their control), elected representatives and civil society volunteers.

12. Transport

12.1. (1) Focused attention needs to be paid to the transport bottlenecks which may arise in disaster situations, particularly if main arterial roads are breached or obstructed and (2) disaster risk reduction needs to be incorporated in the JNNURM either as a mandatory or optional reform.

Mumbai has probably the most efficient public transport system among all metropolitan cities in India. Despite this fact, the rail and road transport systems of the city have not been able to keep pace with the rapid growth in traffic. The major bottlenecks are inadequate capacity of main arterial roads, the Eastern and Western Express Highways; poor riding surfaces of internal roads; traffic bottlenecks resulting in slow traffic and environmental pollution; overburdened suburban rail system; outdated intermediate public transport vehicles like taxis and auto-rickshaws; and encroachment on road-sides by hawkers and shoppers, particularly at evening peak hours. Although some ambitious projects are being/proposed to be undertaken, a viable permanent solution is not in sight. Besides, focused attention needs to be paid to the transport bottlenecks which may arise in disaster situations, particularly if main arterial roads are breached or obstructed. The JNNURM has not included disaster risk reduction either as a mandatory or optional reform. It is necessary to recognize this gap and take action to develop the strategy to provide alternate systems for movement of operational teams and equipments and transport of injured to hospitals.

13. Power

13.1. There is a need for alternative power supply systems in Greater Mumbai in case there are disruptions in the main supplies.

While the overall power supply position in Mumbai is quite satisfactory, care has to be taken to put in place alternate systems in case of disruption of electric supply in a disaster situation. Adequate number of Generator Sets may be maintained to meet the emergent operational requirements in case of disruption in power supply in the event of a disaster.

14. Communications

14.1. There is need to have in-built linkages in all Control Rooms in Greater Mumbai so that these control rooms function in a well-coordinated manner during emergencies.

In Mumbai, there is a multiplicity of Control Rooms or Emergency Operation Centers such as police, BMC, Fire Services, Central, Western and Konkan Railways, Districts and Civil Defence. There is, however, limited coordination among these control rooms. There is need to have in-built linkages so that these control rooms function in a well-coordinated manner. In fact, the MCGM or Police Control Room should assume the function of the nodal control room so that people have just one common number to report any emergency or seek essential services including health services like ambulances. An Instant Alert Messaging System also needs to be put in place to disseminate early warnings and up-dates to all concerned on real time basis. The Communication Network may have triple redundancy so that in the event of failure of one channel of communication, the other channels are functional. In addition to the conventional communication channels, the linkages with POLNET, NICNET and SPACENET could be provided to improve the existing communication mechanism.

STATE ACTORS

15. MMRDA

15.1. MMRDA should develop a Disaster Management Plan.

Although MMRDA plays a key role in the development of Mumbai Metropolitan Region, it has not developed a Disaster Management Plan. No training is being imparted to its employees to integrate plans with disaster risk reduction components. There is no resource inventory which may be accessed by both MCGM and MMRDA. These gaps need to be bridged by MMRDA in consultation with MCGM.

16. MTNL

16.1. There is need to develop disaster-specific training modules and programs for training of employees.

MTNL has its own in-house training centers. However, these Centers mainly cover operational training for its employees. There is need to develop disaster-specific training modules and programs for training of employees. The existing training modules should also include a DRR component.

16.2. MTNL needs to prepare a separate DM plan for Greater Mumbai taking into consideration the SOPs on specific situations, collaborative arrangements with other institutions, and develop an alternate communication plan.

Although the DM Plan of MTNL is in place, it is not specific to Mumbai only. MTNL needs to prepare a separate DM plan for Greater Mumbai. The SOPs are not in place for disaster specific situations, both as affected organization and as responder. There is also no collaborative arrangement with NGOs / community leaders for training, although it is a public dealing organization. These gaps need to be bridged with an alternate communication plan in case of failure of conventional communication channels in the event of a major disaster

17. MHADA

17.1. A fresh survey of the post 1969 constructed buildings should be carried out and viable and realistic solution has to be developed to complete the stupendous task of making these buildings structurally safe.

MHADA is at present responsible for rehabilitation and redevelopment of over 16,000 old and dilapidated buildings, down from 19,642 buildings which were entrusted to MHADA at the time of its establishment in mid-1970s. Most of these buildings are tenanted buildings, with nominal rents being paid by tenants and hardly any expenditure incurred on their maintenance. The structural designs of these buildings are no more available and demolitions are also difficult unless a cluster of buildings are demolished and the entire habitat re-developed together. This again is not a very viable option since tenants are not prepared to be re-located to suburbs. This is probably one reason why their number has reduced by less than 20% over more than three decades. If a fresh survey of the post 1969 constructed buildings is now carried out, the number of dilapidated buildings could be very high. Building collapse is not an uncommon occurrence in Mumbai. A viable and realistic solution has to found to complete the stupendous task of

making these buildings structurally safe, by demolition and redevelopment in most of the cases. .

18. Mumbai Police

18.1. There should be separate funds earmarked for proactive DM related functions.

Although police has a crucial role to play in disaster management in general and disaster risk reduction systems in particular, as it has a direct interface with the community in normal as well as disaster situations, no separate funds have been earmarked for proactive DM related functions.

18.2. There is a felt need to associate few senior and middle rung police officers with the EM Focus Group for getting a proper perspective of police role clarity during emergencies.

18.3. There should be proper incentives given to qualified constables who will discharge multiple purpose roles in all facets of disaster management.

There are several highly qualified constables who can discharge multiple purpose roles in all facets of disaster management. However, they will need proper motivation and incentives to perform the additional tasks. To begin with, this exercise may be initiated by Mumbai Police as a pilot project, in consultation with DM Department of MCGM.

18.4. Joint mock drills with other stakeholders, particularly with hospitals, fire services, MCGM etc need to be held by Mumbai Police, with MCGM taking the lead.

19. SRA

19.1. (1) There is need to explore re-location in vacant lands available with government including railways, located in close proximity and (2) there has to be a well coordinated multi-sector approach involving agencies responsible for all the above mentioned sectors.

Slum redevelopment is a complex problem which has to be solved with a humane approach with viable and practical options. An in site rehabilitation program through re-development with temporary re-location for a short period in a phased manner may probably be workable provided it aims at inclusive development including development of basic infrastructure like water, power, sanitation, drainage etc. SRA, in conjunction with MCGM, has to evolve imaginative options. There is need to explore re-location in vacant

lands available with government including railways, located in close proximity. Therefore, there has to be a well coordinated multi-sector approach involving agencies responsible for all the above mentioned sectors. Unless an all-inclusive comprehensive strategy is worked out and implemented with missionary zeal in a time bound manner, this gap, what to talk of being covered, is likely to widen further.

19.2. The engineers from SRA need to be trained in disaster and earthquake related activities so that they can carry out the inspection process effectively; at present they are not so trained.

20. HPCL

20.1. There should be protocols in place for rescue and evacuation should there be emergencies emanating from petro-chemical accidents.

In the event of an accident resulting in injury to people, there are presently no formal arrangements in place for their rescue and evacuation. This aspect needs to be tied up with MCGM.

20.2. Coordination among licensing authority (RTO), police and HPCL is needed to work out effective mechanism to check drivers' identity/certificates.

20.3. Parking space exclusive for tankers with hazardous and flammable materials is needed.

In Chembur – Mahul area, the tankers with hazardous chemicals are parked along the roadside. There is no dedicated parking space for such tankers, increasing the risk of accidents. Wadala truck terminal can be a solution for the parking space problem. Although the modalities have by and large been worked out, the arrangement has not been put in place so far with the result that there is a potential risk in case of an emergency.

21. Gaps in adoption of an Integrated approach

21.1. Therefore, there is need to adopt an integrated approach in DRR to ensure safer constructions at all levels including at MCGM level.

Although several Ministries and Departments of Government of India have a role to play and responsibilities to discharge, disaster risk reduction has still not been integrated in their normal functions and it is perceived as a function of Disaster Management Department or Ministry of Home Affairs. This is a crucial gap in integrating DRR across all the Ministries and Departments of national government. DRR should not be seen as an isolated approach.

Proper infrastructure planning, maintenance of minimum construction standards, good building practices based on locally available construction materials to improve resistance of buildings to disasters, technical support and supervision are all components of inclusive development. If a cohesive and comprehensive strategy is adopted in constructions in urban as well as rural areas, it will automatically address the DRR concerns also. Therefore, there is need to adopt an integrated, rather than a segmented approach to ensure safer constructions at all levels including at MCGM level.

21A Mainstreaming Disaster Risk Reduction in Development Process

21A.1 There is need to mainstream DRR in the developments plans and projects of all government departments, public and private sector as well as other stakeholders. There is also a need to put in place a Disaster Management Audit Mechanism through a process of self introspection and self certification to make sure that adequate mitigation measures have been incorporated in the projects to ensure vulnerability is not enhanced and is below the level of minimum acceptable risk

The Hyogo Framework of Action 2005-2015 has advocated, in the context of "Building resilience of nations and communities to disasters, to *"integrate risk reduction into development policies and plans at all levels of government including poverty reduction strategies and multi-sectoral policies and plans".* The SAARC Comprehensive Framework on Disaster Management has identified *"mainstreaming disaster risk reduction into the development policies and practices of the government at all levels."* The purpose of mainstreaming risk reduction is to ensure that risks from natural hazards are factored into development policies and plans and are considered as a matter of course in the design of all development projects in hazard-prone areas and further that such development projects and plans do not add to existing vulnerabilities or create new vulnerabilities.

It is well known that development may enhance vulnerabilities and disasters may prove to be a setback to development. On the other hand, if disaster risk reduction is fully integrated or mainstreamed into development plans, such a holistic development, popularly known as inclusive development, can reduce vulnerabilities and disasters can provide development opportunities. The concept of "Build Back Better (BBB)" has emerged in this context and has been practised in our country post-Bhuj earthquake and post-tsunami. In simple words, *"mainstreaming disaster risk reduction in development is a dynamic process to ensure that it is protected through DRR strategies and it does not increase people's vulnerabilities to disasters*".

While DRR may be mainstreamed into all development activities, the key sectors have been identified as Agriculture and livelihood, Education, Environment, Housing, Health, Risk Transfer and Risk Insurance and Critical Infrastructure. {SAARC Roadmap on mainstreaming DRR in development}

DRR should not be perceived as a stand-alone function to be discharged by the Disaster Management Department. It has to be mainstreamed in the development plans and projects of all government departments, public and private sector as well as other stakeholders. There is also a need to put in place a Disaster Management Audit mechanism through a process of self introspection and self certification. It is basically a self audit mechanism for disaster risk assessment, based on self-certification that adequate mitigation measures have been incorporated in the project to ensure vulnerability is not enhanced and is below the level of minimum acceptable risk. The main issues to be addressed while submitting proposals for approval are:

- Does the project involve creation/ modification of structural/ engineering assets?
- Does it involve land reclamation or changes in land use? If so, whether the cost involved for prevention & mitigation of disasters has been included?
- Is location of project area compatible with relevant NDMA guidelines?
- Have possible risks been identified and analyzed to assess possible impact of disasters and structural and non-structural mitigation measures included based on prioritization of risks? It may be confirmed that implementation of these measures will not create new risks.
- It may be confirmed that the process of risk assessment is based on available information and secondary evidence and mitigation measures are in conformity with statutory and other regulatory requirements and are the most viable in the present circumstances.
- What are the land use directives/ regulations applicable?
- List disaster prevention measures enshrined in regulations/ NDMA Guidelines which are to be complied with and confirm compliance.
- Confirm design and engineering of structures is compliant with NBC, 2005, appropriate BIS Codes, NDMA guidelines and other sources such as Manuals of Indian Road Congress, Ministry of Road Transport, Highways and Shipping, Railway Board, Central Public Health Engineering Organization, Central Electricity Authority and Central Water Commission

Similarly, information is required to be included in detailed project reports, from disaster resilience point of view, on project site, nature/ type of project, hazard risk to the project, mitigation/ reduction of risk, and impact of project on environment and people. A detailed check list, which has been given in these instructions, may be attached to bring out that the project is DM compliant. The instructions may be accessed at www.ndma.gov.in (circulars). The state government and MCGM may consider issue of similar

instructions. The rationale for calling it self-audit or self-certification is that the concerned departments are not required to submit the proposals to DM Department or any other agency and get their approval as in case of environment related issues.

22. Gaps in Convergence

22.1. A National Task Force should be constituted and similar Task Forces need to be constituted at State and District and MCGM level to coordinate and monitor the qualitative as well as quantitative progress under different programs.

There are several development programs currently under implementation in rural areas. Besides IAY, there are flagship programs like National Rural Employment Guarantee Scheme (NREGS), Sarva Sikhsha Abhiyaan (SSA), National Rural Health Mission (NRHM), Sampoorna Grameen Rozgar Yojana (SGRY), Pradhan Mantri Gram Sadak Yojana (PMGSY), Swarnajayanti Gram Swarozgar Yojana (SGSY) etc. Some of these programs are being implemented by Ministries, other than MoRD. However, all these programs are being taken up for the welfare of rural population. There is, however, no convergence of these programs due to lack of an integrated approach. Convergence would facilitate supplementing each program through initiatives taken under the other programs. For instance, NREGS can support IAY in carrying the construction materials through unskilled labor in difficult areas, thus saving a cost component under IAY which can be utilized to improve safety of rural houses. In order to ensure convergence, a National Task Force may be constituted consisting of officers from concerned divisions/ departments dealing with respective programs aimed at rural development. Similar Task Forces need to be constituted at State and District level to coordinate and monitor the qualitative as well as quantitative progress under different programs. In that case the National Task Force could consider the need for integrating disaster risk reduction with all development programs being implemented in rural areas keeping in view the recent instructions of the Ministry of Finance. The decisions taken may then be communicated to State Task Forces and, through them, to District Task Forces. A similar Task Force needs to be constituted for MCGM.

MCGM

23. Disaster Management Department

23.1. There is a need to revise comprehensively the functions of the DM Department to reflect statutory provisions for MCGM responsibilities on DRM.

The State level Executive Sub Committee for Mumbai has designated MCGM as the nodal organization for Greater Mumbai and surrounding areas for the purpose of disaster management. It is, therefore, accountable for all duties and responsibilities required to be discharged for urban risk mitigation in Mumbai in terms of the general provisions contained in the Disaster Management Act, 2005. MCGM has also subsumed the statutory functions assigned to the District Authority under section 30 of the Act, through its ward offices. Besides, it being an urban local body, MCGM is also required to discharge the functions assigned to the local authority under section 41 of the Act. The responsibilities assigned to DM Department do not cover even a fraction of these functions. There is, therefore, a major gap in the functions formally assigned to DM Department of MCGM which need to be formally revised comprehensively for Greater Mumbai, keeping the statutory provisions in view.

23.2. Strengthen and capacitate the existing Disaster Management Department to enable it to carry out its mandated functions.

Another important factor to be considered is whether the existing Disaster Management Department has the requisite capacity to discharge the functions which it is expected to perform in the entire cycle of disaster management including disaster prevention, mitigation, preparedness, response, relief, rehabilitation and recovery. It is true that there are a number of state level organizations which are required to extend support to MCGM in the performance of these functions. However, coordination with different departments of MCGM as well as other public and private organizations is a daunting task, which, with the present strength and powers of DM Department, may be extremely difficult to perform. The MCGM is still in the mindset of reactive approach primarily concentrating on post disaster scenario and early warnings. It has yet to take cognizance of pre-disaster aspects, particularly the objective of disaster risk reduction. The paradigm shift advocated under the Disaster Management Act, 2005 and the National Policy on Disaster Management announced recently by the Government of India as well as compliance with several sets of guidelines issued by NDMA, which again are mandatory under sub-section (1) of section 38 of the Act, to be complied with by MCGM in the context of Greater

Mumbai, has not received the attention it deserves. The Department is headed by a Chief Officer of the rank of Assistant Municipal Commissioner, supported by a Deputy Chief Officer and junior staff primarily meant for DM Control Room. Coordination goes hand in hand with rank, which is a missing link. It is true that there is a Joint Commissioner but disaster management is not a full time assignment for him. While the SDMA is in the process of increasing its Desks from 6 to 10, there are no such Desks headed by middle rung officers in the DM Department to take care of mitigation as well as response. In this background, the following recommendations to strengthen the DM Department may be considered:

(a) There may be a Chief Officer of the rank of Deputy Municipal Commissioner and a Deputy Chief Officer of the rank of Assistant Municipal Commissioner, exclusively for disaster management, so that coordination with Ward Officers and other sister organizations is facilitated to some extent; **or** there may be an exclusive Joint Commissioner for disaster management only, supported by a Chief Officer and a Deputy Chief Officer exclusively for disaster management

(b) There should be at least four Desks, two each for mitigation and response, headed by middle rung officers. The first mitigation desk may look after community based disaster risk management program for urban risk mitigation in Greater Mumbai and the second desk may look after the entire gamut of disaster risk reduction including integration of disaster management with national and state level development plans in Greater Mumbai including introduction and institutionalization of techno-legal regime. The first response desk may look after all preparedness aspects and the second desk may look after early warnings, response and relief.

(c) The coordination function within MCGM departments may be looked after by Deputy Chief Officer and inter-organization coordination by the Chief Officer, besides both officers supervising the functions of four desks as well as the Control Room. The DM department may continue to function under the charge of Municipal Commissioner through the Joint Municipal Commissioner, as at present.

23.3. The Head of the DM Department should be delegated administrative powers to issue instructions to other MCGM departments as well as Ward Officers.

Another important gap is inadequate delegation of powers to officers in the Disaster Management Department. In order to bridge this gap, the Head of the Department (Joint Municipal Commissioner, if appointed exclusively) or Chief Officer may be delegated administrative powers to issue instructions to other MCGM departments as well as Ward Officers and the compliance thereof shall be reported to him within the time frame prescribed by him.

The delegation of financial powers to the Joint Commissioner in charge of Disaster Management Department, Chief Officer and the Deputy Chief Officer may be enhanced appropriately in normal as well as disaster situations, with provision for ratification beyond a prescribed limit by the next superior officer.

23.4. The delegation of financial powers should be uniform to all MCGM Departments and not just the DM Department both in normal as well as disaster situations.

The delegation of financial powers may also be by and large uniform in respect of other MCGM Departments, for officers of the same level in normal as well as disaster situations since all departments are required to play an equally important role in such situations, which is essential to mainstream disaster management in all the departments of MCGM, instead of this function being perceived as the responsibility of DM Department alone.

24. General Administration and Personnel Departments

24.1. (1) Training should be organized for all personnel in consultation with the DM Department and (2) manpower should be made available to the DM Department should the need arise.

As for disaster management concerns, the departments are at present not taking any pro-active action to organize training for all staff members, in consultation with the DM department which is a gap in the discharge of their responsibilities at present. In order to cover this gap, these departments may also make available additional manpower from within different departments in disaster situations. These Departments may also assist the DM department in organizing mock drills at ward level. While the first two mock drills in each ward may be organized with prior intimation to avoid panic, the subsequent mock drills may be organized without advance intimation. Basic training in first aid, with the help of Health Department and fire fighting with the help of Fire Services Department may also be organized. These functions should not be perceived as the functions of DM department alone. The Disaster Management Plan to be developed by these departments in consultation with DM department should invariably include the above elements with an annual time frame. These departments need to function in close coordination with other line departments, particularly to address the disaster risk reduction concerns.

25. Municipal Secretary's Department

25.1. The Municipal Commissioner may roll out the roadmap for MCGM and the possible role which the councilors can play in educating people in

their respective constituencies and facilitating micro level risk assessment and vulnerability analysis with possible intervention programs.

Municipal Secretary can play a key role in facilitating sensitization of the municipal councilors in consultation with the Mayor and Municipal Commissioner by organizing a day's workshop once in a year on disaster risk management. Eminent Resource Persons may be engaged from NDMA, NIDM, UNDP and IIT, Mumbai to deal with different aspects of specific disasters. The Municipal Commissioner may roll out the roadmap for MCGM and the possible role which the councilors can play in educating people in their respective constituencies and facilitating micro level risk assessment and vulnerability analysis with possible intervention programs.

26. Legal Department

26.1. **The department may undertake, on regular basis, an exercise to identify gaps which need to be bridged with legislative back up.**

The department should carefully study the Disaster Management Act, 2005 to facilitate identification of gaps in the MMC Act, 1888.

26.2. **The Legal Department officers should participate in training programmes as resource persons to sensitize and educate the MCGM personnel about the legal framework already in place at national, state, MCGM and ward level.**

The officers of the department should participate in training programmes as resource persons to sensitize and educate the officers and staff about the legal framework already in place at national, state, MCGM and ward level and the role of employees, particularly at ward level, to educate the public about possible hazards and measures required to be taken through dissemination of Information, Education and Communication (IEC) materials. The IEC materials may be developed by DM department, based on vulnerability profile of Greater Mumbai and taking into consideration the IEC materials shared under the GOI-UNDP Disaster Risk Management Program.

26.3. The Legal Department may also make use of this opportunity to sensitize the officers and employees about the relevant legal provisions contained in Maharashtra Regional and Town Planning Act, 1966; The Bombay Shops and Establishments Act, 1948; The Prevention of Food Adulteration Act, 1954; The Maharashtra (Urban Areas) Preservation of Trees Act, 1975; D.C. Rules and other Bye-laws.

27. Labor Department

27.1. The Labor Department should institute a program that provides awareness on DRM per se and activities among the workforce.

The Labor Department is undertaking various welfare activities for the benefit of employees and their wards. However, no attention is being paid to disaster risk reduction related activities at present, which can provide an effective vehicle to disseminate knowledge about disaster risk management, do's and don'ts in specific disasters, organizing essay, painting and drama competitions with DM as a theme etc. The Department needs to work in close coordination with line departments, particularly the DM department. If necessary, a creative team may be engaged to develop the theme through folk drama and songs related to urban risk mitigation, while maintaining its entertainment component.

28. Finance Departments

28.1. The officers and employees of finance departments need to be trained and sensitized towards the significance and crucial importance of DRR features.

The analysis of the present systems clearly bring out that, although institutional systems were in place in MCGM, there was a break-down and lack of integration not only among line departments but also among different finance departments. The officers and employees of finance departments needed to be trained and sensitized towards the significance and crucial importance of DRR features and the need to function in a pro-active manner in emergency situations to clear financial proposals.

28.2. There should be a Finance Officer (Additional or Joint Municipal Commissioner level) who could, by protocol, be able to advice the Municipal Commissioner down to the Joint Commissioner and be able to conduct financial reforms.

There is also a felt need to have a senior level Finance Officer of the level of Additional or Joint Municipal Commissioner, to be designated as Financial Advisor who would be responsible for coordination of functions discharged by respective finance departments and who may also be in a position to advise Municipal Commissioner/ Additional/Joint Municipal Commissioners and initiate financial reforms in tune with the vibrant needs of the Corporation with special focus on disaster management in general and integration of disaster risk reduction elements with development plans as well as on-going works in particular.

29. Engineering Departments

29.1. There should be a reassessment on the assigned/delineation/distribution of responsibilities among MCGM Engineering Departments to avoid duplication and making the departments more proactive in ensuring standards and safety in Greater Mumbai.

There is apparently some duplication or overlapping in the functions assigned to respective engineering departments. For instance, Development Plan Department merely verifies structural designs with reference to building regulations but does not own up any responsibility on the plea that in case of any departure from structural designs submitted to MCGM, the concerned structural engineers, architects or builders are held responsible. There is no supervision or verification check by Development Plan Department. The issue is how such variations would come to light in the absence of any verification by MCGM engineers? In other words, the MCGM acts only on receipt of specific complaints; otherwise the DP Department merely attends to table work. It was categorically mentioned that MCGM engineers primarily go by designs submitted by private structural engineers. In that case, the function of DP Department becomes peripheral. The private engineers or architects or builders may as well ensure compliance with building regulations which are in public domain (Reference: Building Regulation under MMC Act 1888, Chapter XII).

29.2. There should be protocol/detailed SOP to audit the performance of these departments, taking into consideration the safety monitoring and coordination mechanisms conducted by these departments.

There are also instances of lack of coordination. For instance, Hydraulic Engineer is concerned with ensuring adequate water supply through fire hydrants. On the other hand, Fire Services personnel brought out that one of the problems they frequently face is non-functional or dry fire hydrants which creates major problem in fire fighting. There is no system in place to ensure that fire hydrants are checked regularly by HE Department. They take action “as and when complaints are received”. On the other hand there is no system in place to have regular coordination meetings between Fire Services and HE Department including their engineers posted at ward level. A detailed SOP needs to be put in place for this purpose by the Hydraulic Engineering Department of MCGM in close coordination with Fire Services Department. Lack of coordination at field level between these two organizations has already been identified as a major gap which impedes fire fighting arrangements.

29.3. Training on detailed evaluation and retrofitting techniques for structural safety should be conducted.

Lack of adequate training is yet another major handicap. It was admitted during interaction that engineers are not trained in detailed evaluation and retrofitting techniques for structural safety. Technical officers can discharge their functions effectively only when their training and capacity building needs have been taken care of adequately. Despite an ambitious scheme being implemented by the Ministry of Home Affairs solely for this purpose and with IIT, Mumbai being one of the premier National Resource Institute under the scheme, apparently MCGM has not taken advantage of it which is discouraging keeping in view that there are about 3,500 engineers on the rolls of MCGM. IIT, Mumbai was the first institute to evolve the system of Rapid Visual Screening (RVS) of buildings to assess their structural safety with a view to determine the inter-se priority of at least life line buildings including multi-storied constructions or buildings where there is large congregation of public. The MCGM engineers, on their own admission, had not been exposed to these techniques.

29.4. Institutional memory cannot alleviate deficiency in coordination, other mechanisms are needed.

The engineers are frequently transferred from one to other engineering department. However, there is lack of coordination among different engineering departments and the exposure to the functions assigned and the modalities of discharging of such functions by other departments was observed to be minimal.

29.5. The entire system of delegation of financial powers to engineering departments needs to be re-visited by an independent agency.

Though some financial powers, inadequate as these may be, have been delegated to engineers, in effect there is no delegation since exercise of these powers has been made "subject to pre-audit". In other words no powers can be exercised by engineers unless Finance Department has "pre-audited" it, making it necessary to refer the proposals to Finance Departments even in respect of delegated powers. This was admitted by Finance Department but no convincing reasons for this system could be advanced. Therefore, while engineers have the responsibility and accountability, they have no worthwhile powers really delegated to them. Another interesting fact is that in several cases, powers have been delegated to engineers by name and not by designation. The entire system of delegation of financial powers to engineering departments needs to be re-visited by an independent agency like IIT, Mumbai with support from a Finance Manager and an Administrator.

29.6. The Director for Engineering Services & Projects should be given the superior charge of all engineering departments.

Presently, Chief Engineers of different departments report to different level of senior officers such as Director (Engineering Services & Projects), Deputy Municipal Commissioner (Environment & Waste Management), Deputy Municipal Commissioner (Special Engineering) and Deputy Municipal Commissioner (Engineering). There is no unity of command for all engineering departments which brings on force the issue of convergence. It may be more appropriate that Director (Engineering Services & Projects) is given the superior charge of all engineering departments. Alternatively, an Additional or Joint Commissioner, who is an engineer himself, is entrusted with the exclusive charge of all engineering departments. This would bring in convergence and effective coordination among all engineering departments.

29.7. All the above recommendations for the Engineering departments should be considered by an Expert Committee and an appropriate decisions/actions should be taken.

The rectification and bridging of above gaps is directly related to the optimum performance of engineering departments in disaster risk reduction as well as in a disaster situation. The basic premise is that if these departments are not in a position to function efficiently in normal situations, there are bound to be more complex problems in a disaster situation. Therefore, these aspects need to be considered by an Expert Committee and appropriate decisions taken.

30. Public Relations Department

30.1. There is need to create a post of Principal Information Officer in the rank of Deputy Municipal Commissioner, preferably to be taken on deputation from Press Information Bureau of Central or state government.

The first issue to be considered is the level of the Public Relations Officer (PRO). Apparently, his/her status is much less than the Heads of Departments or Assistant Commissioners. It therefore becomes difficult for him/her to interact with senior officers to get the feedback quickly from senior officers and his/her responses are primarily reactive and not proactive. In the process, the image of MCGM cannot be projected in an innovative and aggressive way, which is a major handicap for a public dealing organization; more so in disaster situations. There is need to create a post of Principal Information Officer in the rank of Deputy Municipal Commissioner, preferably to be taken on deputation from Press Information Bureau of Central or state government. In that case, he could be assigned additional

duties of development of publicity materials for disaster risk reduction, with the assistance of DM department.

30.2. (1) A training capsule on media management for all levels (especially the junior level) needs to be developed and (2) special professional training is also required to develop user-friendly media handouts.

Since MCGM is a public dealing department, media interaction is allowed even at junior level. Besides, no training is imparted to officers, including field officers in media management. This gap, if bridged, will have a positive impact on the overall image of the Corporation in public perception through proper media coverage. In normal situations, officers of or above the rank of Assistant Commissioners (since Ward Officers have the same rank) should only be permitted to interact with media. However, in emergency situations, it may not always be possible since the media would try to get reports from officers and staff available on the spot. In such cases, junior officers below the rank of Assistant Commissioners may be advised to impart minimum factual information and not get into the causes or rationale of an emergency situation. Even otherwise, officers find it difficult to interact with confidence with visual media. A training capsule therefore needs to be developed with the assistance of professionals for imparting training to officers at all levels and particularly at junior level as well as officials from Fire Services/ civil defense etc. This is one aspect which has apparently not received the attention it deserves in a public dealing organization. On the other hand, senior officers of the rank of Joint Commissioner and above should be sensitized to be media-friendly and not remain tight-lipped. Special professional training is also required to develop user-friendly media handouts instead of preparing it in orthodox bureaucratic language.

31. Health Department- MCGM Hospitals

31.1. The medical facilities need to be upgraded at KEM, Sion, Nair and all suburban hospitals.

There is a major gap in the requirement and the availability of medical facilities even in normal situations, not to speak of additional pressure which would be generated in a disaster situation. Therefore, there is need to augment government health infrastructure in Greater Mumbai even for providing normal medical facilities. The medical facilities need to be up-graded at KEM, Sion, Nair and all suburban hospitals. Besides, it would be desirable to put in place camp hospitals attached to these three hospitals with OT facilities. To begin with, one mobile camp hospital may be organized at KEM Hospital with OT facility for disaster situations.

31.2. It is also necessary for MCGM to enter into pre-contract arrangements with private hospitals in case of a disaster.

Section 65 of the Disaster Management Act, 2005 gives powers to State Executive Committee and District Authority to requisition men and material resources which would include health and hospital facilities also.

31.3. It is recommended that a three years B. Sc. Course for paramedics with assured prospects of employment in government hospitals may be considered.

The nursing and orderly (ward boys and girls) staff is woefully inadequate with the result that patients' relatives and friends are needed to stay back to take care of their patients. This is the reason for overt 20,000 daily visitors to the hospital without adequate holding areas for them. Besides, as many as the number of in-door patients, the attendants stay back during the night also. If there is adequate number of nursing and orderly staff, it may be possible to enforce some discipline and also ensure professional medical care. It is recommended that a three years B. Sc. Course for paramedics with assured prospects of employment in government hospitals may be considered. Absorption of a batch of 40 to 50 paramedics every year in government hospitals is not likely to pose any problem since the requirement is much more; besides there would be turnover also with experienced paramedics moving to private hospitals.

31.4. The Disaster Management Plan related to health sector should particularly take care of equitable distribution of patients among different hospitals keeping in view the locations.

Even in normal situations, transport of patients over long distances poses a problem and is a health hazard. In a disaster situation, the position would worsen, besides putting immense pressure on available government hospitals.

31.5. There is a need to introduce system of heli-ambulances due to traffic congestion, particularly in critical cases.

Facilities for heli-pads can be made available in Sion and Nair hospitals. As for KEM hospital, it will be feasible to provide such facility on the roof. According to Dean, KEM, such a feasibility study has been conducted. To begin with, pre-contract arrangement may be made to take one or two helicopters and convert it to heli-ambulances on wet lease basis. Based on assessment of its utility, the facility could be expanded further. This facility may prove to be crucial in disaster situations like floods and earthquakes when even the normal routes may not be available for transport, besides the traffic congestion problems.

The silver-lining is that there is adequate number of doctors available. For instance, in KEM Hospital alone, there are 470 senior doctors and 720 PG students. The position is likely to be more or less as comfortable in Sion and Nair hospitals. Therefore, in emergency situations, doctors including PG students for minor surgeries and other treatment can easily be made available off-site provided other facilities and paramedics are available and open places in different parts of the city are pre-identified where camp hospitals may be set up.

32. Fire Services

32.1. There should be at least 300 fire brigades and adequate firefighting equipment in Greater Mumbai.

The three major gaps are inadequate strength, lack of adequate fire fighting equipments and lack of state of the art training centers. Similarly the major inescapable constraints are densely populated city, bad road conditions, difficult access to interior areas, indiscriminate parking in most of the buildings making it difficult for fire engines to reach the most appropriate spots for firefighting access to interiors of slum areas and traffic congestion. Based on international norms, the requirement for Greater Mumbai may be around 300 fire brigades, say, about 100 fire stations—50 multiple fire stations with four fire brigades each and 50 double fire stations with two fire brigades each spread over the entire city. Firefighting equipment for high rise buildings should be available at all multiple fire stations to reduce the response time. The concept of single fire stations has become obsolete since, except in case of very small fires, one fire engine is not adequate. Besides, there should be at least one rescue tender at each fire station.

32.2. There should be an increase in the number of firemen and intensive training should be provided to them.

Intensive training need to be imparted to firemen and their number enhanced adequately, as proposed by the Ministry of Home Affairs. The standard of Training Centre needs to be enhanced, based on a professional assessment of the requirements, both trainers and equipments. Besides, water hydrants are not always in operational condition due to lack of maintenance or lack of water supply. There is a felt need for adequate and frequent coordination between Hydraulic Engineering Department and Fire Services.

32.3. The state of the art SOPs need to be put in place and training imparted to firemen.

Mock drills are conducted at present but a system of senior professional observers is not in place to assess the gaps and weak areas with recommendations for feasible remedial measures. The entire system needs to be made proactive instead of sustaining the existing reactive mode.

32.4. **There is also need to have adequate number of administrative officers** for processing the proposals on a fast track and, above all, documentation of all major fire incidents, bringing out the lessons learned and the future remedial actions to be taken.

32.5. **The communication system also needs to be put on a fast track** with manual interventions being minimal. At present 101 calls are routed through MTNL which invariably results in some delay.

32.6. **Delegation of financial powers to fire services is not commensurate with the responsibility and accountability assigned to them; one reason being weak administration wing.**

The general relaxation already proposed may be made applicable to the Chief Fire Officer, as Head of the Department. However, he needs to have administrative support since he is a professional and neither has time nor expertise to deal with financial matters.

33. Municipal Security Force

33.1. **Additional Municipal Security Force is vital for the security of Greater Mumbai and its public facilities.**

It is a misnomer to call it a Security Force. At best, it is equivalent to watch and ward arrangement, suitable only for routine access control. Even the manpower provided is inadequate, which works out to about four guards per installation. When the higher deployment such as at hospitals is taken into consideration (deployment at KEM Hospital alone is about 150 security guards), the remaining manpower is not even adequate to provide one security guard per shift. In the present context of terrorist threat and considering that MCGM is a public dealing organization, any expectation of professional security or resistance to possible terrorist attack would be unrealistic. On the other hand, an attack on MCGM Offices, which are all soft targets, is bound to have lot of publicity value for militants; since it would hold MCGM, which is in over all charge of disaster management in Greater Mumbai, to ridicule.

33.2. **There is a need to totally revamp the security arrangements.**

It has to be broadly divided in two strategic functions, perimeter security and access control. In the first instance an assessment of security risk to all MCGM installations may be made to place them in categories of high, moderate and low risk installations/ offices by a professional government security agency. For high risk offices/ installations, both perimeter security and access control may be entrusted to an armed and professional security force like Central Industrial Security Force (CISF). For moderate risk offices/ installations, while perimeter security may be handled by an organization like CISF, the access control may continue to be with the present Security Force. For low risk offices/ installations, both perimeter security and access control may continue to be with the present Force. Considering the grossly inadequate strength, this arrangement will not result in surplus manpower. Another option to be considered is to allow younger security guards to voluntarily agree to switch over to CISF, which would entail extensive arduous training including training in fire-arms. In that case, the rest of the aging or reluctant security guards may comprise the Security Force, which may be declared a dying cadre. This arrangement can be on the lines of security being provided to Central Ministries/ Departments at Delhi where similar revamping of the Secretariat Security Force was undertaken after the attack on Parliament.

33.3. There should be a security audit to be carried out to assess type of security needed at each installation so that intelligence sharing and proper coordination among government security agencies in Greater Mumbai will be pursued.

There is also no effective coordination with police except routine reports from them about demonstrations. There is no system of intelligence sharing in place. Even if such an arrangement can be made, the present Security Force has no capacity to handle such intelligence information and may possibly become a source of intelligence leak. A security audit needs to be carried out to assess type of security needed at each office/ installation; categorization of installations in high, moderate and low risk groups, training needs analysis, upgrade of existing training institute, requirement of women security personnel and other related issues.

34. Estate and Land Management (ELM) Department

34.1. There should be an effective coordination mechanism in place and proper delineation and delegation of authority among departments and offices that are closely associated with estate and land management.

Despite involvement of several departments, there is no effective coordination mechanism in place, even with sister departments which are closely associated. The department officers conceded that the authority

delegated is not sufficient to discharge responsibilities entrusted as also involvement of too many departments has diluted the responsibility and accountability. School reconstruction is also now diverted to education department. It would be desirable that these allied departments function in close coordination and convergence among the various associated departments need to be brought in. If may be better to integrate various functions together and make allocations among different departments based on small areas. The present arrangement is not conducive to efficiency and responsibility/ accountability. In the process, capacity development also suffers and public do not have the advantage of single window system. In case of a disaster, no single department is likely to own the responsibility or take integrated action due to dilution of functions among various departments for which no apparent justification could be provided by different departments.

35. Markets Department

35.1. There should be proper delineation of responsibilities, particularly on structural safety, between the Markets Inspectors and the Development Plan Department Officials.

Although there are about 60 Market Inspectors, they are mainly engaged in rent collection. The responsibility of structural safety of the market shops is with the Development Plan Department. Apparently there is no coordination between the two departments and no department actually owns the responsibility for structural safety of shops. On the other hand, the shopkeepers have their own concerns to address and the instances of making alterations in the shops, even at the cost of structural safety, are not uncommon. There is no clear policy in place to ensure that the markets are safe in case of a major disaster like earthquakes. MCGM ownership is marginal since licenses are renewed as a matter of course without any special check about the alterations made which may adversely affect the structural safety. It would appear that, due to ignorance or the vast number of market shops or even for any other dubious reason, safety of shops is the least concern. When one takes into consideration that these shops are mostly in clusters, a major disaster is inescapable, sooner or later. The entire matter needs a total policy review at sufficiently senior level and adoption of an aggressive strategic approach, which needs to be implemented.

36. Project Planning and Control Department

36.1. Disaster risk reduction should be integrated with the development plans and structural and non-structural safety should be considered among project proposals.

Disaster risk reduction has not been integrated with the development plans so far. For instance, safety features both structural and non-structural, need to be incorporated when considering proposals for modernization of hospitals. The main constraint was observed to be inadequate coordination with sister departments. If another department or organization is concerned with construction of roads, the Planning Department also needs to coordinate with them. Planning needs to be undertaken with an all inclusive approach, instead of department-wise segmental approach. There is need to sensitize and impart training to officials of the department in various aspects of disaster management as also statutory provisions contained in the Disaster Management Act, 2005 related to integration of DRR with inclusive planning and development.

37. Licensing Department

37.1. There should be an up to date training module related to trade and storage of hazardous chemicals for Senior Inspectors.

Since licenses for trade and storage of hazardous chemicals and materials are issued by this department, it is directly involved in the process of disaster risk reduction. Despite the fact that over 60,000 licenses for trade/ storage of hazardous materials have been issued and there are about 130 Senior Inspectors/ Inspectors for licensing, no specialized training has been provided to them and they normally conduct inspections based on past experience. There is need to impart training to them in a specially developed training module related to trade and storage of hazardous chemicals etc.

37.2. Responsibilities should be distributed accordingly on the following manner: technical inputs may be provided by health and fire departments respectively while administrative action for inspections and issue of licenses may appropriately be taken by license department.

There is apparently overlapping and duplication of efforts. For instance, for materials related to health hazards, technical reports are prepared by health department and licenses are also issued by that department. In that case, the role of License Department is minimal with virtually no responsibility. Similarly, for materials related to fire hazards, technical inputs are provided by fire services and licenses are issued by license department. It is considered that there is need to distinguish between technical and administrative functions. While technical inputs may be provided by health and fire departments respectively, administrative action for inspections and issue of licenses may appropriately be taken by license department.

37.3. There should be a sound and articulated policy on the status of hawkers vis-avis legitimacy and licensing or else the requirement of obtaining licenses for pre-1970s licensees may as well be discontinued since the present arrangement is discriminatory and the number of hawkers further add to traffic congestion leading to road accidents.

There is no clear policy in place for licensing of hawkers. Hawkers' zones are yet to be finalized. The role of the department is really not clear due to lack of well articulated policy. The Department is merely engaged in routine renewal of hawkers' licenses based on licenses issued during pre 1970s period. In the absence of a policy, which is apparently pending for decades, new hawkers are engaged in their respective activities without any license. In that case, pending finalization of the policy, the requirement of obtaining licenses for pre-1970s licensees may as well be discontinued since the present arrangement is discriminatory and adds to the routine administrative work. However, in the entire process, an important issue has been lost sight of, that is, indiscriminate increase in the number of hawkers at roadsides of busy markets will further add to traffic congestion leading to road accidents.

38. Gardens and Zoos Department

38.1. There is need to impart training to employees to give them a clear perception about the important task assigned to them particularly in environmental protection.

This department is directly involved in long term DRR through environment protection. The activities of the department need to be further accelerated based on an ambitious program. It was observed that the employees are not really aware of the pro-active role being played by them for environment protection. There is need to impart training to employees to give them a clear perception about the important task assigned to them and the need to accelerate it.

39. Shops and Establishment Department

39.1. The Department should generate mitigation and preparedness awareness and disseminate information related to DRR to its clients.

The Department can be a useful vehicle to generate awareness and disseminate information related to DRR to labor particularly basic do' and don't related to Earthquakes, Fire, Floods, etc, since it is already interacting with a large number of laborers belonging to poorer segments of society. The fact that this activity is not being undertaken at present is a gap which needs to be covered.

40. Ward Offices

40.1. Each Ward should develop a disaster risk management plan and conduct a regular update at least once a year.

While the overall performance, as observed in K-West ward, was found to be fairly good, there is considerable scope to improve it further. It is necessary that a disaster risk management plan, and not only a disaster response plan, is developed for each ward and up-dated regularly, at least once in a year.

40.2. In preparation for the rainy months, mock drills should be consistently conducted in low-lying Wards in Greater Mumbai during pre-monsoon months and damage infrastructure should be repaired.

Heavy rainfall coupled with high tide being a regular hazard, mock drills may be carried out in pre-monsoon period at least in all low lying areas and repair of pot holes, covers of man holes, de-silting of drains and other related activities completed well before monsoons.

40.3. Proper training should be given to the Disaster Manager in each Ward.

Though a Disaster Manager has been designated in each ward, there was no role clarity about the functions to be discharged by them. A major handicap is lack of training on the aspect of disaster risk reduction. Training needs to be imparted to all functionaries at ward level in disaster prevention, mitigation and preparedness. Regular training mechanism needs to be put in place with specific training modules for different target groups.

40.4. Policy guidelines on integration of disaster risk reduction elements in new projects should be shared with all wards with a monitoring mechanism in force.

At present the system is primarily oriented to response and relief. There is no special focus on integration of disaster risk reduction elements in new projects being taken up. It might be beneficial if policy guidelines on this issue are prepared in a comprehensive manner and shared with all wards with a monitoring mechanism in force, to be implemented by each line department at HQ with the support of DM Department.

40.5. As for response, trigger mechanism is in force but it needs to be streamlined and refined further.

Each functionary should be very clear about his precise role in different facets of disaster management, which is not the case at present.

40.6. There is also need to fill in gaps in the availability of essential equipments.

For instance bulldozers are stated to be available on centralized basis but the vehicles for their movement are not available with the result that it takes considerable time to ensure availability of bulldozers at the places needed. Such essential equipments should be spread over Greater Mumbai to cut down the time taken in transporting them to the site of emergency. Similarly the inventory of resources is maintained but it is not adequate. It does not include all men and material resources. Besides, it is not updated regularly, such as once in six months with particulars of controlling authority with phone numbers of each resource. It is also necessary to enlarge the resource base by including resources available in private sector, which can be requisitioned as and when necessary under the Disaster Management Act, 2005.

40.7. There is also need to have intensive interaction with the corporate sector to ensure that corporate social responsibility is not only accepted but implemented meticulously in times of need.

40.8. Ward offices should take proactive measures to facilitate the task of fire services.

Fire incidents, particularly in slum areas pose serious logistic problems which have not been addressed adequately. Ward offices may jointly inspect the slum areas with fire stations located in the ward as well as adjacent wards, depending on their proximity to slums in their respective areas and work out logistic of fire engines reaching the interiors of slums in the shortest possible time, if necessary with equipments to reach the affected areas even from some distance. Ward offices should not consider it a function of fire services alone; they need to take proactive measures to facilitate the task of fire services. It may also be ensured by each ward office that fire hydrants in their wards are fully operational at all times with adequate water supply.

40.9. UEVRP needs to be made more comprehensive by including other specific disasters.

Although awareness generation program has been undertaken under the Urban Earthquake Vulnerability Reduction Project (UEVRP) of GOI-UNDP Disaster Risk Management Program, which was to have been concluded on December 31, 2009, this project needs to be made more comprehensive by including other specific disasters also, besides earthquakes and ownership may be assumed by MCGM in Greater Mumbai for urban risk mitigation. The awareness programs may include all stakeholders at ward level, Resident

Welfare Associations, schools, slum areas, private sector/industries in the area as well as media to ensure basic preparedness among the community.

40.10. Basic training on first aid and search and rescue should be conducted in the community.

Coordination among stakeholders is at present a weak link. It has to be realized that disaster management is not the function of governments alone. The first responders are invariably the community. This may be promoted through basic training in first aid and search and rescue through the involvement of Civil Defense.

40.11. Frequent field visits from MCGM Departments and among Wards to other Wards is encourage.

Awareness generation, coordination among stakeholders and review to ensure that all systems are in place can be achieved, at least to some extent, through frequent field visits by Ward Officers and heads of departments at ward level. The officer in charge of the zone should also undertake frequent surprise field visits to assess the position, based on a well articulated Disaster Management Plan for the respective zones/ wards. Inter-department coordination meetings on disaster management may be held regularly, at least once in a month, both at Headquarters and Ward level.

Conclusions and Recommendations

Based on the identification and analysis of gaps, the conclusions and related recommendations, both on sector-wise/ department-wise basis, as well as at national/ state/ city levels, have been captured in Part VII of the Report. However, a few key general observations/ recommendations, which impact all the phases of disaster management in Greater Mumbai, are indicated below:

(i) It is desirable to undertake an exercise in respect of all key stakeholders to assess that there is no mismatch in Authority, Responsibility, Accountability and Capacity. It has been observed that in few cases, while the authority may vest at a senior level, the responsibility is entrusted to a comparatively lower level, which in turn is again entrusted to next below levels on task-wise basis. In several cases, the officers responsible or accountable do not have the adequate authority to discharge their functions effectively. Besides, there is no assessment whether the officers held responsible or accountable have the requisite capacity to discharge their obligations. In normal times, the capacity can be built through adequate training. A mismatch in these four components invariably adversely affects the optimum results.

(ii) There should also be adequate delegation of administrative and financial powers, particularly in disaster situations, to officers responsible for coordinating response, relief and rescue operations. For instance, Chief Officer (DM) is of the same rank as Ward Officers with the result that he/she can 'request and persuade' but cannot 'command and control' the actions of ward offices.

(iii) Disaster Management is still perceived as the responsibility of DM Department which has come in the way of mainstreaming disaster risk reduction in the functions of all departments at city level. This can be corrected by training and capacity building of concerned departments. The training modules need to be specific to the requirements of each department based on training needs analysis as well as capacity needs analysis.

(iv) Despite trained and professional manpower, the optimum results cannot be achieved if necessary facilities and equipments have not been made available. The specific instances have been brought out in case of Fire Services and Health Care Management. These aberrations need to be corrected.

(v) Each stakeholder/department needs to put in place Standard Operating Procedures (SOPs) and conduct frequent mock drills to ensure there is role clarity in respect of functions to be discharged by each stakeholder/official in a disaster situation. This was found to be lacking in MCGM departments and particularly in ward offices.

(vi) Lack of adequate coordination among different stakeholders/ departments is a major bottleneck. An effective inter-agency as well as intra-agency coordination mechanism needs to be put in place.

(vii) Community participation was not clearly visible. There is need for MCGM to take a lead and have regular interaction with community through ward offices for community sensitization and training, if necessary through the mechanism of civil defense and home guards, with the lead being taken by respective ward offices. Unless the MCGM departments and ward offices change their mindset from discharging regulatory functions in a colonial manner to a participatory approach, there is little hope of community coming forward to work hand in hand with providers of civic amenities. There is a crisis of confidence so far as community's active participation with MCGM departments and ward offices is concerned. It is unfortunately a harsh but accurate assessment.

(viii) A Disaster Management Action Plan needs to be developed as a part of Disaster Management Plan for Greater Mumbai to be prepared by MCGM. The identified gaps may be bridged through the Action Plan by short, medium and long term interventions. The modalities for necessary financial arrangements to take up intervention programs need to be worked out and included in the disaster management plan.

(ix) Documentation of good practices needs to be undertaken and extensively utilized for sensitization and training. MCGM has

responded well in past disasters, particularly Mumbai Floods, 2005. If the past experiences are documented both with good practices as well as impediments/ bottlenecks faced, these would significantly improve the future performance.

(x) Women empowerment and their active participation in training programs and mitigation measures to be taken by the corporation is essential; more so when 54% of the population is in slum areas where habitats are more vulnerable and womenfolk have the major responsibility of looking after their habitats and children, besides working as hard as men-folk to supplement the household income. MCGM may develop a comprehensive program for imparting training to women for pro-active action in case of a disaster for saving lives, property and community assets.

Path Ahead

The DRMMP may aim at a vision 2020 to build a safer and secure Mumbai through sustained collective effort, synergy of capacities of all stakeholders in the city and active community participation. In order to achieve this end, a serious introspection within MCGM is the first baby step which needs to be taken. MCGM's march forward should actually be visible to the community and not merely be a plan on paper, howsoever laudable it may be.

Appendices

Appendix I. Institutional DRM Stakeholders

119 INSTITUTIONS

1	Aegis Chemical Industries	
2	All India Radio, Mumbai	Bharati Gokhale Rustom Director Broadcasting house churchgate Near MLA's hostel M-20
3	Aniruddha's Academy	Mr. Zantye CEO Shri. Rajeev S. Kadam Dy. Director & Organising Committee Member Aniruddhas Academy Of Disaster Management 3, Krishna Niwas, Sakharam kir road , Off lady jamshedji road ,Mahim-16
4	Army	General Officer Commanding Maharashtra Gujrat and Goa Area 27/28, Assay Building Shahid Bhagatsingh Road , Near Colaba Post Office Colaba , Mumbai- 400005
5	Autorickshaw Union	Chairman Autockshw Union Shop Number 2/11, Unnat Nagar Number-4, Mahatma Gandhi Road , Goregaon (W), Munbai
6	Brihanmumbai Electricity Supply and Transport (B.E.S.T.)	Mr. Ravishankar Kamble Dy. Chief Security & Vigilance Officer BEST Bhavan , BEST Marg ,Post Box No-192 M-01
7	Bank of Baroda	Ravi Malik, Deputy General Manager Greater Mumbai Zonal Office 3,walchand hirachand marg, 3rd floor, ballard pier, mumbai-400001

8	Bhabha Automic Research Center (B.A.R.C.)	Dr.C.Kumar Banerjee Director Mr. H.S.Kushwaha Scientist and Director, Health, Safety and Environment Group B.A.R.C. Trombay, M-85
9	Bharat Petrolium Corporation Ltd. (B.P.C.L.)	Shri. Ashok Sinha Chairman & Managing Director Mr. K. Ravi DGM (Admin & Trainig) B.P.C.L. Bharat Bhavan, Bellard Estate, M-1
10	BIG 92.7 FM	401, 4th Floor Infiniti Link Road Oshiwara Andheri (W) , M-53
11	Board of Control For in India	Shri. Shankar manohar President Board of control for in India , Cricket Centre , Wankhede Stadium D road , Church gate , Mumbai-400020
12	Bombay Chamber of Commerce and Industry	Shri. Bharat Doshi Chairman, Managing Committee Bombay Chamber Of Commerce & Industry , Mackinnon Mackinzie Building ,3rd Floor,4,Shoorji Vallabhdas Road, Ballard Estate, M-01
13	Cricket Club of India	Mr. Badal Mittal president The Cricket Club Of India Ltd J N Tata Pavillion, Brabounce Stadium, Dinshaw Vachha Road, M-20
14	Central Excise	Shri. S.K. Sharma Additional Commissioner Central excise bldg115,M.K.Road churchgate M-20
15	Central Railway	Dr. D.S.Dakhure Off. Of The Div. Rail Manag.Cst Central Railway M-01
16	City and Industrial Development Corporation (CIDCO)	Commissioner, CIDCO CIDCO Bhavan 6th floor, Sion Panvel Road CBD Belapur Belapur, Navi Mumbai -400614

17	Civil Defence	Shri. Sanjivan Joshi Additional Controller Director Of Civil Defence Govt. Of Maharashtra, Kalaghoda, M-400001
18	Civil Defence Staff College	Shri. Sanjeevan Joshi Additional Controller Civil Defence Staff College, B'bay Hospital Lane Near Metro Talkies M-1
19	Collector (City)	Smt. I.A. Kundan Collector Anil Sawant, Residental Deputy Collector Office Of The Collector Of Mumbai City, Old Custom House, Shahid Bhagatsingh Marg Fort, M-01
20	Collector (Suburb)	Shri.Vishvas Patil Collector(Mumbai Suburban District) Administration Building, 10th Floor, Government Colony,Opp.Chetna College, Bandra(E),M-51
21	Controller of Rationing	Controller Of Rationing Royal Insurance Bldg., 5th floor, 14th Jamshedgi Tata Marg, Churgate, M-20
22	D.N.A.	B.Mahesh, D.N.A. Lomj Oasis Complex Kamala Mill Compound Pandurang Budhkar Marg, L-parel M-13
23	Department of Income Tax	G. Anantharaman Shri. Manish Mishra Addl. CIT (HQ) Aykar Bhavan maharshi Karve road M-20
24	Department of Transport (RTO)	Shri. D.G.Jadhav Commisioner Department Of Transport (RTO) Administration Building,4th Floor, Government Colony, Opp.chetna college, Bandra (E),M-51
25	Director Health Services (M.S.)	Dr. D.S. Dakhure Dr. Suhas V. Ranade Dy. Director Director Heath Services (M.S.) ST.george hospital compound P D'mello road CST M-1

26	Director of Medical Education	Dr. W.B. Tayde Director Shri. R.S. Inamdar Dean,J.J.Hospital Grant medical College,and J.J. group of hospital byculla M-08
27	Director of Technical Education	Jt.Director Director of technical education Technical education regional office, World bank project building , Govt. politechnic campus, 49-kherwadi, Aliyawar jung marg, bandra(E), Mumbai-400051
28	Directorate General Factory Advice Service & Labour Institutes	Shri.S.S. Gautam , Director (Industrial Hygiene) Central Labour Institute ,N.S. Manikikar Marg,Sion, Mumbai-400022
29	Directorate General of Shipping	Directorate General Of Shipping Jahaz Bhavan Walchand Hirachand Marg Mumbai-400001
30	Doordarshan	Shri.L.K.Chopra Station Direcor, Doordarshan Doordarshan Kendra,Near Glaxo & Opposite Siemens , Pandurang Budhkar Marg,
31	Federation of indian chambers of commerce and industry	Shri Sushil Jiwarajka , Chairman Dr. Vaijayanti Pandit , Director Western Regional Council Krishnamai , plot no.33-B , Sir Pochkhanwala road, worli, Mumbai-400030
32	Fever 104 FM	HT Media Ltd. 2nd Floor , Mahalaxmi Engineering Building , Lady Jamshedji Croos Road Mahim (w), M-20
33	Food and Drug Administration	The Commissioner 341,Survey no.opp.RBI Bandra Kurla complex M-51
34	Forest Department	Shri. B.P. Panday Principal Secretary(Forests) Revenue & Forest Dept., GOM 4th floor,Room no-460(main) Mantralaya,Madam Cama Road , Nariman Point , Mumbai-400032

35	General Insurance Corporation	Yogesh Lohiya Chairman & Managing Director Mr.K. Raghunath Dy. General Manager Genral Insurance Corporation(GIC) "Suraksha", 170, Jamshedji Tata Road, Churchgate,M-20
36	High power transmission Center, AIR Malad	
37	Hindustan Petrolium Corporation Ltd. (H.P.C.L.)	Shri. Arun Balkrishnan Chairman & Managing Director Mr. A.A. Raichur Petroleum House, 17th Jamshedji Tata Road, Churchgate M-20
38	Home Guards	Shri. Sanjeevan Joshi Additional Controller
39	Housing and Urban Development Corporation	K.G.R. Pillay Dy.chief (law) Shri. Rajesh Sharma Regional Chief Officer Chairman & Managing Director Housing & Urban Development Corporation Ltd. Shreyas Chamber, 2nd Floor, 175, Dr D. N. Road ,Fort , M-01
40	Housing Dept., Govt of Maharashtra	Shri. S. J. Kunte Principal Secretary Housigng Dept. Govt. of Maharashtra Secretary Hsg Dept. Room No.268, 2nd Floor Mantralaya M-32 Shri.S.R.Hazare , Chief Off. MBRRB MHADA,Room No.401, 3rd Floor, Gruhnirman Bhavan (E) M-51
41	Indian Air Force	
42	Indian Bank Association	Shri. Lily Joseph Vice President Mrs. Mary Renjith Manager, Indian Bank Association World trade centre-1 sixth floor cuff parade colaba M-5
43	Indian Coast Guard	Head Quqters No. 2 coast Guard Distt. (Maharashtra) Worli Sea Face P.O. Worli Colony Mumbai- 400030

44	Indian Express group	City Editor Indian Express Group, Express Tower / 2nd Floor, N.Point
45	Indian Institute of Population Studies	Dr.Faujdar Ram Director and senior professor Indian Institute of Population Studies VN Purav Marg, Deonar, Mumbai-400088
46	Indian Institute Of Technology, Bombay(IIT)	Mr. Khakhar Director, Mr.Ravi Sinha Professor Indian Institute Technology(IIT) Bombay Powai M-76
47	Indian Institute of Tropical Meteorology	
48	Indian Merchants Chamber	Gul Kripalani President Mr. Dandekar Vice President - IMC / Chairman & MD- Camlin Indian Merchant Chamber, IMC Bldg., 2nd Floor IMC Marg Churchgate
49	Indian Meteorological Department, Western Region	R.V. Sharma Dy.Direcor General K.Sattidevi Director Indian Meterological Dept. Colaba, M-05
50	Indian Oil Corporation	Shri.Sanat Mishra D.G.M. Maharashtra state Office, Indian Oil Corp. Ltd. 1st Floor,254-c,Dr.Annie Besant Road, Worli Colony, M-30
51	Institute of engineers	Shri. S.H.Jain Chairman The Institution of Engineers (India) Maharashtra State Centre, 15, Haji Ali Park, K.Khadye marg, Mahalakshmi Mumbai-400034

52	Irrigation Dept, GOM	Shri. M.S. Munde Secretary,Command Area Development Water resources Section, 2nd floor (main) Room No - 207 Mantralaya,Madam Cama Road ,Nariman Point Mumbai-400032
53	Jawaharlal Nehru Port Trust (JNPT)	Shri. S.S. Hussain , IAS Chairman JNPT Capt. B.S.Kumar Senior Doc Master JNPT 1107/Raheja Centre 214 FPJ Marg Nariman Point M-21
54	Kalyan Dombivali Municipal Corporation	Shri.Govind Rathod, IAS Commissioner Kalyan Dombivali Municipal Corporation Shankarrao Chowk , Kalyan (West) - 421301
55	Konkan Region , GOM	Shri. S.S. Sandhu Divisonal Commissioner Bhalchandra Thakre Collector Mumbai suburb new administration building 10th floor near chetana college Bandra (E) M-51
56	Law and Judiciary Dept. GOM	Shri. M.N.Gillani Principal Secretary Law and Judiciary Department,3rd floor (main) Room No(354) , Mantralaya,Madam cama road , Nariman Point Mumbai-400032
57	Life Insurance Corporation	T.S. Vijayan Flag Officer Commanding in Chief, Western Naval Command Shri. B.B.Jadhav Superintending Engineer (SBU-Estate) LIC, Yogkshem jivan bima marg,M-21
58	Mahanagar Gas Ltd	Dr. Upendra Dutta Choubey Chairman MGL House,Opp ICICI Bank,Bandra(w) , M-51

59	Maharahstra Pollution control board	Shri.B.D. Wadde Regional Officer Maharashtra Pollution Control Board Shri. Chhatrapati Shivaji Maharaj Municipal Market Building ,4th floor, Mata Ramabai Ambedkar Road, Mumbai
60	Maharashtra Chamber of Housing Industry	Mr. Pravin Doshi President Maker Bhavan -II 4th floor 18, V.Thackersy Marg, New Marine Lines , Churchgate , Mumbai-400020
61	Maharashtra Fire Services Training Center	Shri. K.R.Hatyal , Sr. Instructor Shri. S.S. Warick Dy. Chief Fire Officer Maharashtra Industrial Development Corporation, MIDC Udyog Sarathi, Mahapalika Caves Road, Andheri(E) M-93
62	Maharashtra Industrial Development Corporation	Shri. K. Shivaji Managing Director Maharashtra Industrial Development Corporation MIDC Office, Udyog Sarthi Bldg, Mahakali Caves Road, Andheri- (E), M-96
63	Maharashtra State Road Transport Corporation (M.S.R.T.C.)	Shri. Omprakash Gupta Vice Chairman Mr. J.B. Inamdar Chief Civil Engineer M.S.R.T.C.Maha. Sahatuk Bhavan DR.A.Nair Marg M-8
64	Maharashtra State Road Development Corporation (M.S.R.D.C.)	Shri. Satish Gawai Vice Chairman Mr. M.T. Raipure Superintending Engineer M.S.R.D.C. Nepency road,Priyadashani road M-36
65	Maharashtra Truck Association	
66	Mahavitaran	Shri. Ajoy Mehta Managing Director MSEDCL Prakash gadh Station Rd Bandra(E) M-51

67	Maritime board	Shri. Ashwani Kumar , IAS CEO Com. S.K. Nath Maharashtra Maritime Board, Indian Marcantile Chember, 3rd floor,Ramjibhai kamani marg, Belard,Estate,M-01
68	Mazgaon Dock	Vice Admiral harisimran singh mahli, AVSM,VSM, Chairman & Managing Director Shri. P.K. sahu General Manager adm. Mazgaon Dock Ltd. Dock yard road, Mazgaon M-10
69	MHADA	Shri. Gautam Chatterjee Vice President Shri.J.S. Patel Dy.Chief Engg. Zone III Sonawala Bldg. 1st Floor Shankar Abaji Palav Marg Shindewadi Dadar Mumbai-14
70	Milk and Milk products	Shri. Bhave or vikas ,Mittal Court , 8th floor A wing , Nariman point
71	Mira-Bhayandar Municipal Corporation	Shri. Shivmurthy Naik , IAS, Commissioner Mira-Bhayandar Municipal Corporation Bhayandar (West) , Dist. Thane
72	MTNL	Shri. A.K.Dinkar General Manager (Operation & Plannig) Mr. S.V. Bhat Dy. G.M.(Operation & Planning) Maharashtra Telephone Bhavan Ltd. Prabhadevi
73	Mumbai Custom	S.N. Mina Chief Customs Commissioner -I S.R. Vichare Dy.Commissioner Of Custems,(Prev. Gen.) NCH New Custom House Ballard Estate M-1

74	Mumbai High Court	Shri. A.I.S. Cheema Registar General Mumbai High Court Shri. V.G. Bisht Registar (Finance & Budget), Mumbai High Court Registar Bombay High Court,Annexe bldg, 4th floor,Fort,M-32
75	Mumbai International Airport Ltd	Cdr. Pradeep Dixit Mumbai international airport limited , 1st floor terminal 1B Sancruz (East) Mumbai-400099
76	Mumbai Metropolitian Regional Development Authority (M.M.R.D.A.)	Shri. Ratnakar Gaikwad Metropolitan commissioner Shri. Deshpande E Block,MMRDA Bldg Bandra Kurla Complex
77	Mumbai Police	Shri. D. Shivanandan Commissioner Shri. Liyakat Ali Nadaf A.C.P. , Main Control Room Mumbai Police 2nd Floor Old Council Hall Maha.Police Head Quarter
78	Mumbai Port Trust	Shri. Rahul Astana Chairman Mr. Manohar Belekar (4th and 5th group) Safety Officer Ambedkar Bhavan , 5th floor, blue eate, indra dock, M-01
79	Mumbai University	Dr.Vijay Khole Vice-chancellor Mumbai University Dr. Gita Kewalramani Professor,Deptt. Geography, Co-ordinator,centre for DM. Mumbai University Santacruz Kalina Campus
80	National Dairy Development Board	The Director National Dairy Development Board NDDB,Post Box-9074 Goregaon(E),M-63
81	National Disaster Management Authority ,Government Of India	Cenaur Hotel, Near IGI Airport New Delhi-110037
82	Navi Mumbai Municipal Corporation	Shri. Vijay Nahata ,IAS Commissioner Navi Mumbai Municipal Corporation Belapur Bhavan, Belapur - 400614

83	Navy	The flag Officer Commanding (for staff officer port defence) Head quarters Maharashtra & guhrat Naval Area , noorbhoy building shahid bhagat singh marg, mumbai-400023
84	NDRF	
85	NDTV	Shri. Prasad Rammurti News Editor NDTV,7th Floor,Jupiter Mill Compound Senapati Bapat Marg Elphinstone Road, Mumbai-400013
86	NIDM – Training and capacity building, NIDM	Mr. Rajeev Sharma Joint Director National Institute of Disaster Management (Ministry of Home Affairs) 58, I.P.Estate , M.G.Marg, New Delhi-110002
87	ONGC	Shri. K.S. Jameslin Chairman & Managing Director O.N.G.C. NAC Stock Exchange Building 4th Floor, Badra Kurla Complex, Bandra(E),M-51
88	Pawan Hans	Shri. Subir Das G.M.(WR) Pawan Hans Helicopter Ltd, Juhu Airport , S V Rd. Vileparle(w),M-56
89	Professional Engineers Architects and Town Planners Association (PEATA)	Shri. Ajit A. Khatri President PEATA Office No.4&5 Nagari Terrace Sonawala Agyari Marg, Off. M.M.Chhatani road, Mahim(W),M-16
90	PWD	Shri. G.M. Kandhare Secretary, Public Works Department ,Gom 2nd floor (main) Room No. 264 Mantralaya Madam Nariman Point Mumbai-400032

91	Radio City 91.1 FM	Mr.Sanjay Roy Ms.Milli Shah Music Broadcast Pvt Ltd 5th Floor, RNA Corporate Park , Off Western Express Highway, Kalanagar ,Bandra (E) Mumbai -51
	Radio Mirchi 98.3	4TH Floor, A-Wing, Matulya Centre, Senapati Bapat Marg, Lower Parel (W), M-13
93	Radio One 94.3 FM	Radio Mid-day, 1-18 , Everest Chambers, 10th Floor ,Office #18, 156-D, J. Dadajee Road , Tardeo, M-34
94	Rashtriya Chemicals and Fertilizers (R.C.F.)	Shri. U.S. Jha Chief Managing Director Rashtriya Chemicals & Fertilizers Priyadashani, Eastern Express Highway, Sion, M-22
95	Reliance Energy	Shri. Lalit Jalan Vice Chairman Reliance Energy Reliance energy center, Santacrurz-(E), Western Express Highway, M-55
96	Relief and Rehabilitation, GoM	Shri. S.C.Mohanti Director & O.S.D. Relief & Rehabilitation Dept. Govt. Of Maharashtra,5th floor (main) Room No- 502 Mantralaya,Madam Cama Road ,Nariman Point Mumbai-400032
97	Reserve Bank of India	Dr. D. Subbarao Governor RBI Main Building First Floor Shahid Bhagatsingh Road M-1
98	Sardar Patel College Of Engineering	Dr. S.Y. Mhaiakar Principal & Director Development Cell SPCE & SPIT Munsi Nagar,Bhavans College Campus Andheri(w) M-58

99	Security Guards Board for Brihanmumbai and Thane District	Chairman Choppers rollers pvt.Ltd.Compound 2nd floor Lbs marg , opposite to dena bank ,Bhadup (W)
100	Seepz	Smt. Anita Agnihotri Deveiopment Commissioner Santracruz Electronic E Processing Zone Office Of Development Commissioner, Seepz Special Economic Zone, Seepz Service Centre Bldg,MIDC, Central Road, Andheri (E),M-96
101	Smt.Nathibai Damodar Thakarsi Road Women's University (SNDT)	Smt.Nathibai Damodar Thakarsi Rd.Women University, New Marine Lines,M-20
102	Sr. Divisional Safety Officer, Central Railway	
103	Sr. Divisional Safety Officer, Western Railway	
104	State Bank of India	State Bank of india Jangnnath Bhosale Road, Nariman Point, Mumbai,
105	Tata Institute Of Social Sciences (TISS)	MR. Mahesh Kamble centre for disaster management TISS Sion Trombay road deonar, Mumbai -400088
106	Tata Power Company	Shri.Prasad Menon Chiarman & Managing Director Mr. S.G. Patil The Tata Power Company Salsette Receiving Station, Lake Road Bhandup, Mumbai-400078
107	Taximans Union	Shri. A.L. Quadras, Chairman, Taximens Union, Taximens Enterprises, Navjeevan Society, Tardeo, Mumbai
108	Thane Municipal Corporation	Shri.V.M. Bhat Dy.Commissioner(Disaster) Thane Municipal Corporation Main Office, Basement (Octoroi section) , Panchpakhadi,Thane(West) - 400602
109	THANE BELAPUR INDUSTRIES	

	ASSOCIATION	
110	TIFR	Prof. Mustansir Barma Director TIFR Shri. Basavraj Swamy TIFR Dr. Homi Bhabha Road Navy Nagar Colaba M-05
111	Times of India	Sunando Sarkar Metro Editor Times Of India D.N.Road, Opp. CST. M-01
112	Traffic Police	Shri. Sanjay Barve Jt.Commissioner Of Police(Traffic) Worli New , M-30
113	Ulhasnagar Municipal Corporation	Shri. Ashok Bageshwar, IAS Commissioner Ulhasnagar Municipal Corporation Ulhasnagar Dist.Thane 421003
114	UNDP	
115	Union Bank of India	Shri. D.S. Tripati Union Bank Of India Genral Managers Office Mumbai Samachar Marg Fort, Mumbai- 400023
116	University Institute Of Chemical Technology	Shri. G.D. Yadav , FNA Director UICT(UDCT) Institute Of Chemical Tech. Nathalal Parekh Marg, Matunga,M-19
117	Urban Development, GoM	Shri. Manukumar Srivastava Secretary Nagar Vikas Vibhag Kaksha no-425,main,4th Floor,Mantralaya,Mumbai-32
118	Veermata Jeejabai Institute Of Technology (VJTI)	Dr. K.G. Narayankhedkar Director Dr. V.M. Topkar Professor & Head Civil & Environ. Engg. Deptt. VJTI,College Mahagani Rd.Matunga(E) M-19

119	Water Supply and Sanitation, GOM	Ms. Malini Shankar Pricipal Secretary Water Supply & sanitation Dept., GOM 5th Floor(main), Room No. 530 Mantralaya, Madam Cama Road , Nariman Point, M-32
120	Western Railway	Western Railway Head Quarter Off. Churchgate
121	Yashada	V. Ramani, IAS Director General Yashada Rajbhavan Complex, Baner Road, Pune-411007

Appendix II. Abstract of DRM Related Laws

The AIR (PREVENTION AND CONTROL OF POLLUTION) Act

Similar basis with the Environment (Protection) Act, the Air (Prevention and Control of Pollution) Act, passed in 1981, was created in response to the United Nations Conference on the Human Environment. The Law was instrumental for the creation of Central and State Boards. The rationale behind this is for the preservation of air quality and the control and abatement of air pollution.
The State Boards are tasks to: 1) advice their respective State Government on matters specific to air quality, 2) plan comprehensive programs, 3) conduct capacity building for those who are engaged with its programs, and 4) inspect industrial plants and the like. On the other hand, the State Government can declare any area with the state as air pollution control area.

The AIRPORTS AUTHORITY OF INDIA Act

The Airports Authority of India Act, enacted in 1994 and amended in 2003, created a single and unified Airports Authority that manages both national and international airports in all of India. The functions of the Authority are: 1) provide air traffic and air transport services, 2) plan, develop, construct and maintain runways and terminals, 3) plan, procure, install and maintain navigational aids, communication equipment, beacons and ground aids at the airport, 4) provide air safety services and search and rescue, facilities in coordination with other agencies, 5) establish warehouses for cargo and storage of goods, 6) establish and manage heliports and airstrips, and 7) establishment of training institutes among others.

The BUILDINGS AND OTHER CONSTRUCTION WORKERS Act

The Law essentially is to regulate the condition of service of buildings and employment of construction workers by providing for their safety, health and welfare measures. “Workers” are classified as skilled, semi-skilled or unskilled, manual, supervisory, technical or clerical work for hire or reward. Enacted in 1996, the Law assigned responsibilities to building owners and contractors to provide a safety officer that monitors safety measures undertaken. The Law instructed building establishments that are under construction to make available first-aid kits drinking water, urinals, accommodation, canteen, and proper notices in case of accidents. The Law also constituted in every State the Building and Other Construction Workers' Welfare Board and provides welfare funds.

The DANGEROUS MACHINES REGULATION Act

Became into Law in 1983, it regulates the production, supply, distribution, trade and use of dangerous machines. The Law takes into account the security and welfare of those handling or operating dangerous machines and the payment of compensation for the death or bodily injury suffered by any laborer while operating such dangerous machine. End users or companies are obliged to register every machine perceived as dangerous that they owned or rented. As prerequisite requirements before operating such machines, registration and adequacy of first-aid kit within the area of operation is required. Failure to comply on the provisions of the law would mean the cancellation of licenses of establishments and seizure of equipment.

The ENVIRONMENT (PROTECTION) Act

Passed into Law in 1986 as a response to the United Nations Conference on the Human Environment held in Stockholm in June 1972, the Environment (Protection) Act bridges the gaps of existing pollution and hazard substance specific laws and consolidates environmental protection legislations into a single law. The Law explicitly entrusted the improvement of environmental quality to the Central Government by preventing, controlling and abating environmental pollution. It also paved the way for the creation of Environmental Pollution (Prevention and Control) Authority—the pollution monitoring arm of the Supreme Court. It also provided the drafting of "procedures and safeguards for the prevention of accidents which may cause environmental pollution and remedial measures for such accidents”. The law was amended in 1991.

THE FATAL ACCIDENTS ACT, 1855

Act to provide compensation to families for loss occasioned by the death of a person caused by actionable wrong. It extends to the whole of India except the State of Jammu and Kashmir.

Whenever the death of a person shall be caused by wrongful act, neglect or default, and the act, neglect or default is such as would (if death had not ensued) have entitled the party injured to maintain an action and recover damages in respect thereof, the party who would have been liable if death had not ensued, shall be liable to an action or suit for damages, notwithstanding the death of the person injured, and although the death shall have been caused under such circumstances as amount in law to felony or other crime.

Every such action or suit shall be for the benefit of the wife, husband, parent and child, if any, of the person whose death shall have been so caused, and shall be brought by and in the name of the executor, administrator, or representative of the person deceased; and in every such action the Court may give such damages as it may think proportioned to the loss resulting from such death to the parties respectively, for whom and for whose benefit such action shall be brought; and the amount so recovered, after deducting all costs and expenses, including the costs not recovered from the defendant, shall be divided amongst the before-mentioned parties, or any of them, in such shares as the Court by its judgment or decree shall direct.

The INFORMATION TECHNOLOGY Act

In line with global techno-economic developments and in par with the United Nations standards, the Indian Government passed the Information Technology Act in 2000 and subsequently amended the Law in 2008. The Law made electronic commerce as part of the legally recognized and official transaction in India. These transactions include electronic data interchange and electronic communication.

The LIFE INSURANCE CORPORATION Act

Originally, to nationalize the life insurance sector by transferring all similar private or public businesses into one Government-owned Corporation; as part of the politico-economic mood at that time, the Life Insurance Corporation Act, enacted in 1956, has been amended several times to reflect changes in policy. With the enactment of the Insurance Regulatory and Development Authority Act in 1999, the exclusive privilege of the Life Insurance Corporation of India ceases as private life insurance businesses have sprouted.

The Life Insurance Corporation of India has the power to conduct redemption business and re-insurance as long as it is solely focus on life insurance. The funds accumulated by the Corporation can also be loaned for the security of any immovable or movable property.

The Major Port Trusts Act

The Major Port Trust Act, enacted in 1963, provided for the legal impetus for the creation of Port Authorities all over India including Mumbai Port Authority. The law bestows powers and responsibilities to the Board of Trustees to operate and regulate their business and constitute their own bureaucracy. The Board of Trustees and the Port Authority are under the supervision of the Central Government.

Although there are no provisions in the law that delves particularly on Disaster Risk Management, however, there are institutional responsibilities that provides venue for preparation and action during disasters. Under provisions 36-42, the Board, especially during emergencies or when the need arises can: 1) lend any of its vessels, appliances and services of its employees, 2) bar passengers and goods from using/entering the docks, 3) compel vessels to dock/discharge, 4) remove vessels from docks, 5) transship passengers and good between vessels, and 6) receive, remove, store and deliver goods. Both the Board and the Central Government can make regulations provided it is consistent with the law.

The MOTOR VEHICLES Act

Enacted on October 14, 1988, the Motor Vehicles Act replaced the 1939 Motor Vehicles law and consolidates the amendments. This law too was later amended in 1994, 2000 and in 2001 to include provisions on eco-friendly fuel, simplification of application procedure, and safety standards in the transport of chemicals among others.

The law covers provisions on: 1) licenses of drivers and conductors, 2) registration and permits to operate vehicles with different weights and sizes, and 3) construction and maintenance of vehicles. The law also provides articles on traffic controls. By not allowing abandoned vehicles with hazardous materials on the streets, would minimize the damage in the event of disasters.

The PETROLEUM AND NATURAL GAS REGULATORY BOARD Act

Enacted in 2006, the Law paved the way for the creation of a regulatory body that delves on petroleum and natural gas “refining, processing, storage, transportation, distribution, marketing and sale of petroleum, petroleum products

and natural gas". The Petroleum and Natural Gas Regulatory Board is primarily tasks to: 1) protect the interests of consumers and entities engaged in specified activities relating to petroleum, petroleum products and natural gas 2) ensure uninterrupted and adequate supply of petroleum, petroleum products and natural gas in all parts of the country, and 3) promote competitive markets. The Board is created by Central Government and is part of the Central level institutions.

The Board also has the power to establish storage facilities for petroleum products and lay down safety standards for petroleum related activities. These activities include infrastructure and operation or expansion of natural gas distribution network.

The PUBLIC LI ABILITY INSURANCE Act

The Public Liability Insurance Act of 1991, make available public liability insurance for the purpose of providing immediate relief to the persons affected by accident occurring while handling any hazardous substance. The owner/proprietor or the person in control over the handling, manufacture, processing and storage of any hazardous substance is liable to provide relief to anyone who were injured or died at the time of accident. All owners must have one or more insurance policies before conducting business involving hazardous substance. The Central Government can conduct or authorized anybody to inspect the premises or vehicles where the hazardous substance is "handled" or stored. Owners and companies are penalized if they don't comply with standards ingrain in this law.

The ROAD TRANSPORT CORPORATIONS Act

The Road Transport Corporations Act was enacted in 1950 barely three years after the Republic of India got its independence. The law empowers the State Government to establish a State Road Transport Corporations "with the objective of providing efficient, adequate, economical and properly coordinated system of road transport service". These Corporations have the power such as but not limited to: 1) operate transport services in the State, 2) manufacture, purchase, maintain and repair vehicles, 3) authorize the disposal of scrap vehicles, 4) do anything for the purpose of advancing the skills of persons employed by the Corporation, and 5) provide facilities for the consignment, storage and delivery of goods.

The State Government on the other hand, has the power and authority to supersede the Corporation if the performance of the latter falls short of the State's expectations. It also has the power to make rules and instructions for the corporation to follow.

The TELECOM REGULATORY AUTHORITY OF INDIA Act

The Law, enacted in 1997, is the raison d'être for the creation of the Telecom Regulatory Authority of India. The Authority has the power to: 1) revoke licenses due to failure in the part of the service providers, 2) inspection new types of equipment, and 3) issue directives. It is also responsible for ensuring technical compatibility and effective inter-connection of different service providers.

The WATER (PREVENTION AND CONTROL OF POLLUTION) Act

Alarmed by the problem of polluted rivers and streams as the economy grows and industries flourish, the Government of India passed into law in 1974 the Water (Prevention and Control of Pollution) Act. Just like the Air (Prevention and Control of Pollution) Act, the law provided the legal structure for the creation of the Central and State Boards.

Comparable with the basic tasks of the State Boards on Air (Prevention and Control of Pollution), the Board provides advice to their respective State Government, plan programs, conduct trainings, and inspect business facilities particularly those that handle the purification/treatment of water. In addition, the State Board also manages the condition of sewerage system.

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