

DELHI DISASTER MANAGEMENT AUTHORITY (DDMA)
GOVERNMENT OF NCT OF DELHI
REVENUE DEPARTMENT

Website: - http://www.ddma.delhi.gov.in



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EXECUTIVE SUMMARY

The Disaster Management Act, 2005 stipulates preparation of state and district disaster management plans aimed at reducing disaster risks as well as ensuring strong preparedness, response, and rehabilitation measures for coping with disasters. The State Disaster Management Plan of Delhi named as 'Delhi Disaster Management Plan' and the District Disaster Management Plans of the 11 revenue districts of Delhi have been prepared as per the guidelines issued by the National Disaster Management Authority and duly approved by Delhi Disaster Management Authority, chaired by Hon'ble Lt. Governor of Delhi.

Delhi is vulnerable to natural disaster like earthquakes and floods as well as human induced disasters such as bomb-blasts, acts of terrorism, fires, industrial and CBRN hazards, road accidents, etc. The entire region of Delhi is in Seismic Zone IV. Urbanization in Delhi has been quite unregulated, unplanned and rather, illegal. The structural safety of buildings in Delhi is, therefore, a huge issue that needs to be urgently handled by the agencies involved in construction and regulation of construction. Being the national capital, robustness of the disaster plan for Delhi cannot be overemphasized. At the same time, creating a well coordinated and integrated disaster management system is also challenge, given the multiplicity of command, control and coordination structures with its myriad institutions.

Emergency Support Functions (ESFs) are the essentials of Emergency Management. The plan establishes an organized set-up to conduct ESF operations for any of the Natural and Manmade Disasters. It outlines an implementation framework for preparedness, mitigation, response and recovery. The Plan has structured the activities of agencies concerned according to their capabilities, skills, resources and authorities across the state and district. It attempts to unify efforts of various departments so that they are involved in emergency management comprehensively to reduce the effects of any emergency or disaster within the state. In the State Disaster Management Plan, Standard Operating Procedures (SOPs) for responding to various disasters such as earthquake, fire, building collapse, CBRN disaster, etc. have been prepared and responsibilities have been fixed on relevant authorities. SOPs for various emergency support functions such as communication, evacuation, medical support, equipment support, etc. have also been stipulated. The tasks, person responsible and time frame of action have been defined. Emergency Support Functionaries are to be coordinated by District and State Disaster Management

Authority. The plan recognizes role of Divisional Commissioner and District Magistrates in providing overall operational direction and coordination for all the response functions. Emergency Operation Centre (EOC) at State and District level will be the nodal point for the overall coordination and control of response work in case of any disaster situation. Emergency Operation Centre with the helpline number of 1077 is already operational on 24X7 basis.

I hope all the stakeholders will now implement the Disaster Management Plans. I thank Sh. Kunal, IAS DC (Disaster Management), all the DMs, Sh. Ansuman Satapathy, Project Officer, DDMA (HQ) and all the District Project Officers of DDMA for taking deep interest and preparing the State and District level Disaster Management Plans. I also acknowledge the contributions of Prof. Santosh Kumar, Executive Director, National Institute of Disaster Management and Dr. O.P. Mishra, Seismologist, Earthquake Risk Evaluation Centre, Indian Meteorological Department who carried out expert review of Delhi Disaster Management Plan.

Date: 3rd September, 2015

(Ashwani Kumar, IAS)
Secretary (Revenue) /
Divisional Commissioner, Delhi /
Convenor (DDMA)

LIST OF ABBREVIATIONS & ACRONYMS

ADM Additional District Magistrate

BQS Bus Queue Shelter

BSES Bombay Suburban Electric Supply

CATS Centralized Accident and Trauma Services

CBRN Chemical, Biological, Radiological & Nuclear

CD Civil Defence

CEO Chief Executive Officer

CMG Crisis Management Group

CPWD Central Public Works Department

DCB Delhi Cantonment Board

DCMG District Crisis Management Group

DCP Deputy Commissioner of Police

DDA Delhi Development Authority

DDMA Delhi Disaster Management Authority

DEMEx Delhi Emergency Management Exercise

DEOC District Emergency Operation Centre

DFS Delhi Fire Services

DHS Directorate of Health Services

District DMA District Disaster Management Authority

DJB Delhi Jal Board

DM Disaster Management

DMRC Delhi Metro Rail Corporation

DoHFW Department of Health & Family Welfare

DRM Disaster Risk Management

DRR Disaster Risk Reduction

DSCSC Delhi State Civil Supplies Corporation Ltd.

DTC Delhi Transport Corporation

DTTE Directorate of Training & Technical Education

DUSIB Delhi Urban Shelter Improvement Board

EDMC East Delhi Municipal Corporation

EOC Emergency Operation Centre

ESF Emergency Support Functionary

GNCTD Government of National Capital Territory of Delhi

IC Incident Commander

IMD Indian Meteorological Department

I & FC Irrigation & Flood Control
IRT Incidence Response Team

MAHU Major Accident Hazard Unit

MCD Municipal Corporations of Delhi

MHA Ministry of Home Affairs

MISP Minimum Initial Service Package

NCC National Cadet Corps

NCMC National Crisis Management Committee

NCT National Capital Territory

NDMA National Disaster Management Authority

NDMC New Delhi Municipal Council/North Delhi Municipal Corporation

NDRF National Disaster Response Force

NEC National Executive Committee

NEOC National Emergency Operation Centre

NGO Non-Governmental Organization
NYKS Nehru Yuva Kendra Sangathan

PWD Public Works Department

QRT Quick Response Team

RWA Resident Welfare Association

SCMG State Crisis Management Group

SDM Sub-Divisional Magistrate

SDMC South Delhi Municipal Corporation

SEC State Executive Committee

SEOC State Emergency Operation Centre

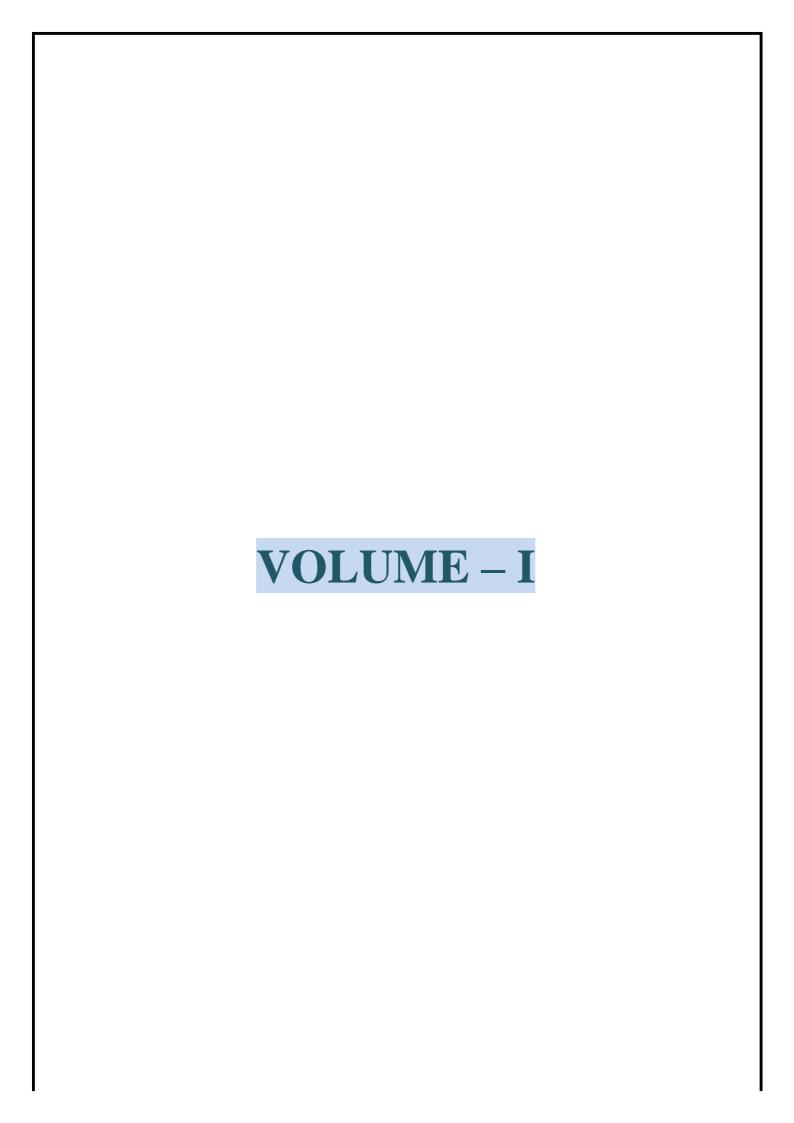
SOP Standard Operating Procedure

TETRA Terrestrial Trunked Radio

TL Team Leader

TPDDL Tata Power Delhi Distribution Ltd.

UD Urban Development





Chapter I

INTRODUCTION

This plan will be known as <u>Delhi Disaster Management Plan (DDMP)</u> and will be applicable in NCT of Delhi.

Disaster Management Act 2005 defines "disaster" as

"Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or manmade 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."

1.1 Purpose of the Plan:

To Make Delhi a Disaster Resilient Capital City so as to minimize human, livestock, property and environmental losses. The themes of the State Disaster Management Plan comprise risk and vulnerability assessment of disasters in the State. It also includes planning for prevention and mitigation, mainstreaming disaster in development plans/ programmes/ projects, capacity building and preparedness measures, the role and responsibilities of each Government Department and other stakeholders, risk transfer mechanism and effective programme management for future disasters. The State Disaster Management Plan has been envisaged for each state of India in section 23 of the Disaster Management Act, 2005.

1.2 Objectives of the plan:

Following are the objectives for preparation of the State Disaster Management Plan:

- To identify the various hazards and hazard prone areas in the State
- To conduct risk and vulnerability assessment and to identify vulnerable locations
- To evolve strategies for preparedness and mitigation so that risk involved in vulnerable communities can be reduced
- To evolve Emergency response and recovery mechanism and financial arrangements
- To promote a culture of prevention and mitigation through, awareness campaign, DM plans at all level, mock drills, risks and vulnerability reduction at community level and streamlining of institutional and techno-legal framework.
- Encourage and promote mitigation measures based on state-of-the-art technology and environmental sustainability.
- Mainstreaming DM concerns into the developmental planning process.
- Ensure efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- To provide clarity on roles and responsibilities for all stakeholders concerned with disaster management



1.3 Methodology:

The Disaster Management Plan for the state is proposed to be developed as an integrated plan encompassing all disasters in the multi-response fashion keeping with the international trend. Albeit, a common planning and operational framework is proposed for all the disasters which would ensure a systematic assessment, communication and management of risk, appropriate for a disaster and identification of response.

This exercise of preparation of disaster management plan in Delhi, aims to develop a comprehensive Disaster Management Plans (DMP) for the state and all the districts. The exercise has been conducted in three phases as shown below:

Phase I: Risk and Vulnerability Assessment for the state and resource mapping

Phase II: Preparation of Disaster Mitigation Strategy and Emergency Response Plan for State of Delhi harmonious with the guidelines and policies for DM formulated by MHA and NDMA.

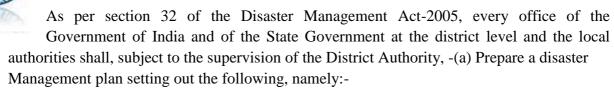
Phase III: Preparation of the District Disaster Management Plans for all eleven districts.

As per the Disaster Management Act, 2005, each district has to prepare a district disaster management plan. Accordingly, all the districts of Delhi are required to prepare district disaster management plans as per the latest guidelines of NDMA and update it annually.

1.4 Disaster Management Plans of Local Bodies & Departments of Government:

Section 40 of Disaster Management Act, 2005 stipulates that every department of the State Government, in conformity with the guidelines laid down by the State Authority, shall-

- (a) Prepare a disaster management plan which shall lay down the following:-
- (i) The types of disasters to which different parts of the State are vulnerable;
- (ii) Integration of strategies for the prevention of disaster or the mitigation of its effects or both with the development plans and programmes by the department;
- (iii) The roles and responsibilities of the department of the State in the event of any threatening disaster situation or disaster and emergency support function it is required to perform;
- (iv) Present status of its preparedness to perform such roles or responsibilities or emergency support function
- (v) The capacity-building and preparedness measures proposed to be put into effect
- (b) Annually review and update the plan and;
- (c) Furnish a copy of the plan to the State Authority.
- (2) Every department of the State Government, while preparing the plan shall make provisions for financing the activities specified therein.



- (i) Provisions for prevention and mitigation measures as provided for in the District Plan and as is assigned to the department or agency concerned;
- (ii) Provisions for taking measures relating to capacity-building and preparedness as laid down in the District Plan;
- (iii) The response plans and procedures, in the event of, any threatening disaster situation or disaster;
- (b) Coordinate the preparation and the implementation of its plan with those of the other organizations at the district level including local authority, communities and other stakeholders;
- (c) Regularly (annually) review and update the plan; and
- (d) Submit a copy of its disaster management plan and of any amendment thereto, to the District Authority.

1.5 Plan Activation

The plan will be so activated and operated upon as to make it responsive for disaster preparedness, quick response to the warning signal/information regarding any impending disaster and finally capable of swift recovery and rehabilitation in the long run. The Divisional Commissioner shall be the in-charge of activating all the linked response departments and Centres. The Relief Commissioner will also declare the end of Emergency once the normalcy is restored in the city. The Divisional Commissioner will activate all departments for emergency response including the State EOC, and District EOC. Also, they will issue instructions to include the following details:

- → Exact quantum of resources (in terms of manpower, equipments and essential items from key departments/stakeholders) that is required.
- → The type of assistance to be provided
- → The time limit within which assistance is needed
- → Details of other Task/Response Forces through which coordination should take place The State EOC and other control rooms at the State level as well as district control rooms should be activated with full strength. Once the situation is totally controlled and normalcy is restored, the Divisional Commissioner declares End of Emergency Response and issues instructions to withdraw the staff deployed in emergency duties.



DELHI STATE INITIATIVE

The State of Delhi has been prone to various disasters both natural as well as manmade. The Government of NCT of Delhi recognized the need to have a proactive, comprehensive and sustained approach to disaster management to reduce the detrimental effects of disasters on overall socio-economic development of the State. Further, on a day-to-day basis, Delhi is at risk to numerous hazards, such as earthquake, flood, bomb-blasts, other acts of terrorism, fires, industrial and nuclear, biological & chemical hazards, flash floods, building collapses, road accidents, water logging, etc.

Hence, Delhi Disaster Management Authority (DDMA) was constituted on 19.03.2008 under the Chairpersonship of Hon'ble Lt. Governor of Delhi for an effective and practicable framework for disaster management in Delhi. Chief Minister of Delhi is the Vice Chairperson of DDMA. The Secretary (DDMA) / Divisional Commissioner of Delhi is the head of the nodal department for disaster management in Delhi i.e. Revenue Department and is the Convenor of the DDMA. The framework created provides for institutional structures for unified command, control and coordination, with legal sanctity and the ability to achieve the disaster management needs of Delhi (systems that define the roles and responsibilities of each part of government and of institutions, techno-legal regime, awareness generation, capacity building, disaster management plans at all levels, specialized teams, an Incident Response System, etc.) in the broader framework of development.

The key elements of Disaster Management being undertaken by DDMA are awareness generation, Development of Preparedness & Response Plans at the community and administrative level, development linkages between the Government and Civil Society response and capacity building of Government institution in disaster mitigation, preparedness and recovery. Department has also made efforts to develop database on hazard, risk & vulnerability of NCT of Delhi. Emergency Operation Centre at the State Level & district levels has been set up to coordinate relief & rescue during the time of emergency. DRM Programme had also been involved in partnership with academic institution and private sector in development of disaster risk management plans & projects. Various structural & non structural measures are being carried out to reduce disaster impacts and enhance the management skills and improve capacities of the community, local authorities, urban bodies and state authorities to prepare, prevent & respond effectively to disasters. The first mega mock drill of India was conducted on 15th February, 2012 in association with NDMA.



Chapter II

NATIONAL CAPITAL TERRITORY - DELHI

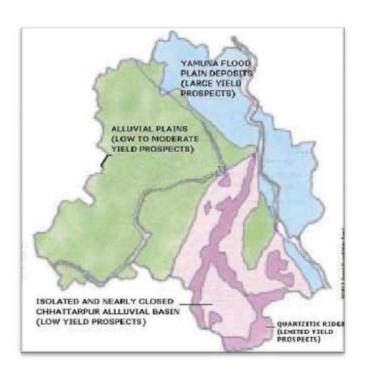
Delhi is the capital of India. The state is spread over an area of 1483 square kilometer. According to the Indian geography the state is located at the center of the Indian subcontinent, amidst the ranges of Himalaya and the Aravalli.

Area: 1,483 Sq.km Number of districts: 11 Number of villages: 112 Per Capita income: Rs. 38,864

(Census, 2011)

2.1Location

The latitudinal and longitudinal location of Delhi is 23.38 degree north and 77.13degree east. The state stands at the northern part of India. Haryana and Uttar Pradesh are the other states, which share their borders with Delhi in the west and east respectively. Delhi geography divides the state into three parts- the Delhi ridge, the Yamuna flood plain and the plains. The Yamuna river plains are very fertile as they are flooded by the river and are rich in alluvial soil. The Delhi ridge is the most important characteristic of the state and is a part of the Aravalli range that passes through Delhi.

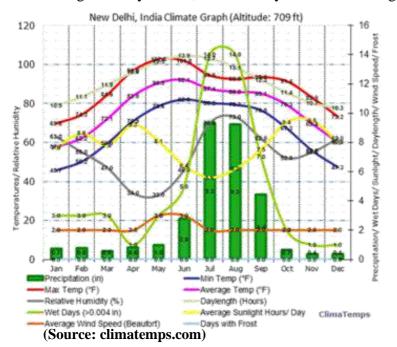


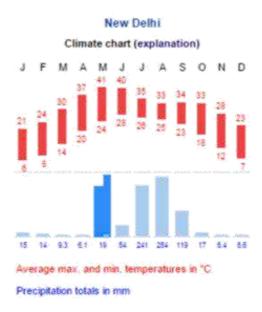
2.2 Weather

Delhi Weather varies with the different climatic conditions that are faced by this city. Delhi is a city characterized by weather extremes. The geographical location of this city influences the weather conditions of Delhi. Delhi experiences tropical steppe type of climate and hence its seasons are marked with extreme temperatures. The summer season commences in the month of April in Delhi and continues till July. During this season, continental air blows over the city and makes the weather in Delhi very dry and hot. Summer weather condition of Delhi is characterized by scorching heat and unbearable temperature. Temperature reaches almost 45degree C in the summer months. On the contrary, winter, which lasts from December to January, is extremely cold. Temperature falls to almost 5 °C during the winter months in Delhi. The rainy season in Delhi begins in June and continues almost till October. Delhi



receives most of its rain during this period from the Northwesterly winds. Most of the precipitation occurs in the month of July. The weather condition of Delhi remains pleasant during the rainy season, but humidity level remains high.





(Source: IMD)

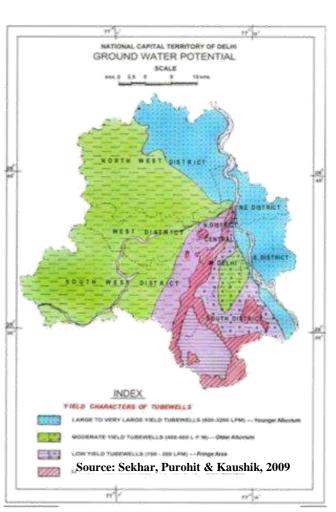
2.3 Geography

Delhi is bounded by the Indo-Gangetic alluvial plains in the North and East, by Thar Desert in the West and by Aravalli hill ranges in the South. The terrain of Delhi is flat in general except for a low NNE-SSW trending ridge that is considered and extension of the Aravalli hills of Rajasthan.

The ridge may be said to enter Delhi from the SW. The eastern part of the ridge extends up to Okhla in the South and disappears below Yamuna alluvium in the NE on the right bank of the river.

2.4 Hydrology

In about 90% of the land in Delhi, fresh water is available at depths varying from less than 2 m upto 60 m and the quality of water is also all right i.e. in drinkable condition. Only some 10 %

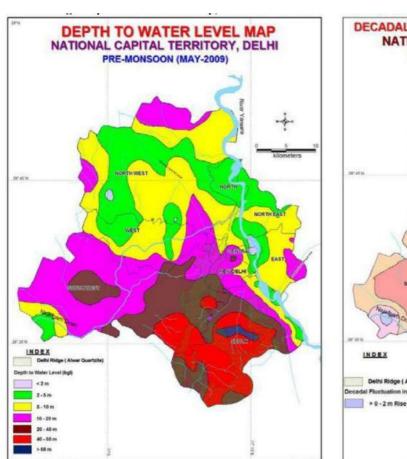


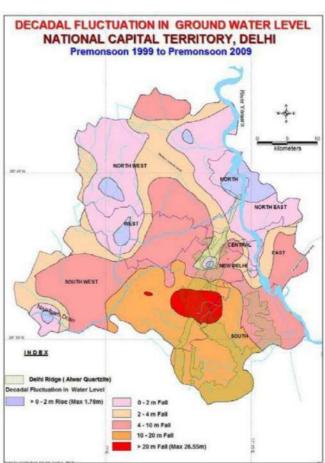


of the area comprises the ridge and some has saline and brackish waters.

2.5 Vegetation

The Vegetation of Delhi varies with its varied topography and comprises small and medium sized plants and shrubs. One important aspect about the vegetation of Delhi is that it is widely scattered and do not form any shade as such over any part in the city.





Source: Sekhar, Purohit & Kaushik, 2009. Groundwater management in NCT Delhi

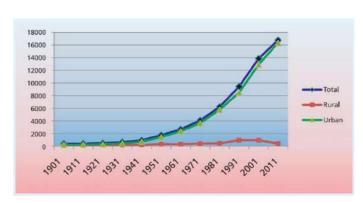
To study the nature of vegetation that grows in the different parts of the city, it is first important to know about the topographical variations of Delhi. The entire topography of Delhi is divided into a ridge, the Yamuna Flood Plain, the Plain. It is interesting to note here that each of these regions is marked by distinct type of vegetation. The ridge area of the city offers the right factors that favour the growth of acacias and other cacti. However, during the monsoon, herbaceous plants grow in abundance in the ridge. As far as the plain region of Delhi is concerned, it is characterized by shisham trees. And finally, riverine type of vegetation grows along the plain of Yamuna. Vegetation of Delhi mainly comprise of medium size trees and herbs. However Delhi is known for its varied flowering plants. Weeds and grass grow on the banks of the Yamuna River.



2.6 Social & Demographic Profile of Delhi

Delhi is still partly rural. Delhi has 1113 sq. km of urban area and 369 sq. km of rural area. It has a total of 112 villages (Delhi Statistical Abstract, 2014). In the 1901 Census, more than

48 per cent of Delhi's population lived in rural areas which showed a gradual decline from 43.7 per cent in 1911 to 7.3 per cent in 1981, though there has been a slight reversal of the trend i.e. 10.07 per cent in 1991. According to the Census of India 2011, the population of Delhi is 16,753,235. The corresponding population density was 11,297 persons per km², with a sex



ratio of 866 women per 1000 men, and a literacy rate of 86.34%. In 2004, the birth rate, death rate and infant mortality rate per 1000 population were 20.03, 5.59 and 13.08, respectively. Delhi is one of the fastest growing cities in the world. It is the second most populous city of the world after Tokyo. Population growth of NCT of Delhi is now showing tendency of stabilization. The decadal growth of population for Delhi has declined from 51.45% in 1981-91 to 47.02% in 1991-2001 to 20.96 in 2001-2011.

Table: Population Projection of Delhi

Year	Population in lakhs	Annual compound growth rate
1901	4.06	0.20
1911	4.14	1.67
1921	4.89	2.68
1931	6.36	3.74
1941	9.18	6.63
1951	17.44	4.31
1961	26.59	4.34
1971	40.66	4.34
1981	62.20	4.34
1991	94.21	4.24
2001	137.83	3.88
2011	195.07	3.54
2021	220.00	1.21



Table: Sex Ratio in Delhi

Districts	SEX RATIO		
	2001	1991	2011
North-East	851	837	886
East	845	846	883
Central	843	872	892
West	830	848	876
North	826	819	871
North West	820	822	862
South	797	807	859
New Delhi	791	793	811
South West	783	795	836

Source: Census, 2011

There is variation in the distribution of sex ratio in different parts of Delhi; there are more women in the old and concentrated settlements. However, compared to the sex ratio of the country as a whole (940 females per 1000 males), Delhi has a low sex ratio of 886 (2011 census), which in some respects has been a cause for concern.

District wise population of Delhi as per Census, 2011 is as follows;

Districts	Population (2011)	
North-East	22,40,749	
East	17,07,725	
Central	14,27,910	
West	25,31,583	
North		
North West	22,46,311	
South	12,33,401	
New Delhi	11,73,902	
South West	17,49,492	
South East	15,00,351	
Shahdara	22,40,749	

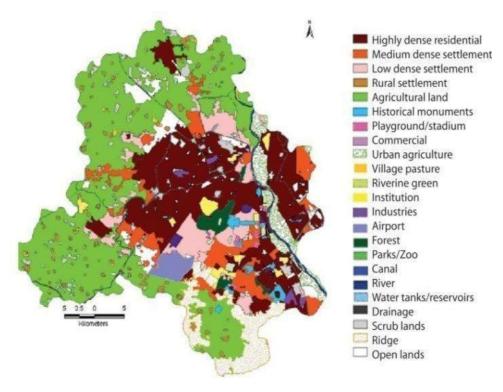


2.7 Economic Profile of Delhi

With the rapid pace of urbanization the rural area of Delhi is shrinking. The number of rural villages has decreased from 314 in 1921 to 112 in 2011 census. The percentage of rural population of Delhi has also declined from 47.24% in 1901 to 2.5% in 2011. As the country's capital, it has vibrant trade and commerce and excellent employment opportunities. Delhi has attracted people from all over the country and its population today reflects the characteristics of almost every region. Delhi truly reflects the wealth and diversity of India wherein diverse religions, languages, customs and cultures co-exist in splendid plural harmony.

Religious, cultural and social functions of different socio-cultural groups have transformed Delhi into a city of festivals. Delhi is among the top three States/Union Territories in terms of per capita income. More than 80% of the state income is from the tertiary sector. However, with the continuous inflow of labourers and unemployed persons, the number of people living in slum area areas is increasing. (Economic Survey of Delhi, 2001-2021). Gross State Domestic Product (GSDP) of Delhi at current prices is expected to increase from Rs.100325 Cr. in 2004-05 to Rs. 404576 Cr. in 2013-14. The Net State Domestic Product (NSDP) of Delhi at current prices is expected to touch a level of Rs. 387097 Cr. in 2013-14 as compared to Rs. 94717 Cr. during 2004-05. Per Capita Income for the year 2012-13 and 2013-14 at current prices are estimated at Rs. 192587 and Rs. 219979, respectively with the respective annual growth rates of 15.40% and 14.22% over the previous years.

Land Use Pattern of Delhi (2004)



(Source: spie.org)



2.8 Administrative Setup

Under the British

The British began their rule in Delhi in 1805 with the operation of General Regulations made by the British under the charge of the Resident and Chief Commissioner of Delhi. The system continued with periodic modifications till 1857. In 1858, the British made Delhi a provincial town of the Frontier Province and later transferred it to the newly formed Punjab province under a Lieutenant Governor. Delhi continued to be administered directly by the Government of India through a Chief Commissioner till 1950.

With the shifting of the capital from Calcutta to Delhi, a separate Committee known as Imperial was formed. Delhi Committee was formed on 25th March 1913 to oversee construction and management of the civic affairs of the new capital. In 1916, it was notified as the Raisina Municipal Committee under the Punjab Municipal Act 1911 primarily for meeting the sanitary needs of the workers engaged in the construction of the capital.

Delhi district had a Deputy Commissioner who was the Chief District Officer, having revenue and Registration powers. He was also the head of urban administration, being President of the District Board and the Municipality.

After Independence

Delhi became a Part-C State in 1951 with a Council of Ministers and a Legislature. The States Reorganization Commission, set-up in December 1953, recommended that Delhi, as the national capital, must remain under the effective control of the national government. It also suggested the formation of the Municipal Corporation of Delhi (MCD). The Municipality evolved into the MCD, in which the DC had no role after 1958. The development works were transferred to the Development Commissioner, the industries work to the Directorate of Industries and the work of transport to the Department of Transport. Accordingly, the Council of Ministers and Legislative Assembly of Delhi ceased to exist from November 1st, 1956. Delhi, as a Union Territory was administered thereafter by the President of India through a Chief Commissioner appointed under Article 239 till the Delhi Administration Act 1966 came into force.

Formation of the 11 Districts

The Municipal Corporation of Delhi Act was enacted by Parliament in 1957 and the Municipal Corporation of Delhi was formed with elected members in 1958. The Delhi Development Authority was created under the Delhi Development Act, 1957. The first Master Plan, 1961-1981 was published by DDA in 1962.

The Delhi Administration Act 1966 (No.19 of 1966) was enacted by Parliament to provide for limited representative government for Delhi with the creation of a Metropolitan Council comprising 56 elected and 5 nominated members. An Executive Council was also constituted by the President, and four Executive Councilors, including the Chief Executive Councilor, were appointed by the President. Delhi's administrative set-up has seen another change

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through the 69th Constitutional Amendment by way of insertion of Article 239 AA and the passage of the Government of National Capital Territory of Delhi Act, 1991.

With the new administrative set-up in Delhi, a number of other changes have followed, such

as the transfer of the Delhi Transport Corporation from the Government to the Delhi government. The Delhi Water Supply and Sewage undertaking **Disposal** have reorganized into the Delhi Jal Board (DJB). DJB has been transferred from MCD to the Delhi Government. In place of the single district that existed in Delhi, 9 districts with 27 sub-divisions were created in January 1997. However, Deputy Commissioner, Delhi continued to be the Head of the Administration, responsible for law and order, excise, issue of arms and explosive licenses, and citizenship certificates, apart from revenue and criminal judicial work. In the mid-seventies, the DC office was organized as follows - there were four administrative districts - New Delhi, Central, North and South, looked after by three ADMs, amongst whom the various powers and functions, such as treasuries,



excise, entertainment etc., were divided. Revenue and Land Acquisition work was supervised by ADM (Revenue) and ADM (LA) respectively. There were 12 Sub-Divisions, each headed by SDM, which was later reduced to seven.

In 1978, the Delhi Police Act was promulgated, by which Delhi came under the Commissioner of Police system. Almost all powers of the District Magistrates as per the Cr.P.C. were vested in the Police Commissioner. Section 107 and Section 144 Cr.P.C., which are very important viz a viz law and order, since then have been directly dealt with by the Police. Furthermore, powers of licensing and entertainment, which earlier vested in the D.C., were also given to the Police. This was the situation in 1996 when the exercise of decentralizing the DC office by setting up 27 SDM offices and 9 DC offices was started. While the SDMs were put in place in mid-1996, the DCs began functioning from 1.1.97. In the year 2012, the administrative set up was modified by creation of 11 districts and 33 sub divisions in Delhi.



Chapter III

HAZARD VULNERABILITY RISK ANALYSIS

A disaster is an event triggered by natural or man-made causes that lead to sudden distribution of normalcy of life within society, causing widespread damage to life and property. Distribution can be caused due to occurrence of frequent hazards like earthquakes, fires, cyclones, terrorism, biological wars and chemical explosions. When hazards connect with risk and vulnerabilities leads to the massive destruction. Level of risk (high/medium/low) depends upon the various hazards for which any specific area is prone to and/or also on the various physical, social-economic and institutional parameters. The chapter has been covered into two parts. First part is covering hazard assessment and second part is covering vulnerability and risk assessment on the basis of hazard assessment.

3.1 Basic Terminology:

• Hazard

"Hazard is an event or occurrence that has the potential for causing injury to life or damage to property or the environment. The magnitude of the phenomenon, the probability of its occurrence and the extent and severity of the impact can vary. In many cases, these effects can be anticipated and estimated." (Terry Jeggle and Rob Stephenson, Concepts of Hazard and Vulnerability Analysis)

It is any phenomenon that has the potential to cause disruption or damage to humans and their environment. Hazards are the potential for an event, not the event itself. Extreme events are natural or man-made processes operating at the extremes of their range of energy, productivity, etc.

• **Vulnerability**

Vulnerability is the degree to which a population, individual or organization is unable to anticipate, cope with, resist and recover from the impacts of disasters (Blaikie et al.1994). Vulnerability is a function of susceptibility (the factors that allow a hazard to cause a disaster) and resilience (the ability to withstand the damage caused by emergencies and disasters and then to recover)

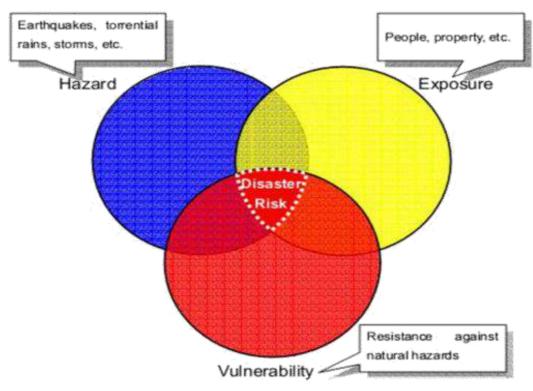
Risk

"Risk" is defined as the expectation value of losses (deaths, injuries, property, etc.) that would be caused by a hazard. Disaster risk can be seen as a function of the hazard, exposure and vulnerability as follows;

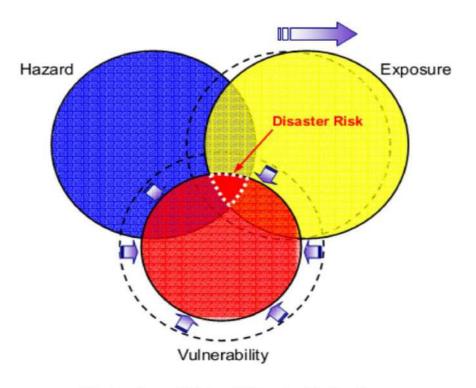
 $Disaster\ Risk = function\ (Hazard,\ Exposure,\ Vulnerability)$

To reduce disaster risk, it is important to reduce the level of vulnerability and to keep exposure as far away from hazards as possible by relocating populations and property. Growing exposure and delays in reducing vulnerabilities result in an increased number of natural disasters and greater levels of loss. (Asian Disaster Reduction Centre)





Mechanism Behind the Emergence of Natural Disasters



Mechanism of Natural Disaster Reduction

Source: Asian Disaster Reduction Centre



3.2 Hazard Assessment

In order to focus limited resources on to those areas of the state at risk, it is necessary to understand the pattern of hazard activity precisely and put a quantitative probability to the likelihood of occurrence of hazards. Information is available through newspaper clippings and records maintained with the various government departments of the hazard prone areas in the State with respect to various hazards has been documented for assessing the types of hazards probably occur in Delhi.

3.3 Earthquake Hazard:

An earthquake is a sudden shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface and followed by a series of vibrations. Earthquakes can cause buildings and bridges to collapse, telephone and power lines to fall, and result in fires, explosions and landslides.

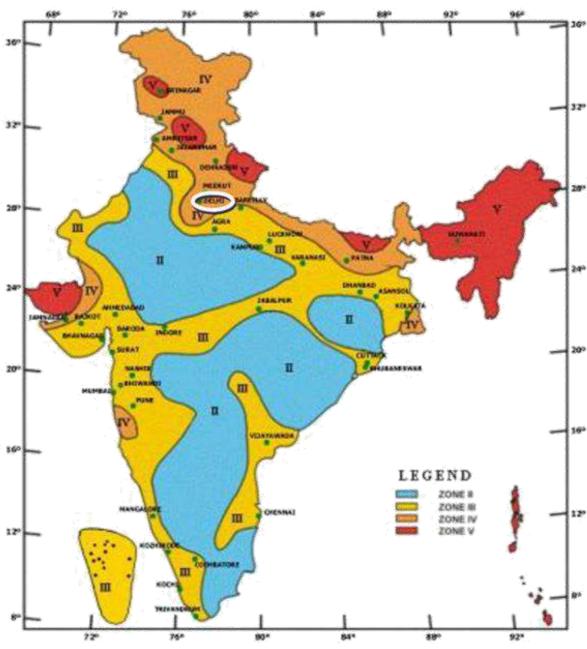
Seismicity in Delhi

The country has been classified into different zones indicating the intensity of damage or frequency of earthquake occurrences. The region with intensity less than V is designated as Zone 0. Thus, the designation of area as seismic Zone V indicates activity. Delhi is located in zone IV which has fairly high seismicity where the general occurrence of earthquakes is of 5-6 magnitude, a few of magnitude 6-7 and occasionally of 7-8 magnitude. Delhi thus lies among the high-risk areas.

Seismicity in North India, including the Himalayas, is due to collision of the Indian plate with Eurasian plate. It is seen that the Delhi region has a long seismic history being affected by earthquakes of local origin as well as these on Himalayan origin. Based on the tectonic map of the region prepared by Srivastav and Roy, this region is characterized by several dominant features such as the *Delhi - Hardwar ridge*, the *Aravalli - Delhi fold*, the *Sohna fault, the Mathura fault and the Moradabad fault*. The distribution of the epicenters appears to have a NE-SW trend correlated with the direction of major tectonic features of the region. It coincides with the extension of the Aravali Mountain belt beneath the alluvial plains of the Ganga basin to the northeast of Delhi towards the Himalayan Mountain (Jain, 1996). According to these authors it is not possible to associate the seismicity of Delhi with any particular tectonic unit.

In engineering terminology this generally referred to as the depth of bedrock below ground level. It is quite well known that tall buildings founded on deep alluvial deposits can be vulnerable to even long-distance earthquakes due to resonance effects. Detailed and accurate information on the depth of bedrock in the Delhi region is not available. Geological Survey of India(GSI) reports mention that the bedrock depth is 60 m in the Patel Road area, 15 m in Connaught Place Central Park, 40-50 m near Rajghat and 150 m and beyond in the Yamuna river bed. Similarly, the depth is reported to be 80-100 m in the Aurobindo marg-Hauz Khas area

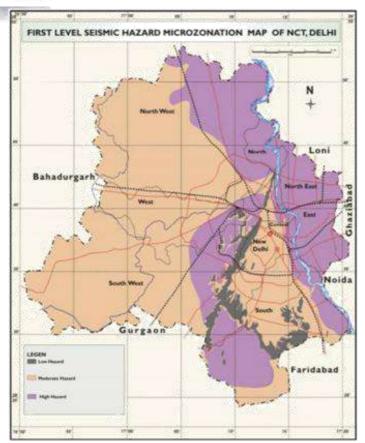


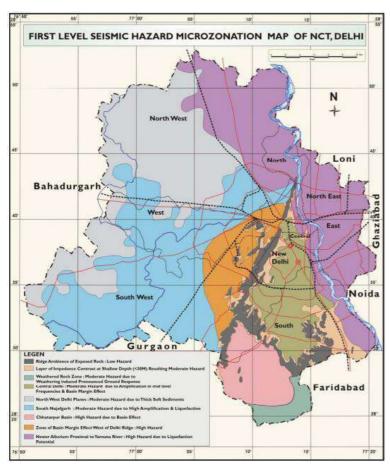


Seismic Zoning of India

Source: IS 1893 (2002)







Source: India Meteorological Department, New Delhi

The 1st level micro-zonatation map discretizes the territory of NCT Delhi in 9 units viz.

- (i) Ridge ambience of exposed rock with low hazard,
- (ii) Layer of impedance contrast at shallow depth (<30 m) with Moderate Hazard,
- (iii) Weathered rock zone with Moderate Hazard due to weathering induced pronounced ground response, (iv) Chhattarpur Basin with High

Hazard due to anticipated Basin effect,

- (V) Central Delhi with Moderate Hazard due to amplification in mid frequency level and Basin margin effect
- (vi) North-West Delhi plains(Bangar) of Moderate Hazard due to thick soil cover,
- (vii) South Najafgarh sedimentary fill (Dabar) with Moderate Hazard due to high amplification and liquefaction, (viii) Zone of Basin margin effect west of Delhi ridge: High Hazard, (ix) Newer alluvium proximal to Yamuna River: High Hazard due to Liquefaction Potential. Hazard levels map) have been alluded to different microzones based on anticipated amplification and liquefaction susceptibility.



Liquefaction population map of Delfa

Soil conditions affecting Delhi Seismicity Coupled with the settlement pattern, the geological characteristics, such as depth of alluvial soil, play a crucial role in determining the magnitude of risk. Impact of earthquake in Delhi may compound the expected colossal damage due to liquefaction, physical location and hydrogeology (combination of geology and ground water) details. There is severe threat of liquefaction along the river *Yamuna* areas covering northeast, east and some part of North West district.

A moderate to high threats across the belt running from central district, West district and South-West district is also expected. Delhi lies in the Indo-

Gangetic Geosyncline, a down wrap of Himalayan foreland of variable depth that is converted into flat plain by rigorous sedimentation. Gangetic Geosyncline has shown considerable amounts of flexure and dislocation at the northern end, which is bounded by the Himalayan Frontal Thrust on the north. The floor of the Gangetic trough (without all the sediments) shows corrugated inequalities and buried ridges (shelf faults). The Naraina-Patel Road section and the Yamuna River - bed section, extending till NOIDA and Faridabad, are more vulnerable to damage even by a moderate earthquake because they are on alluvial soil up to 200 m deep. These regions face a very grave problem of soil liquefaction during an earthquake. Moreover, earthquakes are amplified by alluvial soils. The Ridge is comparatively safe as it has a rocky base.

3.3.1 Past Trends of Earthquakes in Delhi

Delhi has been a witness to earthquakes in past. As Poer Iyengar (2000) damaging earthquakes have occurred around Delhi since ancient times. He points out that the great epic, Mahabharata mentions about earthquakes during the war at Kurukshetra (Circa 3000 BC). More recently, damage to Delhi in the 1720 earthquakes (intensity IX in Delhi) is well discussed by Kafi Khan (Iyengar, 2000). Tandon (1953) mentions of damage to the Qutab Minar during the 1803 earthquake near Mathura. Srivastava and Roy (1982) discuss several more earthquakes in Delhi region. These include:

- . (a) Earthquake of year **893 or 894** (Intensity XI XII) which took place not far from Delhi in which many persons died;
- . (b) Earthquake of **22 March 1825** near Delhi Intensity VII;
- . (c)Earthquake of 17 July 1830 near Delhi (Intensity VIII); and
- . (d) Earthquake of **24 October 1831** near Delhi (Intensity VI)

Delhi has also sustained earthquake damage in more recent times. For instance, Srivastava and Somayajuluy (1966) mention of :

. Khurja earthquake (**M6.7**) of **10 October 1956** in which 23 persons were killed in Bulandshahr and some injured in Delhi;



- . M6.0 earthquake of **27 August 1960** near Delhi wherein about 50 persons in Delhi were injured; and
- . An earthquake near Moradabad on **15 August 1966** that killed 14 persons in Delhi.
- . Iyengar (2000) also mentions about damage to one of the minarets of Delhi's Jama Masjid during the M4.0 earthquakes on 28 July 1994.
- . Most recently, the **1999** Chamoli earthquake (M6.5) took place about 280 km from Delhi. Such a moderate earthquake does not normally cause damage at such large distance. And yet, several buildings in Delhi sustained non-structural damage possibility due to peculiar geological and geotechnical features if this area.
- . Only recently in **September, 2011 and March, 2012**, tremors of more than **4** on Richter scale have rocked the capital, reminding once again Delhi's susceptibility to earthquakes.
- . On **November 12, 2013** four tremors ranging from **2.5 to 3.3** on Richter scale have struck the National Capital.

. The devastating Nepal earthquake of 25th April 2015 was also felt in Delhi.

Table: Recent	Earthauake	es in Delhi :
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Date	Latitude °N	Longitude °E	Magnitude
June 6, 1992	28.65	76.69	2.8
Feb 16, 1993	28.63	76.35	2.6
Mar 27, 1993	28.63	77.20	3.6
Aug 6, 1993	28.64	77,14	2.5
Dec 3, 1993	28.60	77.40	3.5
July 28, 1994	28.51	77.25	2.8
Oct 15, 1994	28.59	79.92	2.8
Nov 16, 1994	28.50	76.95	2.9
March 18, 2004	28.62	77.25	2.7
March 28, 2004	28.60	77,10	1.6
April 4, 2004	28.60	77.20	1.5
April 5, 2004	28.70	77.30	1.9
April 21, 2004	28.60	77.30	1.5
June 06, 2004	28.60	77.00	2.0
October 08,			5.6
2004			

Source: www.amateursesmiccentre.com

3.3.2 Future Analysis of Earthquake Disaster

- Six minor earthquakes in ten days sometimes is the precursor to a large one. The current local seismic behaviour is very similar to the one in Gujarat few years back. The net effect can weigh more devastating that even a nuclear bomb in Delhi.
- The Chinese centre for earth studies has a station in Tibet. The Tibetan monitoring systems is providing a similar reading in the Southeast of Tibet. The satellite mappings are also pointing towards some unusual seismic activities in the Delhi area.



The epicenters for the small earthquakes are clustered around a series of local fault lines in Delhi.

- Normally before the major shock comes, there is a dull period of no activity for a few
 days or even weeks. The major shake normally comes in suddenly and normally is of
 six or higher in Richter scale.
- There is something called cycle of earth quakes. We looked into India's major cycles. Delhi is due for a big one since 1999. However, seven years in geographic scale is very minuscule. It can come anytime during next seventy years. If the small tremors subside and nothing happens for the next six months, probably nothing will happen for at least three years. However, when all evidenced are put together, it does not look very good.

A great disaster may occur if three conditions are met:

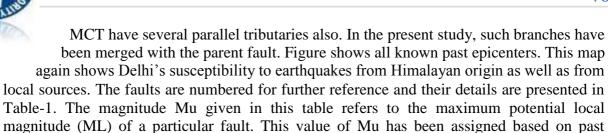
- (a) An earthquake of sufficiently large magnitude,
- (b) Occurrence of the earthquake close enough to a population centre, and
- (c) The population centre having buildings which are not earthquake resistant.

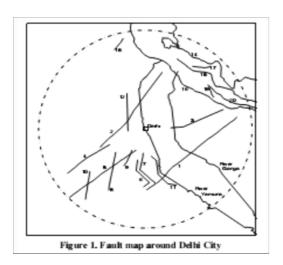
The question we must address is: is there a possibility of these conditions being met for Delhi at some time in the future? In view of huge population and the economic-cum-political significance of Delhi, occurrence of such conditions can cause not just a great disaster; but a mega disaster.

3.3.3 Seismic Background

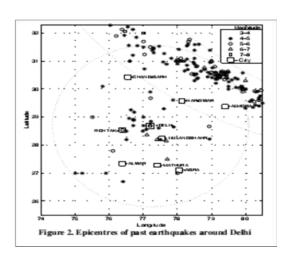
The terrain of Delhi is flat in general except for the NNE-SSW trending ridge. This is one of the prominent features of Delhi. This is considered as an extension of the Aravalli hill, which is buried under the Yamuna alluvium in the northern parts of Delhi. River Yamuna, which is another prominent feature of Delhi, enters the city from north and flows southward with an eastern bend near Okhla. This path forms a tri-junction with the Lahore-Delhi ridge, and the Delhi-Haridwar Ridge. This region is seismically active and shows sporadic activity aligned in NNE-SSW direction, nearly perpendicular to the Himalayan arc. Proximity of Himalayan region makes Delhi susceptible to the earthquakes from Himalayan seismic sources also. The nearest point from the Main Boundary Thrust (MBT) to Delhi is around 160 km. A large number of fractures and faults are noticed in the Himalayas [Valdiya 8]. This zone is well known for its severe seismic activity. In comparison with this, the Delhi region is seismically less active. Srivastava and Somayajulu have discussed the geological structures and seismicity of the target area. Their study suggests that the Sonepath-Delhi-Sohna dislocation is responsible for frequent earthquakes in and around Delhi city.

The epicentral map provided by them shows the presence of a seismogenic source inside the city limits. Data on the magnitude and location of past earthquakes have been collected from different catalogues. In engineering studies, it is the usual practice to consider a region of 250-300 kms. around the site for purposes of seismio-tectonic characterization. Here, with India Gate in Delhi as the center, a circular region of 300 km radius has been assumed as the catchment area for Delhi city. Tectonic features around Delhi city have been previously discussed by. This has been further improved here to map all known faults in a radius of 300 km., around Delhi city. Twenty faults recognizable as affecting Delhi are shown in Figure. Among these, eighteen faults have been marked following the Seismo-tectonic Atlas of India. A short fault within Delhi city has been identified based on a report of GSI. Sohna fault has been marked in Figure based on the work of Srivastava and Roy. Faults such as MBF and





information, without being overly conservative.



Source:- Iyengar and Ghosh

Table 1: Fault characteristics

No	Fault Name	M _u	Length Km.	w _s
1	Great Boundary Fault (GBF)	7	320	0.1462
2	Mahendraghar-Dehradun (M-D)	7	300	0.2657
3	Moradabad	6.5	165	0.0790
4	Chahapoli	5.5	215	0.0872
5	Sabi Fracture	5.5	195	0.0796
6	Near Mathura	5	84	0.0371
7	Fault Parallel to no. 6	5.5	115	0.0490
8	Fault left of Alwar	5	130	0.0547
9	Fault near Alwar	5	55	0.0260
10	Fault near Jaipur	5	117	0.0497
11	Mathura	6	100	0.0432
12	Sohna	6	105	0.0719
13	Delhi	4.5	7	0.0106
14	Main Central Thrust (MCT)	8	350	0.5847
15	North Almora thrust (NAT)	6.9	280	0.1315
16	Main Boundary Thrust (MBT)	8	450	0.1647
17	Alaknanda	5.5	51	0.0454
18	Ropar	5	35	0.0144
19	Near Ramgarh	5	37	0.0149
20	South Almora Thrust (SAT)	6.5	130	0.0444



3.4 FLOOD HAZARD

Floods in Delhi are not nature's wrong doing, it is invariably the failure in implementation of sound urban planning measures. This is very clear from the recurring phenomenon of floods in the mighty river Yamuna and flash floods caused by rains due to choked drains of Delhi.

River Yamuna and Floods

Keeping in view the topography, Yamuna catchments upto Delhi is divided in two parts –

- (1) The upper catchments from source in Himalayas to Kalanaur in Haryana which comprises parts of Himachal Pradesh and hills of West Uttar Pradesh and
- (2) The lower catchment from Kalanaur to old Delhi Rail Bridge which consists of West Uttar Pradesh and Haryana. River Yamuna enters Delhi from the northeast near Palla at an altitude of 210.3 meters and after traverse of about 40 km. it leaves Delhi at an altitude of 198.12 m near Jaitpur in the South. The width of the riverbed varied from 1.5 to 2.0 km. In its flow from Wazirabad barrage, a network of seventeen drains joins the river on the West bank during its traverse in the northern parts of the city. Najafgarh and Alipur drains, due to heavy discharge from Sahibi River, inundate a number of villages in Nazafargarh block causing heavy damage to life and property. There was, however, little effect of it in Yamuna river flow. Only one drain joins on the East bank near the old rail bridge.

3.4.1 Flood zoning

The flood situation is projected in the flood atlas map prepared by central water commission. As per the map of the flood prone areas of Delhi, it has been classified into thirteen zones based on the flooding risk in relation to incremental rise in the water level of the Yamuna (DDA, 1993). These cover a range from 199m to 212 m level of water in the Yamuna. This zoning map covers part of North Delhi on the West bank of the Yamuna and almost the entire Trans Yamuna Area on the East bank. Besides this, the Delhi Flood Control Order also the NCTD into four Flood Sectors, namely Sectors, namely, Shahadra, Wazirabad - Babrapur, Alipur and Nangloi - Najafgarh sectors.

Although the unprotected flood prone area is only 1.7% or 25km only towards the south east and about 5% or 74 sq km in the north eastern parts which is protected by earthen embankments every year water level rises in Yamuna above danger level and large population has to be evacuated to the top of the bunds and Delhi highways.

As already stated, main reasons for this rise of water level is not natural but release of excess water from Tajewala headworks upstream to the two canals one on left and other on the right bank of the river. Rise in water levels also cause back flows in the connecting drains and have effect on the city drain network causing overflow cause of many monsoon related diseases.

3.4.2 Local Flooding

A significant phenomenon which has been increasing during recent years is that of local flooding. Urban areas are characterized by a high area under impervious surfaces (Roads, pavements, houses etc). High rates of development along with the resultant loss of soft landscape have led to high surface water sun-off rates. This results in flash floods in the low

lying areas even after moderate precipitation. Another factor adding to this effect is that of river because the river is already flowing at a higher level within its embankments. Thus, the water gets logged in the city areas and it takes several days to mechanically pump it out and bring the situation under control. Similarly, during the past few years, flooding due to the city's 18 major drains has also become a common phenomenon. Already under the pressure of the city's effluent discharge, these drains experience reverse flow from the Yamuna, which is in spate, and as a result they tip their banks, flooding the neighbouring colonies.

3.4.3 Past Trends of Floods

The flow of Yamuna within Delhi is by and large influenced by discharge from Tajewala Headwork 240 kms upstream. In the event of heavy rain in the catchment area excess water is released from Tajewala. Depending upon the river flow level downstream, it takes about 48 hours for Yamuna level in Delhi to rise. The rise in water level also causes backflow effect on the city's drains. The city also experiences floods due to its network of 18 major drains having catchment areas extending beyond the city's limits.

Major Floods in Delhi

1977: Najafgarh drain experienced heavy floods due to discharge from the Sahibi River. The drain breached at six places between Dhansa and Karkraula, marooning a number of villages in Najafgarh block. Six human lives were lost due to house collapse. 14 persons died in a boat mishap. Crop damage was estimated at Rs 10 million.

1978: (September) River Yamuna experienced a devastating flood. Widespread breaches occurred in rural embankments, submerging 43 sq km of agricultural land under 2 meters of water, causing total loss of the kharif crop. In addition to this, colonies of north Delhi, namely, Model town, Mukherjee Nagar, Nirankari Colony etc. suffered heavy flood inundation, causing extensive damage to property. The total damage to crops, houses and public utilities was estimated at Rs 176.1 million.

1988: (September) River Yamuna experienced floods of very high magnitude, flooding many villages and localities like Mukherjee Nagar, Geeta Colony, Shastry Park, Yamuna Bazzar and Red Fort area, affecting approximately 8,000 families.

1995: (September) The Yamuna experienced high magnitude floods following heavy runs in the upper catchment area and resultant release of water from Tajewala water works. Slow release of water from Okhla barrage due to lack of coordination between cross state agencies further accentuated the problem. Fortunately, the flood did not coincide with heavy rains in Delhi, and could be contained within the embankments. Nonetheless, it badly affected the villages and unplanned settlements situated within the river-bed, rendering approximately 15,000 families homeless. These persons had to be evacuated and temporarily housed on roadsides for about two months, before they went back to living in the river-bed (Source: Sharma, 1996).



Maximum Water Level Attained in River Yamuna in the Last 10 Years:

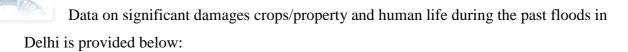
Sl. No.	Date	Gauge in Mtrs.	
1	06-08-2003	204.60	
2	28-08-2004	203.72	
3	18-07-2005	204.86	
4	11-08-2006	204.10	
5	15-08-2007	204.74	
6	23-09-2008	206.00	
7	15-09-2009	205.33	
8	22-09-2010	207.11	
9	19-08-2011	205.72	
10	29-08-2012	204.70	
11	19-06-2013	207.32	

Danger Level: 204.83 Mtrs. Source: Flood Control Order, 2014

3.4.4 Flood vulnerability

The Irrigation and Flood Control Department of Delhi is the sole in-charge of execution, repair and maintenance of flood control works on River Yamuna and Najafgarh drain system. Till date both banks of the River Yamuna has been embanked through its run in Delhi right from Palla in the North to Jaitpur in the South. On the right bank, Delhi is protected by Rural Marginal Embankment (RME) from Palla to Supplementary drain, Jagatput Bund from Jagatpur to upstream of Wazirabad Barrange, Yamuna Bazaar Wall upstream of Old Railway Bridge and Rural Marginal Embankment Madanpur Khadar from Okhla to Jaipur. On the left side, Delhi is protected by Left Forward (LF) Bund from Delhi - U.P. Border upto Wazirabad, Shahdra Marginal (SM) Bund from Wazirabad to Old Delhi railway Bridge and L.M Bund from Old Railway Bridge to NOIDA.

Analysis shows that while RME Palla meets the requirement from with-standing a 25 year frequency flood, Jagatpur Bund, Yamuna Bazaar wall, Mughal Bund, L.F Bund, S.M Bund and L.M Bund all fail to meet this standard and would overtop in such a flood. In the eventuality of a 100 year frequency flood, all these embankments would fail to meet the requirement (Sharma 1996.)



Year	Damage to Crops/Property (in Crores)
1955	0.32
1961	1.13
1964	1.85
1967	4.88
1977	5.39
1978	17.61
1995	32.34
1997	65.80

Year	Loss of Human Lives
1955	7
1961	2
1964	4
1972	1
1977	18
1978	18
1980	2
1997	52

Source: Central Water Commission



3.4.5 List of Affected Areas

As per the Flood Control Order-2014 following areas of Delhi are vulnerable to drainage congestion (Urban Flooding)

S.No	Block	Location/Area			
1.	Kanjhawala	Tikri Kalan, Rohtak Road Area near Mundka Village, Bakarwala			
		Village, Nangloi Jat & Shivram Park, Shahabad Daulatpur Diary			
		Colony, Daryapur Village, Bawana Village, Ishwar Colony.			
2.	Alipur	Kaushik Enclave (Burari), Tomar Colony (Burari), Sindhi Colony,			
		Jindpur, Palla, Sarup Nagar, Mukhmelpur, Jhangola, Shardanand			
		Colony Wazirabad Village, Milan Vihar, Hiranki, Sangam Vihar,			
		Sant Vihar, Jivan Vihar, Chandan Park, Rajeev Colony, Bhalswa			
		Jhuggi Colony.			
3.	Mehrauli	Tajpur, Jaitpur, Madanpur Khadar, Okhla, Mithapur Extn., Jamia			
		Nagar, Sarai Kala Khan, Mithapur Harijan Basti, Gagan Vihar/Om			
		Vihar, Jaitpur Extn. Nangli Rajapur, Ahizrabad. Jasola, Jogabai,			
		Chijrabad, Chilla, Beslol Pur Khadar.			
4.	Shahdara	Kondli-Gharoli Area, Gandhi Nagar, Geeta Colony, Lalitapark,			
		Dallupura & Adjoining Area of Ashok Nagar.			
5.	Najafgarh	Najafgarh Near Jharoda Road, Roshanpura, Harijan Basti			
		(Kakraula), Mansa Ram Park (Near Matiyala Village), Vijay			
		Enclave, Mahavir Enclave, Palam Village, Bijwasan Village,			
		Rawta, Jharoda Kalan, Malikpur, Jhuljuli, Sarangpur, Galibpur.			
6.	Apart from above	Apart from above, the following DDA areas are also vulnerable:-			
	1. Jwala Puri (Pira Garhi)				
	2. Ordnance Depot (Shakur Basti)				



The following areas are exposed to Flood from the drainage system present in Delhi

Name of Sector	Totally Exposed Area	Moderately Exposed Area
		Sabhapur Chauhan, Sabhapur
		Chauhan Patti, Sherpur,
Shahdara	Usman Pur, Garhi Mandu	Sadatpur, All low lying
		areas/villages like Sonia
		Vihar.
	Joga Bai, Khizrabad, Jhuggies behind	
	Raj Ghat and Shanti Van, Jhuggies on	All low lying fields
Wazirabad, Jaitpur	West of Shahdara Marginal Bund	
	Downstream of Approach Road ISBT	
	Bridge	
		Palla, Sungerpur, Hiranki,
Alipur	NIL	Tigipur, Mohd. Ramzanpur,
		Gopal Pur, All low lying
		fields.
Nazafgarh – Dhansa	NIL	Galibpur, Rawata, Daurala,
		Nanak Heri, Ghuman Hera,
		All low lying fields.
Kanjhawla- Nangloi	NIL	Daryapur, Bajit Pur,
		Katewara, Bawana,

3.4.6 Flood Management

The Irrigation and Flood Control Department of Delhi is the sole incharge of execution, repair and maintenance of flood control works on River Yamuna and Najafgarh drain system. Till date both banks of the River Yamuna has been embanked through its run in Delhi right from Palla in the North to Jaitpur in the South.

On the right bank Delhi is protected by Rural Marginal Embankment (RME) from Palla to Supplementary drain, Jagatpur Bund from Jagatpur to upstream of Wazirabad Barrange, Yamuna Bazaar Wall upstream of Old Railway Bridge and Rural Marginal Embankment Madanpur Khadar from Okhla to Jaipur. On the left side, Delhi is protected by Left Forward (LF) Bund from Delhi - U.P. Border upto Wazirabad, Shahdara Marginal (SM) Bund from Wazirabad to Old Delhi Railway Bridge and L.M Bund from Old Railway Bridge to NOIDA. Analysis shows that while RME Palla meets the requirement from with-standing a 25 year frequency flood, Jagatpur Bund, Yamuna Bazaar wall, Mughal Bund, L.F Bund, S.M Bund and L.M Bund all fail to meet this standard and would overtop in such a flood. In the eventuality of a 100 year frequency flood, all these embankments would fail to meet the requirement (Sharma, 1996)

3.4.7 Settlement Pattern in Flood Plain

A close analysis of the flood zoning pattern reveals that the high risk zones are the areas that have earlier been identified as unplanned or poorly planned areas having high population



densities and sub standard housing structures. These include areas of North Delhi, and Trans Yamuna Area. Some of the colonies that have come up in these areas are at levels 3 to 4 meters below the 1978 flood level.

The community exposed to the highest risk from floods comprises the families living in the villages and unauthorized colonies within the river-bed. There are over 15,000 such families, having over 75,000 persons. Situated on the wrong side of the embankments, these people live on the edge of the floods, and are the first ones to find their homes washed away. Direct effect of floods in the river Yamuna and the city's network of drains are witnessed. These affect the population living in the Yamuna River-bed and on the banks of the river and drains. Local flash floods and water logging increased surface run-off due to high ratio of hard surfaces leading to flash floods. This in turn badly affects the low lying areas, particularly the unplanned colonies which get water logged.

3.4.8 Risk of break in embankments

Protection from the river by embankments leads to a false sense of safety and development starts taking place in the shadow of these embankments. In the event of failure of these protective works, as has been seen in the form of breaches during past floods, the effect is devastating because the pressure of the entire embanked stretch is released at one point, and it takes the people by surprise.

District wise summary of flood and urban flood vulnerability is given in the annexure

3.5 FIRE HAZARD

Fire hazards, for the purpose of this study, include fires due to chemicals, LPG, explosives as well as short circuit of electrical systems. However, while assessing the resource needs of the state fire services, it must be considered that these services are also used in rescue operations during building collapses. Additionally, the fire department's services are also required in rescue and relief operations in fires caused by accidents involving hazardous inflammable substances.

3.5.1 Past Trends of Fire Hazards in Delhi

According to Delhi Fire Service statistics, Delhi had more than 95,000 fire incidents during the last five years (2007-08 to 2011-12), resulting in more than 1950 deaths, and injuries to more than 11,600 persons. These incidents include 10 serious fires and 48 medium fires. In the year 2013 64 incidents of fire in factory were reported in the State EOC and 12 incidents of fire in slums were reported as well. 308 no. of major fire incidents were reported in the State EOC in the year 2014 leaving 64 deaths and 187 injured victims. Fire safety awareness in unauthorized constructions, slums and congested market places need to be developed and compliance of fire safety building codes need to be ensured for reduction in loss due to fire.

The numbers of deaths have increased potentially. The basic reason is that deaths are not as much due to burning but more because of inhalation of toxic fumes, which get concentrated in high density less open space area. It is the lack of circulation/ventilation within tenements. In industrial areas there is disrespect for the safety measures required and hence large number of deaths or injury due to fires occur.

Numbers of fire incidents in *jhuggie* cluster and high-rise buildings has reduced while fire incidents in industrial and residential areas have increased. One of the reasons for such increase is that industrial areas have started hosting non-confirming industries and residential areas have become haven for illegal storages and dangerous commercial activities in pursuit of mixed permitting land and occupancy in these areas. Also, disrespect to circulation space and open space and increase in congestion in these areas have caused poor accessibility to the place of tragic incidence, which takes only records to increase.

If the number of incidents of fires is carefully studied area wise in Delhi maximum percent of calls of fire incidents have been received in Shahdara, Janakpuri (west), Moti Nagar (northwest), Connaught Circus (New Delhi), Roopnagar and Nehru Place in South Delhi. The reason is congestion and illegal storage of recycling material and chemicals.

3.5.2 Causes of Fire

- About 70% of fires are estimated to arise from electrical causes, mainly short-circuiting and another about 17% due to carelessness. Electric short circuiting results mainly from illegal loose connections, substandard wiring and over-loading of the system. Illegal tapping of electricity from overhead lines through use of loose hooks has been a common sight in Delhi.
- During Gandhi Market, Sadar bazar, fire (1990) enquiry, it was found that an electric pole had even being enclosed within the unauthorised construction with overhead wires running only about 4/5 feet above the roof of the illegal construction. Yet, no Municipal Corporation of Delhi or Delhi Electric Supply Undertaking official had even taken notice of these blatant violations of all norms and rules.
- Fire was also caused due to wood shavings lying on the roof catching fire from the sparks from the overhead electric line. Due to loose connection of wires of the irregular tapping and over loading, distribution losses are also known to be one of the highest.
- Yet, the **authorities are unable to check such illegal tapping**, supposedly due to resistance from local residents and politicians. The recommendations of various Committees to replace overhead lines with underground cables too have not been implemented, particularly in the fire prone older areas.



Major Causes of Fire

	1993-94	1994-95	1995-96	1996-97	1997-98
Electricity short circuit	5848	6473	70.40%	7433	7268
Carelessness	1701	1728	18.37%	1896	1466
Miscellaneous	308	504	0.75%	356	387
Spark M/Heat	156	258	1.73	203	160
Fire Works	139	146	1.68%	198	59
Unknown	138	184	1.49%	181	166
Naked Flame	105	133	4.59%	351	288
Intentional	75	986	0.90%	121	109
Incendiarism	45	16		22	16
Spontaneous	13	1	-	0	0
Radiation	10	4		1	0
Lighting	6	0	0	1	0
Children Playing with	6	2	0.00%	1	0
fire					

Source: Delhi Fire Service, 2001

Vulnerable locations

Unlike in the case of hazards, such as floods or road accidents, definition of specific vulnerable spots is not possible. However, a broad definition of the type of locations where there is a potential of fire hazard can be identified. Some of these areas are:

- Storage areas of flammable / explosive material in the vicinity of populated areas.
- Hotels and restaurants in crowded areas using improper practices of storage of cooking fuel such as LPG, kerosene etc.
- Multi-storeyed buildings, especially in cities, with inadequate fire safety measures.
- Narrow lanes, congested, overcrowded buildings, old buildings with poor internal wiring.

District wise summary of vulnerability to fire is given in the annexure

3.6 COLD WAVE & HEAT WAVE

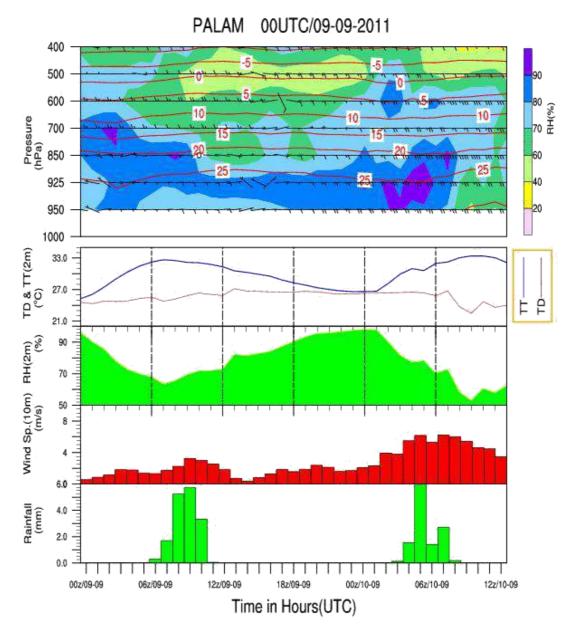
The temperatures fall sharply for a few weeks in January and February. According to the weather office, cold winds from the Himalayan region as well as from desert regions in Rajasthan, brings down the temperatures. Occurrences of extreme low temperature in association with incursion of dry cold winds from north into the subcontinent are known as cold waves. Proper shelter arrangement for poor is to be ensured by Government for dealing with this disaster.

Every summer tens of thousands of people suffer from heat stress when their bodies absorb more heat than they can dispel. Unless prompt treatment is received, they suffer serious or even fatal consequences of heat stroke (hypothermia). Usually, it is the cumulative effect of heating up for days without the relief of cool nights. At highest risk groups are very poor children, the elderly people with weight, chronic ailments or other health problems and those on medication or with alcohol/drug dependency – all of which have a drying effect or reduce

perspiration – the body's cooling system. Poor and homeless people are more prone to its danger as they cannot seek the luxury of a cooled home. Proper public awareness is required to be raised to deal with heat and cold waves.

3.7 CLOUD BURST

Though it is not a regular hazard affecting Delhi, on 09/09/2011 a cloudburst occurred in Palam area of Delhi and the T3 terminal of IGI Airport was affected by it.



Meteorological data of cloudburst in Delhi



3.8 THUNDERSTORM & SQUALL

The summer season lasts from mid-March to the end of June, with average maximum and minimum temperatures of 97 °F (36 °C) and 77 °F (25 °C); it is characterized by frequent thunderstorms and squalls, which are most frequent in April and May. A sudden squall on 30 th May, 2014 took Delhi residents by surprise, disrupting road, rail and air traffic as well as Metro services and led to nine deaths. The dust storm accompanied by heavy showers led to a drop in the soaring temperature but not before it left in its wake broken tree branches, overturned cars, traffic jams and power outages.

3.9 EPIDEMICS HAZARD

In all the districts of Delhi, preventive, primitive and curative health is being looked after by the health department. There are also Dispensaries, referral hospitals and community hospitals supplementing the task. With the view of detecting epidemics at the earliest, an epidemiological cell has been established under the Directorate of Health Services.

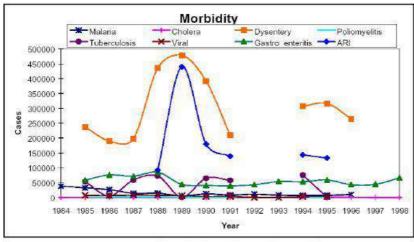
The following epidemics are monitored in Delhi:

- Cholera
- Gastroenteritis
- Acute Diarrhoea / Dysentery
- Infective Hepatitis
- Encephalitis
- Poliomyelitis
- Typhoid
- H1N1
- Malaria

In addition to the above, the following outbreaks are also monitored:

- Food poisoning
- Viral Fever
- Meningitis
- Dengue Fever

3.9.1 Epidemic Management

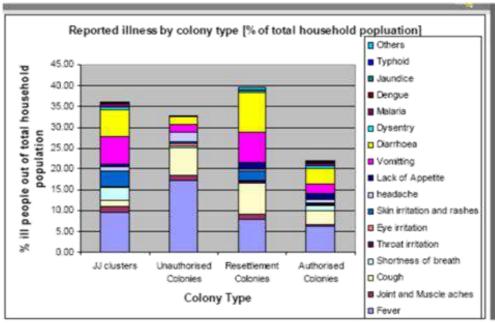


Source: Department of Health and Family Welfare, GNCTD

The monitoring is in the form of daily, weekly health condition report and monthly report. Each outbreak is supposed to be thoroughly investigated by the officials and the report regarding the action taken to contain the outbreak, the actions and the measures to



prevent similar occurrences has to be submitted.

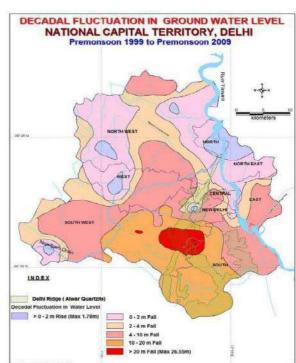


Source: Directorate of Health Services

The state has a system to forecast epidemic. However, it seems that health facilities at Municipal level get activated quickly on perception of threat. Actions were taken to survey the risk prone areas and also to control mosquito breeding in various places. Similarly, actions had been also taken for vector control during the threat of plague in 1994. The response mechanism to epidemics gears up only after there is a perception of threat which mitigates the risk of the hazard to a certain extent. Essentially, however, the diagnostic facilities need to be strengthened.

3.10 DRINKING WATER SHORTAGE

According to latest Comptroller and Auditor General (CAG) audit report of 2013, Drinking water was not being distributed equitably due to a lack of reliable data on population and water supply to different areas. It added that 24.8 per cent of households in the Capital were being supplied water through tankers in the absence of pipelines, with the average per capita supply at 3.82 litres per day against the prescribed norm of 172 litres. The metering of water at the consumer end was comprehensive due to which less than 40 per cent of water produced was billed during the past three years, said the report. Subsoil water is mostly brackish. The water requirement is 950 mgd while Delhi Jal Board supplies 750 mgd.



Source: Sekhar, Purohit & Kaushik (2009)



However, distribution still is not equitable across the city, with the outskirts in North, North-West, North-East and southern districts receiving poor supply. "The poor and underprivileged in Delhi receive subsidised water, but it comes at a price, in terms of time and cost. Hours of waiting in queues at water points and fights around tankers are a common sight in the slums of Delhi...among the Delhi slums, which are solely dependent on government provisioning for water, just half the households have drinking water available within their premises and nearly 10 per cent have to go far away to fetch water," says the report.

Groundwater level is also depleting rapidly due to intensive irrigation and agriculture in surrounding states of Uttar Pradesh and Haryana and high rise of population.

3.11 ROAD ACCIDENTS

Road accidents, for the purpose of the Disaster Management Action Plan include all forms of motor vehicle accidents involving two / three/ four wheeler passenger vehicles, vehicles carrying goods including hazardous substances. These accidents may lead to injuries and fatalities to pedestrians, bystanders and/or passengers.

STATISTICS FOR ROAD ACCIDENT INCIDENT FOR THE PAST THREE YEARS

Year	No. of accidents	Total death	Total injured
2011	<mark>7280</mark>	2110	<mark>6975</mark>
2012	<mark>6937</mark>	1866	<mark>6633</mark>
2013	<mark>7566</mark>	1820	<mark>7098</mark>
2014	8623	<mark>1671</mark>	<mark>8283</mark>

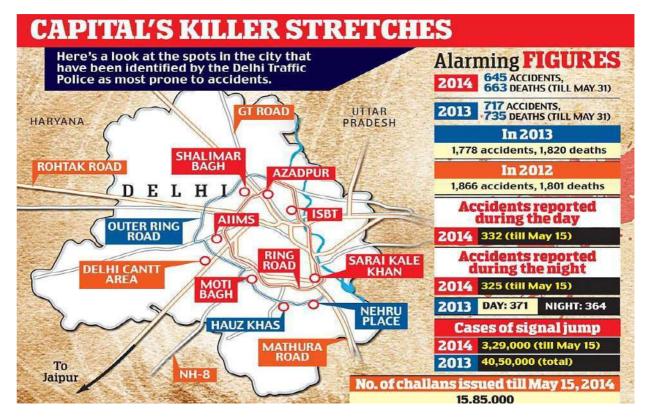
The causes of road accidents are given below priority wise:

Sl. No.	Cause			
1.	Rash and negligent driving			
2.	Lack of pedestrian facilities and public (road) transport system is not good			
3.	Heterogeneous or mixed traffic; no provision for segregation of slow moving and fast moving traffic.			
4.	Non-destined heavy and high speed vehicle movement through city			
5.	Unplanned/poorly planned (make adjustment type) road network; not upgraded to the needs of actual road users			
6.	Road environment (from traffic point of view) and engineering defect			
7.	Encroachment on road/ footpath			
8.	Weather conditions			
9.	Mechanical fault			

The most vulnerable locations of road accidents are given district wise in the annexure.









3.12 INDUSTRIAL HAZARDS

Industrial accidents may occur as a result of natural phenomena, such as earthquakes, forest fires etc., however, most accidents occur as a result of human activity leading to accidental or deliberate harm. Although there are a number of different definitions of these accidents, the most practical appears to be as follows: any incident connected with an uncontrolled development (such as leak, fire and / or explosion) of an industrial activity involving a serious immediate or delayed hazard to man and / or the environment.

Industrial hazards are most likely due to accidents occurring during chemical processing, manufacturing, storage, transport and from the disposal of toxic waste as described in the table below:

Chemical Process	Examples of potentially hazardous circumstances		
Manufacturing, processing	In the workplace, industrial plant, manufacturing site, higher education facility and research labs.		
Storage	In warehouses, chemical stores, silos, storage tanks.		
Transport	On the public highway, railway, waterway, shipping and air freight. Freight handling areas of transport systems, such as harbour, airport or station.		
Waste	Disposal of potentially toxic waste by dumping or incineration, knowledge of toxic waste and landfill sites.		

3.12.1 Nature and Occurrence

Industrial hazards, like natural disasters, can be understood in terms of their occurrence in time and place, how they affect social units and how these units take responsive actions to mitigate disaster consequences. The off-site impacts of industrial accidents and other hazards such as fire or natural disasters, often lead to loss of human life, property, financial damage and considerable environmental pollution. The severity of these disasters occurring in a developing country like India is increased due to high levels of poverty, illiteracy, inadequate housing structures, under-resourced health services, lack of expertise in training and planning for risks and hazards, necessary support structures and finance from relevant organizations for the rehabilitation of victims. Both preventing and mitigating effects of crisis depend upon the improvements made in the above areas. Some areas in Delhi where industries are concentrated are the Okhla Industrial Area in South Delhi, Mayapuri in West Delhi, Jwalapuri in East Delhi, Jhilmil Industrial Area in East Delhi, and so on.

<u>List of Vital Installation of New Delhi District</u>

SI.NO	Name of Vital Installation	Police Station	Category
1	India Gate	T.Marg	1
2	Parliament House	Pt.Street	I
3	President House	S. Avenue	I
4	P.M House	Ch. Puri	I
5	South Block	Pt. Street	I
6	North Block	Pt.Street	I
7	Supreme Court	T. Marg	I
8	National Museum	S. Avenue	I
9	Teen Murti Bhawan	Ch. Puri	I
10	Army Headquarters	S. Avenue	G-I
11	Naval HQ	S.Avenue	G-I
12	Hyderabad House	T.Marg	G-I
13	Vigyan Bhawan	S. Avenue	G-I
14	RAksha Bhawan	T. Marg	G-I
15	Delhi High Court	T.Marg	G-I
16	Baroda House	T. Marg	G-I
17	UPSC	T.Marg	G-I
18	Rail Bhawan	Pt. Street	G-I
19	Shastri Bhawan	Pt. Street	G-I
20	Krishi Bhawan	Pt.Street	G-I
21	RBI	Pt. Street	G-I
22	Niti Aayog	Pt.Street	G-I
23	Sanchar Bhawan	Pt. Street	G-I
24	Shram Shakti Bhawan	Pt. Street	G-I
25	Transport Bhawan	Pt. Street	G-I
26	Nirma Bhawan	S. Avenue	G-I
27	Sardar Patel Bhawan	Pt. Street	G-I
28	Udyog Bhawan	S. Avenue	G-I
29	Dak Bhawan	Pt. Street	G-I
30	Jaisalmer House	T.Marg	G-I
31	All India Radio	Pt. Stree	G-I
32	Nirvachan Sadan	Pt. Street	G-I
33	Vice President House	S. Avenue	G-I
34	Akbar Bhawan	Ch. Puri	G-I
35	Lok Nayak Bhawan	Tug. Road	G-I
36	DRDO Bhawan	S.Avenue	G-I
37	National Defence College	Tug. Road	G-I
38	NDCC Bldg.	Con. Place	G-I
39	MEA Bldg. Jawahar Bhawan	S. Avenue	G-I
40	Air Headquarter	S. Avenue	G-I

Details of Water Treatment Plants Under Chief Engineer (WW)

SI.No	Name of	Area	Name of Nodal	Contact Nu		Address
	Installation	(In Acres)	Officer/EE(E&M)	Landline	Mobile	
1	Wazirabad WTP	51.77	Sh. Rajiv Agarwal		9650364422	Wazirabad Water Works, Delhi- 1100084
2	Chandrawal WTP	61.10	Sh. R.D. Yogi		9650290895	Chandrawal Water Works, Delhi- 1100054
3	Okhla WTP	29.83	Sh. Tej Pal Singh		9650680606	Okhla Water Works, Near Hply Family Hospital Delhi.
4	Akshardham WTP	2.02	Sh. Tej Pal Singh		9650680606	Akshardham WTP, NH-24, Delhi-110092
5	Bhagirathi WTP	65.00	Sh. R.D. Yogi		9650290895	Bhagirathi Water Works, Gokulpuri, Delhi-110053
6	Sonia Vihar WTP	140.00	Sh. S.P Singh		9650291589	Sonia Vihar Water Works, Delhi- 110094.
7	Haiderpur WTP I &II	103.00	Sh. S.S Bhardwaj		9650291252	Haiderpur Water Works, Delhi-110085
(a)	Khayala BPS	12.50	Sh. S.S Bhardwaj		9650291252	Khayala BPS, Raghubir Nagar, New Delhi
(b)	Naraina BPS	1.25	Sh. S.S Bhardwaj		9650291252	Naraina BPS, MES area, N. Delhi.
8	Bawana WTP	40.00	Sh. S.S Bhardwaj		9650291252	Bawana WTP, Kamaruddin Nagar, Delhi.
9	Nangloi	48.43	Sh. K.K Piplani		9971490048	Nangloi WTP, KAmaruddin Nagar, Delhi-110041
10	Dwarka WTP (Existing)	24.3	Sh. K.K Piplani		99714900448	Dwarka WTP, Najafgarh, Delhi- 1100043
(a)	Dwarka WTP (Proposed)	26.87	Sh. K.K Piplani		9971490048	Dwarka WTP, Najafgarh, Delhi- 1100043

As per data available in the Labour Department, GNCTD, there are 18 Major Accident Hazard Units in Delhi. Onsite disaster management plans have been prepared for these units. Details of MAHUs are as follows;

<u>SI.No</u>	Name & Address of MAH unit	Districts	Hazardous materials being mfd., handled, store and Imported
1	M/s Bhagirathi Water Treatment Plant, Gokulpuri	North-East	Chlorine
2	M/s 140 MOD Water Treatment Plant, Sonia Vihar	North-East	Chlorine
3	M/s Haiderpur Water Works, Haiderpur	North-West	Chlorine
4	Delhi Water Works Chandrawal	Central	Chlorine

	No-I, Civil Lines		
5	Delhi Water Works Chandrawal No-II, Behind Cyber Pass, Civil Lines	Central	Chlorine
6		 Central	Chlorine
Ь	Wazirabad Water Works, Timarpur	Central	Chiorine
7	Badarpur Thermal Power Station	South-East	Chlorine Ammonia
/	-	South-East	
	(NTPC), Badarpur		(gas) Ammonia
8	MA/a Indone I DC Dattling Dlant	Courth Foot	(Liquid)
8	M/s Indane LPG, Bottling Plant,	South-East	LPG
	Behind Sarita		
0	Vihar, Madanpur Khadar	C. Il. F. I	Chlerin
9	M/s Okhla Water Works, Okhla	South-East	Chlorine
10	M/s Bharat Petroleum Corp. Ltd.,	New Delhi	ATF
	IGI Airport		HSD
	Terminal-2, near Shabbad Mode		
11	M/s Indian Oil Corp Ltd. P.O.	South-West	MS, HSD, SKO, ATF,
	Bijwasan		МТО
12	M/s Hindustan Petroleum	South-West	MS, HSD, SKO
	Corporation Ltd., Village		
	Bijwasan,		
13	M/s Bharat Petroleum Corp Ltd.,	South-West	MS, SBP, Hexane,
	Village Bijwasan		HSD, LDO, SKO,
			MTO, ATF
14	Gas Turbine Power Station, Ring	Central	Chlorine, HSD
	Road, I.P. Estate		
15	M/s 40 MGD Water Treatment	West	Chlorine
	Plant, Kamruddin		
	Nagar, Nangloi		
16	M/s Hindustan Petroleum	West	MS, HSD, ATF, LDO,
	Corporation Ltd., Shakur		Lubricants, MTO,
	Basti		Hexane, Solvent
17	M/s Indian Oil Corp Ltd., Sakur	West	ATF, LDO, MTO,
	Basti		ULMS, HSD
18	Indian Bottling Plant, Ghevra	West	LPG
	Mode, Rohtak Road		

Abbreviation:- ATF- Aviation Turbine Fuel, HSD- High Speed Diesel, LDO- Light Diesel Oil, LPG- Liquefied Petroleum Gas, MS- Motor Spirit, MTO- Mineral Tupentine Oil, SBP- Special Boiling Point Solvent, SKO- Superior Kerosene Oil, ULMS- Un-Leaded Motor Spirit



3.13 CBRN DISASTER

Delhi being National Capital is also under the threat of any form of conventional and contemporary warfare. Being capital city, CBRN threats are one of the major potential hazards in Delhi. Radiation disaster in Mayapuri occurred in 2010. There is high threat of biological disaster caused due to bioterrorism. The threat of chemical attack and chemical disasters caused by hazardous units is also very high. There is need for training of security personnel, doctors and community task forces such as Civil Defence corps to combat CBRN disasters. National Disaster Response Force battalion present in Delhi has specialization in dealing with such disasters.

3.14 BUILDING COLLAPSE

Building collapse incidents at Lalita Park (Nov. 2010), Chandni Mahal (2011) and Inderlok (June 2014) were major events. There are a high number of unauthorised colonies throughout Delhi, rarely complying with building codes and byelaws pertaining to earthquake and fire. Congested areas of Trans Yamuna are most vulnerable. Recent report of CPWD also mentions that many bungalows of Lutyens Delhi may not be able to withstand earthquake. Stringent compliance of building codes and survey of unsafe buildings need to be taken on priority basis. District wise summary of vulnerability to building collapse is given in the annexure.

Note: - Table for Building Collapse has to be inserted

3.15 TERRORIST ATTACKS AND BOMB BLASTS

- Delhi being National Capital is also under the threat of any form of conventional and contemporary warfare.
- History perceives that generally terrorist attacks takes place in important government building, air ports, cantonment areas, historical monuments, populous places and important public gathering etc. Many events of bomb-blasts and terrorist attacks give an insight towards the importance of this issue.
- Terrorist attacks such as High Court blast, Paharganj, Sarojini Nagar, Govindpuri blasts, serial blasts of 2008 depict the high vulnerability of Delhi.
- Being capital city NBC threats are one of the major potential hazard in the state

3.16 ENVIRONMENTAL POLLUTION

Delhi ranks fourth among the forty one cities of the world monitored for air pollution. 64% of pollution is by automobiles, 16% by thermal Power plants, 12% by industry and 8% by domestic source. Big and Small units (70,000 uncontrolled) discharging gases, liquids and solids are all producing health hazards. Najafgarh Road, Lawrence Road, Wazipur, Kirti Nagar, DLF Industrial area and Moti Nagar are the most polluted areas. The Thermal power stations at Indraprastha uses 2,500 tonnes of coal and 80 Kilo Litters of Furnace oil daily and

emits 1,000 tonnes of ash. Power stations at Rajghat and Badarpur also discharge fly ash emission in to the air. The improvement of efficiency of electrostatic precipitator (ESP), installed in these plants, the particulate matter emission is reduced from 720 m/tonnes in 1987 to only 30 m/tonnes in 1993. The slums and sewer disposal also contribute their share to the pollution of air in Delhi.

Daily garbage generated by the city is 6000MT. Annual generation of E waste in Delhi is 11,500 tonnes. Generation of Biomedical waste is 20-25 tonnes daily (Source: TOI, 14th Oct-2007).

As per the Environment Department portal of Delhi:
Major sources of water pollution are Domestic sewage and Industrial effluent.

Problems: Lesser Dissolved Oxygen, Higher Bio-Chemical Oxygen Demand, Fecal coliform and Toxic chemicals and heavy metals.

The major sources of noise pollution are industrial, aircraft, transportation and diesel generator sets

Vulnerabilities exist due to municipal solid waste, biomedical waste, electronic waste and plastic waste

Sectors identified under climate change agenda for Delhi 2009-12 are Water, forestry, buildings, lighting, energy, renewable, transportation and waste management

3.17 SOCIETAL VULNERABILITY

As per the 2011 Census there are around 2.6 crores differently abled people, constituting 2.21 % of the total population of the country. Disability is a multidimensional construct. Persons with disabilities are not a heterogeneous group, and persons with different disabilities or different severity of a disability will have needs in a disaster or emergency situation.

India is a signatory to the "Incheon Strategy" to make "Make the Right Real" for persons with disabilities in Asia and Pacific. Goal No. 7 of the strategy provides;

- 7A Strengthen disability inclusive disaster risk reduction and management.
- 7B Strengthen implementation of measures on providing timely and appropriate support to persons with disabilities in responding to disasters.

Core Group Indicators for measuring disability inclusive preparedness are:

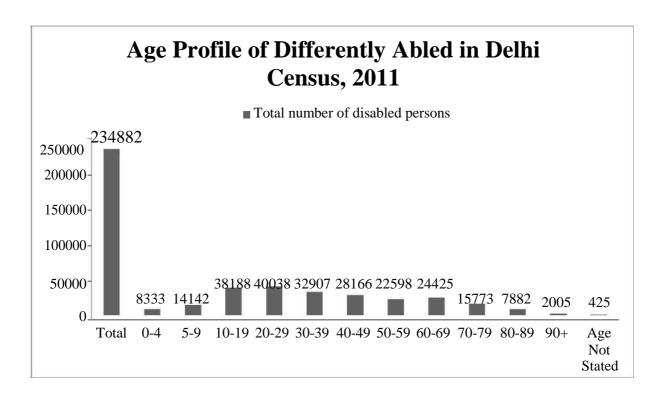
- 7.1 Availability of disability inclusive disaster risk reduction plans.
- 7.2 Availability of disability inclusive training for all relevant service personnel.
- 7.3 Proportion of accessible emergency shelters and disaster relief sites.

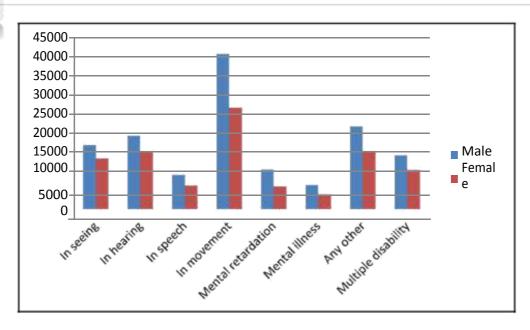


The following table gives a brief account of the disability data in NCT of Delhi as per 2011 Census.

Total no. of differently abled persons in NCT of Delhi (Census, 2011)

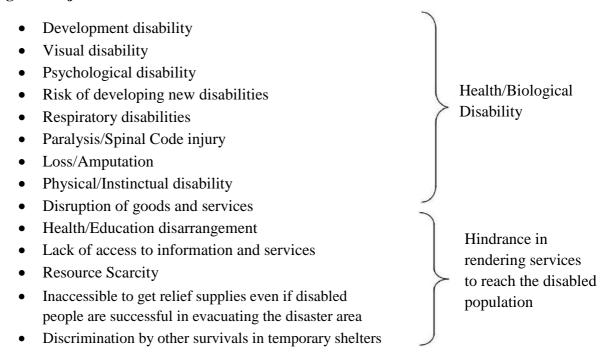
	Persons	Male	Female
In seeing	30124	16864	13260
In hearing	34499	19277	15222
In speech	15094	8946	6148
In movement	67383	40727	26656
Mental retardation	16338	10385	5953
Mental illness	10046	6292	3794
Any other	37013	21783	15230
Multiple disability	24385	14105	10280





Male-Female Distribution of Disability

The following possible disabilities that may arise resulting from any disaster situations leading to a major chaos:-



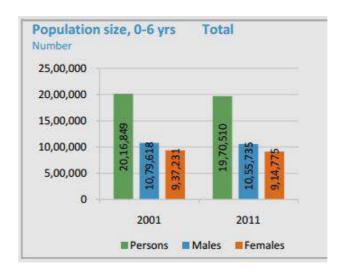
As per the disability population data (the district wise data given in annexure) of NCT of Delhi, preparation and response actions and strategies are to be incorporated and arranged in all the 11 districts of Delhi and also is included in each district disaster management plan.

Apart from the above, following societal vulnerabilities also exist:

a) As per Census, 2011 total Homeless population is 46,724 from which 17% are female.



- b) 17,85,390 persons are slum dwellers from which 8,11,061 are female and 2,29,029 are below 6 years of age
- c) 4,02,974 persons are above 70 years of age



Population size (0-6 Years), Census, 2011

3.18 RISK AND VULNERABILITY ASSESSMENT FOR THE STATE OF DELHI

3.18.1 Risk Analysis

Risk has defined by the United Nations as a measure of the expected losses due to a hazard event of a particular magnitude occurring in a given area over a specific time period. The level of risk depends upon the nature of the hazard, the vulnerability of the elements which it affects and the economic value of those elements. As communities grow larger, more established and more complex, experience has shown that the level of risk which they face increases.

Risk Analysis means the identification of undesired events that lead to the materialization of a hazard, the analysis of the mechanisms by which these undesired events could occur and, usually, the estimation of the extent, magnitude, and likelihood of any harmful effects.

3.18.2 Vulnerability Analysis

The vulnerability of a particular element of society is defined as the degree of loss which is would suffer as a result of a specific hazard event. The nature of vulnerability and its assessment vary according to whether the element involved represents people and social structures, physical structures, or economic assets and activities. The vulnerability of an area is determined by the capacity of its social, physical and economic structures to withstand and respond to hazard events.

Certain groups of people, types of physical assets and economic activities can be particularly vulnerable or susceptible to damage. The concept of vulnerability implies a measure of risk combined with the level of social and economic ability to cope with the resulting event in order to resist major disruption or loss. Vulnerability is thus the liability of a community to suffer stress, or the consequence of the failure of any protective devices and may be defined as the degree to which a system or part of a system, may react adversely to the occurrence of a hazardous event.

In this part, on the basis of nature of hazards, socio-economic parameters and institutional arrangements (discussed previous chapters) and community preparedness Strength, Weakness, Opportunity Threats (SWOT) risk and vulnerability assessment has been conducted.

3.18.3 Risk and vulnerability Analysis based on Hazards

Delhi is vulnerable to various disasters. Below table explains (on the basis of hazard analysis) district-wise degree of risk and vulnerability involved in Delhi.

Districts	N	NW	C	W	SW	ND	S	SE	NE	SH	E
Earthquake											
Flood											
Fire											
Building Collapse											
Epidemics											
Urban Flood											
Industrial Hazard											
Terrorist Attack											

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Districts: N: North, NW: North West, C: Central, W: West, SW: South West, ND: New Delhi, S: South, SE: South East, NE: North East, SH: Shahdara, E: East Vulnerability: High Moderate Low Nil

Table 2.2 Vulnerability Matrix of Delhi

District Wise names of vulnerable locations for various hazards can be found in the Disaster Management Plans of the respective District Disaster Management Authorities.

For risk and vulnerability assessment, physical, socio-economic, housing, community and institutional preparedness related parameters had been identified. To assess their importance, checklists were prepared under each parameter and information was gathered from various primary and secondary sources. Based on the information collected under the checklists, few indicators were formulated and status of strength, weakness, opportunity and threat has been



assigned which was further utilized for risk and vulnerability analysis. Below given table explains the risk and vulnerability assessment based on the certain parameters.

SWOT Analysis for Risk and Vulnerability Assessment in Delhi

Parameters	Indicators	Strength	Weakness	Opportunities	Threats
Physical	Soil				1
•	Terrain/Physical features				
	Geology				
	Water depth				
Socio-	Population Density				
Economic	Literacy rate				
	Slums/JJ clusters etc				
	Industrial density				
	Type of Employment				
Housing	Residential Conditions				
•	Occupancy Rate				
	Quality of Design				
	Quality of Construction				
	Quality of Materials				
Community	Public awareness about				
Preparedness	local disasters				
-	Local level Disaster				
	management planning				
	Vulnerability and				
	resource mapping done				
	Local people trained in				
	Disaster management				
	Local People active in				
	disaster management			l	
	initiatives				
	Identification of Disasters			1	
	by local authorities				ļ
Institutional	Disaster Management			I	
Capacities	Plan	-			
	Communication				
	Transportation				
	Response planning				-
	Fire fighting capabilities				-
	Medical Facilities				
	Search & rescue				
	Capabilities				1



The SWOT analysis clearly shows a fragile condition of Delhi. Some of the inferences are mentioned below:

- 1. Soft alluvial soil around river Yamuna pose risk of high damages during earthquakes and floods. A high population, high residential and industrial density, scattered slums and JJ clusters, living in poor housing conditions along with poor preparedness and administrative response aggravates the risk and may lead to colossal losses to lives and property during emergencies.
- 2. On the other hand, Delhi being a capital city is also full of strengths, which may become opportunity in case of any disaster and a systematic approach may also help to overcome from above-mentioned weaknesses. For example, more than 90% of area in Delhi is urbanized and enjoying a good communication and transportation facilities therefore response time of any disaster can be reduced with the help of systematic institutional approach and proper decision-making.

Similarly, around 80% population of Delhi is literate with highest per capita income in Nation. Therefore an approach towards community preparedness for disaster management may help in reducing risk at the local level.

3.18.4 Reasons of Growing Risks in Delhi:

Haphazard Growth in Delhi: In Delhi there has been a substantial increase in population and industrialization, since Independence. Well over 1,50,000 small scale industrial units in identified industrial units in identified industrial pockets (in addition to industries running illegally), over 1200 J.J. Clusters providing shelter to nearly one third of the population and over 3.5 million automotive vehicles have choked infrastructural services. The fast increase has not been planned for. Master Plan for Delhi had been created as an instrument to control the use of land in urban area and protect the welfare of people. The concept of zoning has not yielded desirable results over and above allowing for mixed use and occupancy, authorized as well as unauthorized. Banquet halls in residential areas, cottage industries in congested areas, trade of hazardous chemicals from the highly congested residential/commercial areas, hazardous and non hazardous industries in close vicinity are few to mention which have further deteriorated environmental services. Moreover, there is more than 30 Lakhs of floating population from adjoining states of UP, Rajasthan & Haryana.

Zoning and mixed use planning is a vital part of urban design. However, it can fail through abuse, misuse, and resistance to changes in urban pattern essential for the general welfare of the population. This has certainly added to the fire risk already inherited by a particular occupancy. As a result losses due to fire are increasing to both the life and property. This is developing a dangerous trend. Man-made disasters are likely in these areas.



3.18.5 CONCLUDING REMARKS

Delhi is exposed to various risks due to soil, which is liable to liquefaction, very high population density, sub-standard habitat, disproportionate occupancy rate, poor design and construction qualities and lack of community preparedness and adequate response. Therefore it is desirable to incorporate these risks elements into the development plan. Following broad set of recommendations has been suggested below which may help in integration of risk assessment in regional development:

- 1. There is a need for an institutional setup at various level of administration to ensure the management of disasters during emergencies. The responsibilities and reporting system of the various departments such as Police, Fire, Transport, Communication, NGOs, Public Work Department, Municipal Corporation and Revenue department etc should be clearly demarcated within a well-defined structure so that response time may be reduced at the time of disasters.
- 2. Mainstreaming Disaster Management into development planning may be ensured by regulating land-use zonatation according to the exposure of risks, Updation and enforcement of building byelaws as per the disaster resistance codes and retrofitting of life line buildings and other important buildings. Such practice may help in reducing risk by improving the condition of existing buildings and new constructions.
- 3. There is a need of awaking generating public by fostering community based disaster management planning initiative in schools, hospitals, residential areas and villages etc. in the disaster management initiatives at grass root level so that community preparedness may be ensured
- 4. Geographic Information System and databases, focusing on the development of techniques and decision support tools using GIS to integrate, manipulate and display a wide range of risk-related information should be developed. Such system may also include the techniques to assess the vulnerabilities of buildings, infrastructure and people to the impact of hazard that may be helpful for the local authorities in taking decisions during emergency situation.
- 5. Availability for quantified database at various administrative levels for various aspects is very limited, which was also faced while conducting the present study. A detailed database on disaster risk aspects should be developed so specialized studies and assessments can be facilitated at all levels of planning. It may help in exploring and expanding means of indicators and parameters which will result more relevant picture in front of us.



Chapter IV

PREVENTIVE MEASURES & CRISIS MANAGEMENT PLAN

In the face of increasing menace of hazards, mitigation would remain the key and the most effective strategy to reduce the risks of these hazards. State has to decide its own mitigation strategy according to its own risks, resources and capabilities. Broadly such strategies would be twofold: structural and non-structural.

Structural mitigation measures generally refer to capital investment on physical constructions or other development works, which include engineering measures and construction of hazard resistant and protective structures and other protective infrastructure. Non-structural measures refer to awareness and education, policies techno-legal systems and practices, training, capacity development etc.

4.1 Manmade Disaster

Manmade disasters are unpredictable and can spread across geographical boundaries. Some disasters in this class are entirely manmade while other may occur because of natural disasters, equipment failures, or workers having inadequate training or fatigue and make errors.

Manmade disasters include a broad range of incidents. Routes of exposure through water and food, airborne releases, fires and explosions, and hazardous materials or waste (e.g., chemical, biological, or radiological) released into the environment from a fixed facility or during transport. Fires, explosions, building or bridge collapses, transportation crashes, dam or levee failures, nuclear reactor accidents, and breaks in water, gas, or sewer lines, chemical ,biological ,radiological and nuclear disaster, (CBRN) are other examples of technological manmade disasters.

The hierarchy of concepts in reducing the risks of chemical disasters is given below:

- 1. Eliminate use of toxics and replace them with a less or non-toxic alternative at each source.
- 2. Reduce use of toxics through minimizing use and/or storage volumes.
- 3. Implement risk management programs designed to minimize opportunities for releases to occur, and mitigate any release that does occur at the source with fail



(passive) safe systems, and install secondary active mitigation systems (like water curtains), flairs, vent stacks, etc.

- 4. Implement land-use restrictions to provide minimum safe distances from sources to public and sensitive receptors. This is especially critical for a zone where even a rapid and qualified response may not be able to save lives.
- 5. Plan for both or a combination of sheltering in place and evacuation programs where they are complimentary. A "key-hole" sheltering concept is ideal and is such that the population within a plume shelter and adjacent populations are evacuated. Both concepts require public warning systems that initiate the community action immediately and are either automatic or initiated by the releasing facility through a formal system.
- 6. Maintain basic emergency capability to respond to everyday emergencies such as fire and medical. A strong emergency response (fire, police, medical) is essential building block to build chemical emergency response capability. Maintain a rapid (timely) and qualified (well trained and equipped) chemical emergency response capacity to control and reduce the quantity of hazardous chemical leaked and duration of such leak. This requires an extremely effective trigger mechanism for an immediate response.
- 7. Establish plans, develop public warning systems, and conduct public outreach and training on evacuation and shelter in place. The public needs to be trained on what actions are expected of them based on the warning systems. Without training the public, neither sheltering-in-place nor evacuations will be effective.

4.2 Natural Disasters

The State approach for disaster prevention and mitigation will be multi-hazard as it is vulnerable to all-major natural hazards such as Fire, Epidemics, Flood, Earthquake, etc. due to its geo-climatic, geological and physical features as described in detail in previous chapter.

There are several prevention/mitigation activities which will be common for natural hazards. Hazard specific measures are mentioned in the chapter 6.



Earthquake

In most earthquakes, the collapse of structures like houses, schools, hospitals and public buildings results in the widespread loss of lives and damage. Past earthquakes show that over 95 per cent of the lives lost were due to the collapse of buildings that were not earthquake-resistant. In such situation, the losses can be reduced if all structures in earthquake-prone areas built in accordance with earthquake-resistant construction techniques.

Flood

Floods being the most common natural disaster, people have, out of experience, devised many ways of coping with them. However, encroachments into the flood plains over the years have aggravated the flood problem and a need to take effective and sustained mitigation measures.

Drought

It is very difficult to prevent droughts, usually because it is caused by lack of rainfall, which is beyond our control. However, by taking effective mitigation measures effect of drought can be minimized.

4.3 Training Needs Analysis

Training Analysis is most often used as part of the system development process. Due to the close tie between the design of the system and the training required, in most cases it runs alongside the development to capture the training requirements. The training need analysis is done considering variable factors of intensity, affected population and severity of damage need to be quickly assessed based on which government and non-government agencies can allocate and deploy relief. The training requirements would be based on emergency response functions. Each ERF consist of sub functions.

The ERFs are:

- Coordination and Command
- Source and Impact Control
- Population Care
- Medical Care
- Maintaining law and order



All the government line departments who have a stake in different phases of the disaster management will have to identify their roles and carry out training need analysis of their personnel.

4.4 CRISIS MANAGEMENT PLAN

This Crisis Management Plan-2013 addresses the crises entrusted to MHA, which are as follows;

- a) Public Order/Civil disobedience
- b) Terrorist Outrages
- c) Mutiny- In the paramilitary forces and the police.
- d) Migration/exodus/infiltration

Plan lays down the sequence of actions to be taken by all the relevant agencies in the crisis/emergency situations. The Plans lay down the sequence of actions in three phases: the preparedness phase, the precautionary phase and the response phase.

The different Ministries of the Central Government/State Government are required to issue detailed instructions on aspects identified in this Crisis Management Plan as requiring action by them. Delhi specific SOPs for the manmade disasters covered under Crisis Management Plan-2013 are to be prepared by Home Department, GNCTD in consultation with Delhi Police.

4.4.1 <u>Institutional Framework</u>

- The State Governments are responsible for Public Order and Police as per List-II of the Seventh Schedule to the Constitution of India. The State Government will work under the policy guidelines laid down by the Central Government while dealing with emergencies.
- The following four committees will be constituted to handle emergencies/crises, which are the subject matter of this Plan:
 - i) A National Crisis Management Committee headed by the Cabinet Secretary.
 - ii) Crisis Management Group headed by the Union Home Secretary.
 - iii) State Crisis Management Group headed by the State Chief Secretary.
 - iv) District Crisis Management Group headed by the District Magistrate/Commissioner of Police.
- All agencies of the Government at the National, State and district levels will function in accordance with the guidelines and directions given by these committees.

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National Crisis Management Committee

The National Crisis Management Committee (NCMC) would be the apex body of high-level officials of the Government of India for dealing with a major crisis.

Crisis Management Group (CMG)

- The CMG may co-opt other members as necessary. Member Convener will use his discretion while inviting relevant members of CMG in event of a disaster/extigency.
- In the event of an emergency situation, the CMG shall keep abreast of all developments in the State/Union Territories by obtaining situation reports on phone/hot lines and by wireless/fax messages. It shall keep the State/UT Governments informed of all such developments, which have a bearing on general law and order and security in the concerned State/UT. It will communicate guidelines as laid down by the NCMC, wherever necessary, and may advise and suggest preventive and other measures in dealing with the situation in the State or which may develop as a repercussion of developments in other places providing reinforcement of Central Paramilitary Forces and coordinating the intelligence efforts of the State/UTs and central intelligence agencies.

State Crisis Management Group

The State Group shall normally handle all crisis situations and advise and guide the District Crisis Management Group. The State Group shall keep the Crisis Management Group in the Ministry of Home Affairs informed of the evolving situation and the steps being taken.

District Crisis Management Group

This group will be responsible for on-scene management of the incident/emergency. All agencies will provide resources to this Group as required.

4.4.2 Search and Rescue Teams

- At the Central level the National Disaster Response Force (NDRF) has been constituted comprising 8 Bns of Central Paramilitary Forces (CPMFs). The 8 Bns of the force are trained and equipped for specialist Search and Rescue (SAAR), 4 Bns of NDRF are special trained and equipped to deal with NBC Emergencies. The NDRF teams are located at different places in the country based on vulnerability. The trained personnel of this Force would be proactively available to the State Administration in the event of any natural disaster NBC emergencies.
- Each state will have specialized Search and Rescue teams (State Disaster Response Force: SDRF), with training and equipment for rapid deployment to deal with any disaster/crisis within the State. The SDRF may be constituted by the State by training selected personnel out of the existing State Armed Police Bn. The NDRF (NDMA) will assist the States in training the SDRF personnel.
- Delhi's Disaster Response Force in the line of SDRF shall be raised.



4.4.3 Communication

- The States will set up Emergency Operations Centre's at the State level and at the district levels under the District Magistrates. The Emergency Operations Centers will be responsible for monitoring and responding to all emergencies/crisis. The Emergency Operations Centers will be linked to the National Emergency Operations Centre of the Ministry of Home Affairs by telephones, fax, internet and satellite phones.
- Delhi's Emergency Operating Centre is located at the Office of the Divisional Commissioner, Revenue Department (HQ), 5-Shamnath Marg. All the necessary communication is being carried out from EOC (HQ).
- The National Emergency Operations Centre, the State and District Emergency Operations Centers will have GIS based maps indicating the roads/railways/hospitals and other essential infrastructure. They will have online access to India Disaster Resource Network (IDRN) for locating and mobilizing resources for speedy response action.
- Emergency Operation Centers shall have written protocols for their functioning and also maintain log book in which all information received as well as arrivals/departures of offices are entered along with time.
- The State Emergency Operation Centers is responsible for informing the Ministry of Home Affairs and all concerned agencies about any emergency/crisis.



Chapter V

MAINSTREAMING DISASTER MANAGEMENT CONCERNS INTO DEVELOPMENTAL PLANS/PROGRAMMES/ PROJECTS

5.1 Introduction

Mainstreaming disaster risk reduction into development planning has been a priority concern for the State Government. Disasters considerably impact all the sectors of development resulting in a serious social and economic setback to the overall physical and social development of the community. The process of development and the models of development choices may sometimes lead to disaster risks.

There is a paradigm shift in the approach to disaster management in the country. The new approach proceeds from conventional approach that development cannot be sustainable unless disaster mitigation is built into the development process. The new policy also emanates from the belief that investment in mitigation is much more cost effective than expenditure on relief and rehabilitation.

Mainstreaming risk reduction should result in appropriate measures being taken to reduce disaster risk and ensure that development plans and programmes do not create new forms of vulnerability.

In continuation with the efforts to integrate disaster management into development planning especially for new projects that are under preparation stage, the Central Government has revised the formats for pre-approval from **EFC** (**Expenditure Finance Committee**) and for preparing the **DPR** (**Detailed Project Report**) to address disaster management concerns.

The relationship between disaster and development is reviewed from SDMP preparation perspective in the following table.

Factors	Economic Development	Social Development
Disaster	Destruction of fixed assets	Destruction of health or
limits	- Loss of production capacity, market access	education infrastructure and
development	or material inputs	personnel.
	- Damage to transport, communications or	- Death, disablement or
	energy infrastructure.	migration of key social
	- Erosion of livelihoods, savings and physical	actors leading to flight of
	capital	Social capital.
Development	Unsustainable development practices	Development paths
causes	that create wealth for some at the	generating cultural norms
disaster risk	expense of unsafe working or living	that promote social isolation
	conditions for others or degrade the	or political exclusion.
	environment	



Mainstreaming of Disaster Management concerns into development

Mainstreaming disaster management concerns into development cooperation is the process of assessing the impact of disasters and hazards on the social, economic and industrial development within the state. The impacts of disasters have trickling effect on the functioning of several key government departments. It is a strategy for making disaster management concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that the state as a whole and vulnerable people benefit equally and inequality is not perpetuated. The ultimate goal is to achieve better prepared government, civil, private industry and other stakeholder in mitigating natural as well as human-caused disasters.

Because disaster risks impact multi-sector development activities (such as education, health, environment, governance, employment and livelihoods) they influence development gains. An assessment of the extent to which these social domains consider natural or human-induced factors or risks (existing and prospective) in the conceptualization and implementation of programmes is crucial for successful execution of risk mitigation plan. The key to achieving sustained disaster loss reductions lie in factoring risk considerations into both development and post-disaster recovery activities. To ensure the implementation in key areas, a check list for responsible departments is shown below:

Task	Activity	Responsibility
Mainstreaming disaster management	1.To ascertain whether project involve any creation/ modification of structural/ engineering assets	
into development planning	2.To ascertain the possible risks, likelihood and impact from disasters due to the location of project sites	
	3. To ascertain whether probable risks have been prioritized and the mitigation measures being contemplated, both structural and non-structural measures	



- 4.To ascertain whether the design and engineering of the structure has taken into consideration the National Building Code 2005, the appropriate BIS Codes, other applicable sources as per the type of the project and the NDMA guidelines
- 5. To ascertain whether the cost of disaster treatment/ mitigation measures been included in the overall project cost
- 6. To ascertain whether the process of risk assessment has been done based on available information and secondary evidence

- Line Depts.
 - Irrigation
 - Power
 - Water supply
 - Health
 - Roads & Buildings
 - Education
 - Health
 - Others
- Dept. approving the project
 - o Administratively
 - o Financially
 - o Technically
- Urban Development
 Authorities
- Land & Building Dept
- Irrigation Dept.
- DDMA
- Local Bodies



To ensure the implementation of key areas, a check list for DPR format and the responsible departments are as shown below:

Task	Activity	Responsibility
Mainstreaming disaster management into development planning	 Impact Assessment of project (damage that can be caused to the project by natural disasters, design of the project that could accentuate the vulnerability of the area to disasters and / or lead to rise in damage / loss of lives, property, livelihood and surrounding environment), Risk assessment of project Vulnerability assessment of project (Evaluation of site with regards to parameters such as probable maximum seismicity, probable maximum wind speed, probable maximum precipitation, probable maximum flood discharge and level, soil liquefaction proneness under probable earthquake intensities) Complacence of land use management Building Code Building use regulation Directives and Legislation Maintenance requirement 	 Line Depts. preparing the project Irrigation Power Water supply Health Roads & Buildings Education Health Others Dept. approving the project o Administratively o Financially o Technically Urban Development Authorities Land & Building Dept Irrigation Dept. DDMA Local Bodies
	 Details about the location of the project, proneness of the project area to various hazards and analysis of impact on safety of the project. Impact of the project on the environment and the surrounding population with respect to the type of the project and adoption of mitigation measures to reduce the impact of the same 	



5.2 Mainstreaming disaster management at the level of the state

While key departments like Revenue (Disaster Management) Department, Health and similar other departments have been prudent in preparing hazard specific manuals for the state, there are several gaps that need to be plugged especially from mainstreaming disaster planning into other development activities of the departments. A comprehensive approach by each and every department of the state in identifying disaster management as a fundamental strategy and priority in the preparation of annual or five-year business plans is critical to achieve the goals and vision of the state plan.

5.3 Identification of development induced disasters

Un-planned settlements, migration of population to urban centers in search of livelihood contribute to enhanced hazard risks. Rapid urbanization and migration are prime examples of economic growth and social improvement leading increased disaster risk. New settlement spring up year after year along the banks; these settlements pre-empt the capacity of the river to naturally surge during monsoons leading to floods and inundation of urban settlements.

5.4 Developing sector-specific guidelines on mainstreaming

Development projects, implemented by both government and bilateral agencies often have implementation guidelines and methodologies. State-wide new projects and development programmes must identify guidelines to reduce risks. It will also be mandatory to develop sector-wide guidelines. General guidelines of key sectors are outlined as follows:

a) Housing: Urban and Rural Housing Development

- Promote use of hazard-resilient designs (e.g., flood proofing, or seismic safety) in housing programmes especially in hazard-prone areas.
- Promote use of national building codes that have special provisions for enhanced design standards for buildings in areas affected by natural disasters.
- Ensure compliance and enforcement of local building laws requiring prescribed standards under natural building codes in urban hazard-prone areas.
- Introduce retrofitting of public buildings and provide incentives for private building owners for retrofitting the structures with seismic resistant designs.
- For retrofitting of buildings to withstand natural disasters, classification of buildings based on ownership, design of the buildings and physical conditions shall be undertaken by the ULBs.
- Retrofitting of buildings based on the classification will be prioritized. Prioritization of public buildings/government buildings shall be done in phase I of the scheme. Retrofitting of multi-storied buildings is done either by reinforcing additional beams to add strength or by removing a floor to reduce total mass.
- Standard retrofitting methods for seismic activity, flood proofing & damage etc.



b) Infrastructure: Public works, Roads and Construction

- Review and revise land-use planning and zoning regulations that promote hazard risk information.
- Mandate disaster risk impact assessment as part of the planning process before construction of new roads etc.

c) Health

- Local government/ULBs, departments/district officials shall prepare inventory of hospitals and available facilities especially in hazard-prone areas; analyze their internal and external vulnerability during emergencies and increase hazard resilience of these hospitals.
- Promote proactive measures in public display of these facilities and keep the hospitals accessible during emergencies.
- Institute incentive mechanisms to the private hospitals that agree to be identified as nodal hospitals during emergencies.
- All hospitals to have 'hospital preparedness plans' to meet emergencies.

d) Education

- Incorporate Disaster Risk Mitigation modules into the school curriculum.
- Every school to have 'school preparedness plans' and evacuation/exit routes identified and displayed in school premises at easily accessible and visible locations.
- Promote school children as ambassadors of disaster preparedness for their individual families and community.
- Design programmes that promote leadership among school children to become disaster management sensitive and act as future disaster management community leaders.
- Schools in cyclone-prone areas and other hazard prone areas to have features that could double up as emergency shelters; retrofitting schools with facilities to meet water, sanitation and cooking needs during emergencies.

e) Financial services

- Incorporate provisions in micro-financing schemes to have flexible repayments schedules that can be activated in the event of recipients being affected by natural disasters.
- Encourage financial services/banks to design loan schemes for retrofitting homes to meet emergencies such as floods, cyclones and earthquakes; the schemes shall have flexible repayments schedules especially in disaster-prone zones/areas.
- Encourage financial services sectors and local capital markets to develop schemes for financing disaster risk reduction measures.



5.5 Cross-sector analysis

Development programmes and schemes being implemented in the state across sectors needs to be reviewed to identify activities that could strengthen disaster management preparedness or to identify activities that may increase the risks/vulnerability. Future programmes shall keep disaster management preparedness measures as part of implementing principles. Ongoing projects and schemes will also be reviewed and if possible mid-course corrections to include disaster preparedness measures.

5.6 Developing area specific guidelines on mainstreaming

Area specific guidelines for mainstreaming Disaster Preparedness in development will be formulated with particular reference to coastal, Eastern Ghats and urban areas.

- **Flood Zone Management:** Preparing flood zone management plans separately are critical in successful implementation of SDMP.
- **Urban areas:** Each ULB and local governments shall undertake risk assessment of the area and identify preparedness measures to meet disaster emergency situations. Similarly, integrating development activities with SDMP and District Disaster Management plans is critical in reducing losses during disasters.

5.7 Creating techno-legal regime for mainstreaming DM concerns

The risk prone nature of certain regions of the state emphasize the need to adopt a multidimensional, multi-disciplinary and multi-sectoral approach involving diverse scientific, engineering, financial and social processes for risk reduction. The disperse nature and lack of coherent regulations impede achieving a state of 'complete' preparedness. Urban and other development activities without adequate infrastructure, construction of buildings that is inadequate to cope with hazards such as floods, cyclone and earthquakes set back the development paradigm. Enforcing land use restrictions in hazard prone areas in the town and country planning laws will reduce the vulnerability risk of people living in developments that lack infrastructure facilities.

5.8 Conducting Disaster Impact Assessment

Government departments execute development works as part of annual or five-year plan outlay.

When emergencies impact the state, the regular activities/functions of the departments gets off-track. Resources and energies are diverted on relief and rehabilitation works. Once the task at hand of relief and rehabilitation is over, it is recommended that every department that was impacted due to the onset of emergency or disaster utilize the opportunity to conduct internal impact assessment. This assessment will be two-fold:



- 1) Assessing the time, energy and resources that were specific to each department in mitigating the disaster/emergency and
- 2) Assessing the overall impact of the emergency/disaster from development perspective on the ground.

Deriving lessons from these assessments, the annual work plans specific to each department will be revised; budget items specific to impending emergencies that are known to impact the state recurrently such as floods/cyclones etc. will be earmarked. The overarching objective in undertaking impact assessments is to internalize the lessons and identify mechanisms to mainstream disaster management concerns with regular development works of each department.

5.9 Public-Private Partnership (PPP)

In order to achieve community resilience and preparedness, public and private owners of critical infrastructures and key resources need to work together, before, during and after a disaster. Corporate houses have begun foraying into community development; by participating in community development, the corporate sector is making efforts to fulfil social responsibility. Identifying disaster management and preparedness as one key aspect of social welfare will prompt private corporations to streamline in the sphere of disaster management.

The social and economic networks that exist in Delhi will ultimately influence the ability to adapt and respond to the consequences of disasters. This includes both private and public entities. The key issue is to recognize and embrace the public-private interfaces that can improve the ability of a community to manage the response and recovery phases of disaster management. Community preparedness is a dependent variable; it is influenced by the relationships government departments develop with private sector partners.

Development activities involve both private and public enterprises. To mitigate disasters and create better prepared society for disasters and other hazards, strong public-private coordination is critical. Communication, outreach and educational measures are keys to successful mitigation of disasters. Involvement of private corporations especially in urban conglomerations in raising public awareness, community involvement and citizen participation is possible through mutual cooperation and fulfilling social responsibility of both public and private sectors



5.10 Awareness generation, training and capacity building

Awareness and public outreach is critical to successful implementation of the plan. Scores of private sector agencies, especially Information Technology (IT) companies and academic institutions organize regular trainings for their personnel. Integrating Disaster Management as part of training modules or curricula will result in achieving awareness and strengthening capacities of stakeholders in meeting challenges during and after disasters. Capacity building through education, training and mid career intervention using on campus as well as off campus model must be streamlined. The plan envisages activities such as interacting with private sector management to impress the need to internalize disaster management as key capacity building.

5.11 Recognition of best efforts

Individuals and communities are stimulated when good actions are incentivized and actions that reduce risk and best practices in disaster mitigation are recognized. Awarding cash and other incentives in recognition of best practices and efforts will be promoted to encourage active participation. Similar efforts will also be instituted to recognize non-government agencies and community based organizations that devote programmes in educating and training communities to better prepare in disaster management.

5.12 Integrating disaster management into development planning

The stated goal and vision of the State of Delhi is to ensure economic and social development. Policies cutting across all sectors, including disaster management will subserve this broad goal. Disaster prevention and preparedness therefore shall be integral to every development policy within the state to ensure sustainable development. Development planning and strategies at the state level shall therefore address disaster management as a core part of short and long-term planning.

5.13 Optimize existing government infrastructure

DDMA will strive to ensure that the long-term approach to disaster management utilizes the existing administrative structure of the State Government at all levels within the state. Utilizing already available resources optimizes communication, capacity creation, relief, rehabilitation, and reconstruction, information collection and dissemination and sharing of disaster management best practices. All Government departments, agencies, corporation, authorities and bureaus – at state and local levels are encouraged to utilize available resources within their respective areas for disaster management. Strengthening existing institutions and establishing new institutions is encouraged where existing mechanisms are found inadequate.



Chapter VI

PREPAREDNESS MEASURES

6.1 Disaster Preparedness

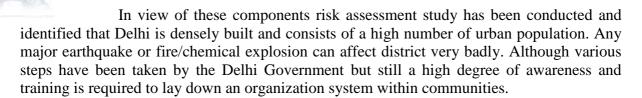
Preparedness focuses on plans to respond to a disaster threat or occurrence. It takes into account an estimation of emergency needs and identifies the resources to meet these needs. It also involves preparation of well-designed plans to structure the entire post-disaster response, and familiarizing the stakeholders, particularly the communities through training and simulation exercises. Preparedness has to be supported by the necessary legislation means, a readiness to cope with disasters or similar emergencies which cannot be avoided.

The first objective of preparedness is to reduce the disaster impact through appropriate actions and improve the capacity of those who are likely to be affected most (that is, marginalised, poor and handicapped) to get maximum benefit out of relief. The second is to ensure that ongoing development continues to improve the capacities and the capabilities of the system to strengthen preparedness efforts at community level. The third is disaster risk reduction in development programmes and plans of the Government. Finally, it guides reconstruction so as to ensure reduction in vulnerability. The best examples of preparedness activities are the development of local warning and community evacuation plans through community education, evolving local response structures such as Community based Disaster Management Teams (DMT) and administrative preparedness by way of stockpiling of supplies; developing emergency plans for rescue and relief.

It shall be the duty of every citizen to assist the State Relief Commissioner, the District Magistrate or such other person entrusted with or engaged in disaster management whenever his aid is demanded generally for the disaster management. Since disasters affect economic and social processes, preparedness and mitigation must emphasize the socioeconomic rather than just the physical aspects. If disasters demonstrate the vulnerability of the social system, then any policy for disaster management must include the potential reduction of such vulnerability.

6.1.1 Important Components of Preparedness Plan

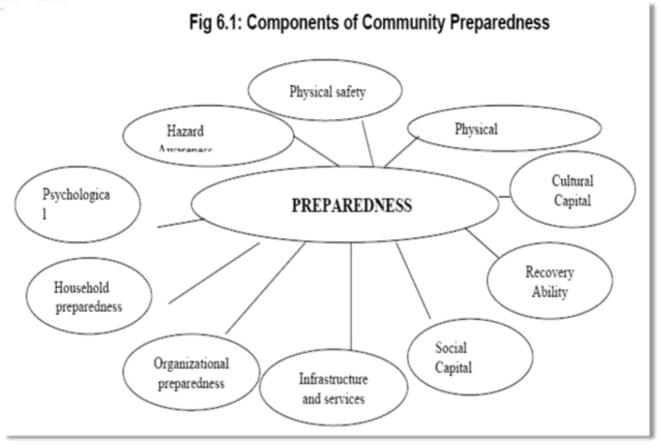
- Population characteristics (number of children, squatter settlement etc.)
- Building and critical infrastructure such as road, drinking water, communication network, health and sanitation
- Physical environment
- Social environment (social groups)
- Matching availability of resources to assessed risks



Looking at the complexity of repose mechanism during disasters two sets of components have been studied to prepare this plan i.e. components of community preparedness and administrative response.

- **1. Physical Safety:** i.e. how safe community members are in view of the physical danger from these hazards? The parameters essentially tries to measure how effective structural mitigation measures are e.g. resistance of building structures for earthquakes, availability of safe shelters and its capacity etc.
- **2.** Hazard awareness i.e. awareness level about hazards which have a reasonably higher probability of occurrence.
- **3. Organization preparedness** i.e. how far the community is organized to face a disaster i.e. existence of committee at community level, task forces, volunteers of civil defence and other local volunteers, trained disaster management teams and community disaster management plan etc.
- **4. Infrastructure and services** which tries to measure current state of these services and how well restoring critical services as and when disruptions occur.
- **5. Recovery ability** i.e. ability of the community members to recover from the impact of the hazard.
- **6. Physical environment** i.e. state of environment to face hazards e.g. Condition of subsurface aquifers and vegetation etc.
- **7. Social capital** i.e. degree to which social networking and cooperation exists among community members.
- **8.** Psychological preparedness i.e. how safe and prepared do community members feel in view of these hazards.
- **9.** Cultural capital i.e. cultural richness such as existence, recognition and use of traditional mechanism to cope with such disasters.
- **10. Household preparedness** i.e. preparedness at a house hold members.





- 1. Operation readiness of facilities, equipments and stores in advance
- 2. Maintaining response inventory of equipments and materials required for response
- 3. Assignment of responsibilities to agencies and organizations
- 4.Management training of crisis group members, desk officers and officers of respective departments likely to be assigned management duties
- 5. Specialized trainings of district disaster committee members, officials, community organizations through seminars and workshop
- 6. Training of taskforces
- 7. Raising community awareness
- 8. Improving response mechanism through conducting practice drills etc
- 9. Annual updating of State, District and community level plans
- 10. Conduct of mock exercises on all types of perceived disasters at the district and state levels.



6.1.2 Establishment of Emergency Operation Centre (EOC):

The Emergency Operations Centre is the hub of activity in a disaster situation. This is however, not to underestimate its normal time activities. The EOC, the key organizational structure, is flexible to expand when demands increase, and contract when the situation slows down. There is no one best way to organize an EOC. The primary function of an EOC is to implement the Response Action Plan which includes:

- Coordination
- Operations management
- Information gathering and record keeping.
- Public information
- Resource management.

The EOC, its system, and procedures are designed in such a way that information can be promptly assessed and relayed to concerned parties. Rapid dissemination contributes to quick response and effective decision-making during emergency. As the master coordination and control point for all counter-disaster efforts, the EOC is the place of decision-making, under a unified command.

The EOC under all the circumstances will be under the supervision of Addl. Secretary (Revenue) and under overall guidance of Secretary (REV/DM). It is the nerve centre to support, co-ordinate and monitor the disaster management activities at the state level. It is the hub of information and requisitioning additional resources from neighbouring states and also from Central Government. A 24x7 central flood control room is established in the office of D.C. (East) during the monsoon period. Another control room is established at ISBT, Kashmiri Gate by I&FC Department. A Boat Club has been established for disaster response during flood.

District EOC shall send First Information Report to SEOC within 12Hrs of Incident. This Report shall be forwarded to NEOC, MHA by SEOC. Thereafter, Daily Situation Report shall be forwarded by DEOC to SEOC, till the situation normalises. Usually, the SEOC shall coordinate with state level nodal officers and control rooms while, DEOC shall coordinate with district level officials. The SEOC & DEOC shall remain in constant touch with the ESF officials at the incident site and various ESF control rooms throughout the incident. They shall coordinate the requirement of extra Human Resource, equipment or machinery needed at the incident site. Public alert/warning if required shall be issued through Directorate of Information and Publicity. There is a need to strengthen Early Warning Systems in consultation with IMD and Flood & Irrigation Department. There is also a need to strengthen public address and public communication.

The normal time activity of the EOC through the office of the Secretary Disaster Management will be to

Ensure through appropriate statutory instruments that;

- District Disaster Management Plan (DDMP) is operationalised.
- Standard Operating Procedures for various departments are operationalised.



- Ensure that all districts continue to update DDMP on a regular basis
- Encourage districts to prepare area-specific plans prone to specific disasters
- Receive reports on preparedness from the district control room as per the directives every six months. Based on these, the EOC will prepare a summary report for the consideration of the Chief Secretary
- Setup study groups and task force for specific vulnerability studies and submit the reports to Chief Secretary
- Identify and interact with expert agencies to evolve mitigation strategies
- Serve as a data bank to all line departments and the planning department with respect to risks and vulnerabilities, and ensure that due consideration is given to mitigation strategies in the planning process
- Receive appropriate proposals on preparedness, risk reduction and mitigation measures, from various state departments/agencies and place the same for consideration of the Chief Secretary
- Convey policy guidelines and changes, if any, in the legal and official procedures, eligibility criteria, with respect to relief and compensation
- Upgrade and update SDMP(Disaster Management Plan) according to changing scenarios in the state
- Dissemination of SDMP to other departments of the GOM and state level agencies
- Update data bank
- Monitor preparedness measures undertaken at the district levels, including simulation exercises undertaken by various departments
- Organize post-disaster evaluation and update state DMAP accordingly
- Prepare an actions-taken report for Chief Secretary
- Receive reports and documents on district level disaster events, and submit the same to Chief Secretary, Revenue Minister and Chief Minister
- Warning and communication systems and other equipments in the control room are in working condition.
- Requisition resources and place them at the disposal of concerned districts.

Inform district control room about the changes, if any, in legal and official Procedures, with respect to loss of life, injuries, livestock, crop, houses, to be adopted (death certificates, identification procedures, etc.).

6.1.3 Warning on Occurrence of Disaster

On the receipt of warning or alert from any such agency which is competent to issue such a warning, or on the basis of reports from Dy. Commissioner of the occurrence of a disaster, all community preparedness measures including counter-disaster measures will be put into operation. The Secretary (REV/DM) will assume the role of the Incident Commander if disaster cannot be managed at lower levels. It is assumed that the district administration would be one of the key organizations for issuing warnings and alerts.

For seasonal disasters like floods, warning to be issued in a top-down manner, from IMD to State EOC to District EOC. In disasters where no warning is possible, like in earthquake and terrorism disasters, the information is to be routed in Bottom-Up approach.



(a) Normal Time Activities of Emergency Operations Centre

- Ensure warning and communication systems are in working conditions
- Collect and compile of district-wise information related to hazards, resources, trained manpower etc.
- Conduct district, sub-division and community level mock drills
- Generate coordination within Community, District and State level departments
- Monitor and evaluate community(Residential colonies, schools, hospitals, institutions, business establishments) level disaster management plans
- Develop a status report of preparedness and mitigation activities under the plan
- Allocate tasks to the different resource organizations and decisions making related to resource management
- Review and update response strategy
- Supply of information to the state government

(b) Facilities with EOC

Presently, the Emergency Operations Centres in districts and state are equipped with computer related facilities, human life detection machines, basic search and rescue equipments and wireless communication facilities. Following other facilities are present with EOCs:

- A databank of resources, action plans, state and district disaster management plans, and community preparedness plans.
- Maps indicating vulnerable areas, identified shelters, communication link system with state government and inter and intra district departments would strengthened
- Inventory of manpower resources with address, telephone numbers of key contact persons has been maintained
- Frequently required important phone numbers would be displayed on the walls so that they can be referred. Other phones and addresses are kept under a easy retrieval and cross-referring system

Future plan of the strengthening of EOCs:

- Reconstruction/ Retrofitting of building will be done so that it can remain operational during disaster also. Establish one EOC at Delhi Secretariat.
- 24x7 Disaster Emergency vehicle will be available in the EOC for better rescue and response

To ensure coordination within State, district and local authorities, EOC plays a very important role. Directing the operations at the affected site, the need for coordination at the district headquarter and the need for interaction with the state government to meet the conflicting demand at the time of disaster are the responsibilities of the Divisional/Deputy Commissioner and his team members. State/ District EOC helps Incident Management Team to meet these conflicting demands. Keeping this in view, Delhi has setup 1 State level Emergency Operations Centers and eleven Emergency Operations Centers for all the districts. The State EOC has a permanent Disaster helpline number (1077) and is operational 24x7. The District EOCs are also operational on a 24x7 basis. There is a plan for further



(c) Communication Room (Main Message Room)

The TETRA wireless system is available with EOC. The following facilities would be available in the communication room:

- Telephones, fax units for contact with the ESFs,
- TERTA wireless network (up to tehsildar level) is functional,
- Helpline number 1077 has been setup for emergency related queries

(d) EOC Staffing/Manning of EOC

Manning of EOC is required for making EOC operational during and post disaster situation. Districts thereby have kept adequate staff. There is a need of regular staff, staff on requirement and staff-on disaster duty. Staffs have been kept for manning communication room on 24 hours. Staff on call is there in the form of trained civil defence volunteers who are called immediately on requirement. Staff on disaster duty can be appointed by Deputy Commissioner. This staff can be drawn from the various government departments.

(f) Desk arrangement

In case of emergency Incident Commander/Deputy Commissioner and other team members would be present round the clock in the office in EOC.

<u>6.1.4 Preparation of Reso</u>urce Inventory

Resource inventory means listing of various useful materials, manpower and vehicles etc with their contact addresses and system of procurement. Resources of State/District EOC has already been fed in India Disaster Resource Network (IDRN). The resource inventory is available online and can be accessed from the server residing at MHA and NIC. The District EOCs are responsible to update quarterly and manage the details of IDRN data in a user-friendly manner.

6.1.5 Reliable Communication Systems

Delhi being a capital city already has well-established communication system but yet disasters like earthquakes has witnessed partial or total collapse of general communication system which delays flow of information from the disaster site consequently resulting delays in relief operations. Therefore, establishment of reliable communication also plays a very crucial role. TETRA network have been established in Delhi which is the most reliable system in the time of disaster. These TETRA sets have been installed the EOCs for strengthened communication system in all nine district offices and state headquarter office. Use of HAM radios and satellite phones by DDMA will give added redundancy. DDMA is in the process of notifying Disaster Management Lanes for smooth movement of Emergency Responders during disaster situations.

Media management is required to ensure precise communication of the impact of disaster and relief measures being taken and generate goodwill among stakeholders. Community



management is to be done by communicating to the affected communities with a view of preventing panic reactions, providing relevant information and handling welfare enquiries. Similarly it is needed to establish feedback mechanism including communication network to get feedback on relief measures.

6.1.6 Preparation of Response Plan

One of the important tasks during preparedness phase is formulation of a response plan. It basically helps in quick mobilization of manpower, resources and in performing various duties. The response plan explains a hierarchal system of Emergency Response Functions in terms of tasks and assigned responsibilities to different agencies. It also lays down an Incident Response System under the directions of Deputy Commissioner of every district or divisional Commissioner (depending upon the extent of disaster). This whole exercise helps in reducing confusions and result in prompt and coordinated response. Activation of trigger mechanism by Incident Commander, Functioning of EOC and Response of Emergency Support Functions can be tested every year in form of mock drills for resolving perplexity occurring during actual scenario. A total of 9008 awareness programmes, 5100 training programmes and 2690 mock drills were conducted by DDMA in the period 2009-2014. 1326 RWA plans and 6560 school DM plans have also been prepared. The mega mock drill of 15th February, 2012 and DEMEx mock drill of 4th December, 2012 helped to test the DM plans and the audit report of observers from Indian Army has suggested for improvement in response operations at EOC, hospitals, incident sites and relief centers during disaster situation. Each district shall formulate their district disaster management plans as per the guidelines of NDMA.

The audit report of mega mock drill by Indian Army described the following lacunas:

Emergency Operation Centre	1) In adequate space
	2) Poor equipping
	3) No representations by ESFs
	4) Non compatible communication
	5) Absence of resource inventory
	6) No feedback system
	7) EOC needed to be housed in sturdy place.
Incident Sites	1) Poor response time
	2) Poor handling of causalities
	3) Lack of basic equipments with rescue teams
	4) Poor crowd control
	5) Poor command and control
Hospitals	1) Lack of disaster ward
	2) Poor handling of causalities
	3) In adequate resources
	4) Absence of Media relating and display boards
	5) In proper distribution of injured and poor
	maintenance of dead and discharged personnel.
Relief Camps	1) Lack of basic amenities
-	2) Housed in unsafe structures
	3) Poor stocking of resources



The audit report of DEMEx listed following lessons learnt:

Sl. No.	Lesson Learnt
1.	Capacity Building: There is a requirement in terms of equipments, training and
	joint exercise
2.	Awareness: Stake holders were not aware of their roles.
3.	Training: ESFs require further improved training for skill building
4.	Feedback System: Feedback given in hot-wash needs to be implemented
5.	Built in Redundancy: Redundancy urgently required in communication, building
	design and response
6.	Frequency of the exercise: Table Top exercise should be held once in three months
	and mock drill once in six months
7.	Best practices cell: DDMA/NDMA need to establish this for improving drill
	conduction.
8.	Exercise Setting: In future mock exercise may be limited to single ESF for better
	observation and subsequent refining of procedures.

6.1.7 Training and Capacity Building

Disaster Management is a multi-organizational effort requires training on execution and coordination related subjects. Therefore wide ranges of trainings related to management and planning skills are highly required for potential officers in order to equip them for specialized disaster-related tasks.

Training requirements are likely to comprise of core activities of emergency management such as Incident Response System, Emergency Response Functions, basic management skills and specialized training on search and rescue, first aid etc. Persons who have trained so far are:

- Government Officers at par with the rank requirement under Incident Response System
- Team leaders and members of Emergency Support functions
- Quick Response Teams at headquarter and field level
- Community level taskforces including Civil Defence Volunteers, NYKS, school students, RWAs, NGOs, Market Associations etc.

Delhi Disaster Management Authority shall continue organizing several seminars and workshops with the help of various research institutions, Civil Defence and Home Guard, Fire fighting department, Health departments etc. A record of trained manpower shall be maintained by each department and their preparation shall be noticed during mock-drill.



6.1.8 Community Awareness and Community Preparedness Planning

The hazard and risk analysis of the state indicates that there is a high need of community awareness through public *awareness programmes* on the following themes of disaster:

- Types of disasters and basic do's and don'ts
- Post disaster epidemic problems
- Construction and retrofitting techniques for disaster resistant buildings
- Communication of possible risk based vulnerable areas in the district
- Evacuation related schemes and community preparedness problems
- Non-structural mitigation measures.

Volunteers and social organizations shall also play a vital role in spreading mass scale community awareness. Media shall also play an important role in raising awareness and educating people. Delhi Government have developed large scale Information Communication and Education material in the form of booklets, handbooks, manuals, posters and flyers etc. These documents are distributed in all the offices, schools, institutions and residential colonies.

Community Disaster Management Planning is one of the vital components of community preparedness. It involves all important parameters related to hazard awareness, evacuation planning, and preparation of resource inventory, formation of community level taskforces and committees which will enhance capacities in communities in combating a disaster in a predefined manner. Delhi Disaster Management Authority is working with UNICEF for developing a system of warehouses in Delhi for disaster response. These warehouses ranging from about 10 acres to 22 acres would provide localized community response equipped with essential supplies. These would also work as relief shelters and training centres.

District authorities keep on fostering community planning exercises in local areas. District administration has also been imparting trainings to the communities with the help of Civil Defence, Nehru Yuva Kendra Sangthan, St. John Ambulance Brigade, Indian Red Cross Society and NGOs etc. Yet more steps required to be undertaken for encouraging community based disaster management planning initiative.

Institutional framework in the form of Community Disaster Management Committee for community units such as RWAs, slum clusters, Market & Trade Associations, Office Complexes, etc. shall be built up by the District Disaster Management Authorities. Civil Defence Volunteers being one of the pioneering first responders in Delhi would be given strategic responsibilities in these committees in order to help trickle down disaster management activities to grass root level.

The primary functions of NGOs, RWAs, NYKS and other such community based organisations during disasters would be First Response; Basic Relief and Rescue; and help maintain peaceful coordination between administration and General Public. Commemorating the organisation of first ever mega mock drill on earthquake safety in India by DDMA on

15/02/2012, each year the day of 15th February will be observed as Earthquake Preparedness Day. Similarly October 13th of each year will be observed as International Disaster Reduction Day as declared by United Nations.

6.1.9 Capacity Building of Community Task forces

District administration, Medical officers, Trained volunteers, Delhi fire Services, Civil Defence and NYKS etc. are responsible for building capacities of community taskforces in search and rescue, fire-fighting, warning dissemination, first-aid and damage assessment etc.

Potential of these organisations need to be optimised to support all community based initiatives. DM training needs to be included in their programmes. Special training campaign shall be launched to strengthen their capacities. Partnerships with RWAs on Bhagidari platform and with NGOs shall be developed for community capacity building to face disasters. All the District DMAs shall prepare and maintain the list of NGOs/CBOs of the district, along with details of their functional specialization/capacity and geographical coverage.

District level Medical Officer shall organise training for volunteers in basic first-aid with the help of Civil Defence & Home Guard, St. John Ambulance and CATS. Delhi Fire Service along with Civil Defence & Home Guard shall impart training on search and rescue and fire fighting.

6.1.10 Simulation Exercises

To encourage participation in a coordinated manner, simulation exercises on various disasters are very important. Mock exercises have been promoted at state, district and community level. As the State response plan is ready, mock-drills are organized regularly by the State Government. Mock exercises help in improving response time and also test reliability. Therefore mock-drills are organized involving all the required agencies on regular basis. These drills also help in updating the response plans. Delhi Disaster Management Authority is responsible for conducting mock drills. Mock drills shall be arranged on regular basis for cinema halls, hospitals, malls, market places, metro stations and other strategic locations on regular basis. Each district shall prepare a calendar of mock drills in the beginning of the financial year. State level mock drill shall be conducted once in every year and District level mock drills shall be conducted by each district once in six months.



6.1.11 Community preparedness strategies

S. No	Tasks	Mode of conduct	Nodal Agencies	Supporting Agencies
	Information	Through Nukaad Nataks, Film	District	Civil Defence and
	Dissemination of	Shows, Rallies, Media,	Administration	Home guards
	various hazards and	Newspaper Media, Posters		volunteers(CD &
	their precautionary	and Pamphlets, Groups		HG), Nehru Yuvo
	measures (do's and	discussions and workshops		Kendra
	don'ts).	etc		Sangthan(NYKS),
	Also, preparation of			Residential Welfare
	community based			Associations(RWAs),
	disaster management			Market trade
	plans shall be			Unions(MTAs), Rotar
	promoted in these			Clubs, Nor
	areas.			Government
				organizations(NGOs)
	First priority shall be			Schools and college
	given to the schools,			volunteers, NSS
	industrial clusters,			NCC etc.
	Market Trade			
	Associations and			
	Residential areas,			
	slums and			
	resettlement colonies			
	etc living in the			
	densely populated			
	areas of North-east,			
	East, Central, West			



	and North districts			
	Second Priority shall			
	be given to the			
	communities living in			
	the outer part of the			
	South, South-West and			
	North West districts			
2.	Formation of	Through community level	District	Representatives of
~	Community Based	meetings	Administration	RWAs and MTAs
	Disaster Management	Theomings	Administration	Members. Local
	0.10			Volunteers etc.
3.	Taskforces Capacity Building of	Through mock-drills,	District	CD & HG, Local
~.	Community Members	preparation of community		NGOs, NYKS, St. John
	Commonly Members		administration	
		plans, trainings and		Ambulance, C.A.T.S
		workshops on disaster specific		etc.
4.	Trainings to the	topics Trainings and workshops	Revenue	CD & HG, St. John
"	taskforces and		Department	Ambulance and
	committee members		along with	CATS and NGOs
	- First-Aid and		Health, Police	CAIS GIIG 14003
	Trauma			
	Counseling		Departments	
	- Search and rescue			
	and fire-fighting			
	- Warning			
- E	Dissemination etc.	Seminars and community	Health	Local health
5.	Post disaster epidemic		Health	
	problems	meetings	department	departments, and
6	Trainings for	Showing Films, videos,	Revenue	MCD, PWD, Private
`	construction of seismic		department	contractors and
	resistant buildings and		Sopamion	NGOs etc
				11003.610
	retrofitting of the			
	buildings.	workshops or any other		



	Target groups are	community gathering		
	contraction			
	contractors, masons,			
	engineers, architects			
	and local			
	communities			
	(especially those who			
	are taking loans for			
	building constructions			
	and provided			
	assistance under			
	Indira Awas Yojana			
	and other			
	developmental			
	programmes)			
7.	Orientation/Training of	Organising state level	State Nodal	DHS, Social Welfare
	government and non-	sensitization programmes in	Agency/Delhi	Department, Fire
	government officers	their roles in disaster	Disaster	Department,
	and various other	management	Management	Research
	stakeholders		Authority	/Academic
				Institutions like IIT-
				Kanpur and Roorkee,
				School of Planning
				and Architecture,
				Delhi College of
				Engineering, Jamia
				Milia Islamia
				University, Delhi
8.	Establishment and	Construction/Restrengthenin	Delhi Disaster	University etc Funds of United
	Strengthening of		Management	Nations
	Emergency	Manning of EOC	Authority	Development
	Operations Centres	Strengthening of EOC with	Zioniony	
	Oberditions Certifies			Programme
9.	Response Planning	equipments and IT facilities Based on Incident Command	Delhi Disaster	
1	and Simulation			
$\overline{}$	Grid Simordion	did Energency	munagemen	



Exercises	Support Functions	Authority/District	
	Developing Partnership with	Authority	
	various public support units		
	and private agencies		
	Organising mock-drills		
	exercises at state/district level		

6.1.12 Resource Availability

During past disaster, it has been observed that a comprehensive database of disaster management related inventory is essential for an organized response. More often than not, lack of proper and adequate information has hampered swift and measured response resulting in delay which could be critical in such eventualities. Therefore, a need was felt to prepare a database of such resources, from Village/Ward level to State level.

THE INDIA DISASTER RESOURCE NETWORK (IDRN) - DELHI

In the phase of escalating disaster risk in India, it has become highly critical to be prepared with preventive measures along with access to relevant resources system like the India Disaster Resource Network (IDRN) to be handy 24x7 from district to national level.

IDRN is a nation-wide electronic inventory of resources that enlists equipment and human resources, collated from district level Government line departments and agencies. It is a web based platform, for managing the inventory of equipments, skilled human resources and critical supplies for emergency response. The primary focus is to enable the decision makers to find answers on availability of equipments and human resources required to combat any emergency situation. It is website whereby all the disaster relief necessary information and resources pertaining to various emergency support functions such as fire fighting, health services, search and rescue, shelter, transportation, etc are monthly updated for smooth access to responders during emergency situations. Precise information on location and quantity of emergency resource is vital for timely and adequate disaster response.

A new State Disaster Resource Network (SDRN) is also needed to be developed which would be integrated with the geospatial database of Delhi maintained by GSDL.



6.1.13 ESF Specific Preparedness Plan

Following is the summarized Emergency Support Function wise preparedness plan:

COMMUNICATION			
Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare operational checklists	All	0-6 Months
2.	Prepare and update inventory of equipments and resources on monthly basis and also prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	All	0-6 Months
3.	Prepare a list of private agencies and experts for providing support in restoration of communication	MTNL, NIC	0-6 Months
4.	Identify the exchanges, towers and other communication infrastructure vulnerable to disasters and carryout correctional measures. Prepare contingency plan for restoration of service after disaster and conduct mock drills	All the Telecom Service Providers of Delhi	1-2 Years
5.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	All	0-6 Months
6.	Deploy equipped manpower at the identified wireless posts of Flood Control Deptt. during flood warning period of the year	I & FC Department, Revenue Department	-
7.	Procure response equipments and conduct training of QRTs in restoration of communication	All	1-2 Years
8.	Establish Unified TETRA Communication System across ESFs upto District level for better emergency coordination	Revenue Department, Delhi Police	1-2 Years
9.	Establish modern GIS enabled State and District EOCs and one EOC with structural resilience to earthquake at Delhi Secretariat	Revenue Department	1-2 Years
10.	Establish alternate communication systems such as HAM radio and satellite phone network	Department	1-2 Years
11.	Bring all the ESFs to common communication platform, to be accessed by Revenue Department during disasters	Revenue Department	1-2 Years
12.	Prepare checklists of items and plans for regular updating of IDRN and DSSDI, for all the Departments in consultation with them	Revenue Department	6-12 Months



13.	Convene coordination meetings with line ESFs, at least once in six months	MTNL	-
	EVACUATION	,	
Sl. No.	Preparedness Measures	Agency	Timeline
1.	Formulation of crowd management plan for places of prominent public gathering	Delhi Traffics Police, Delhi Fire Service	6-12 Months
2.	Ensure that evacuation plans of strategic buildings (Cinema hall, mall, high rise building, etc.) are ready	Delhi Fire Service, DDMA	6-12 Months
3.	Designation of evacuation routes in hazardous areas	Delhi Traffic Police	6-12 Months
4.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	All	0-6 Months
5.	Prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	All	0-6 Months
6.	Prepare operational checklists and manuals	All	6-12 Months
7.	Ensure the staffs are well trained on skills of special handling care for disabled, women, old aged, diseased and children during evacuation	All	6-12 Months
8.	Pre plan for relocation of vulnerable and affected population in disaster situation	DDMA	6-12 Months
9.	Convene coordination meetings with line ESFs, at least once in six months	Delhi Police	-
	SEARCH & RESCU	JE	
Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare handbook on team equipment	All	6-12 Months
2.	Develop SOPs/Field Guides/Checklists/Emergency toolkit	All	0-6 Months
3.	Prepare training calendar for staff	All	0-6 Months
4.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	Delhi Police, Fire Service, Civil Defence	
5.	Prepare and update inventory of equipments and resources and prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	Delhi Police, Fire Service, Civil Defence, Army	6-12 Months



6.	Enhance the strength of Quick Response Vehicles and procure additional equipments required for effective response	All	1-2 Years
7.	Establish State Disaster Response Force	DDMA	2-5 Years
8.	Commission 200 nos. of Quick Response Vehicles for Delhi in a phased manner, to be deployed in each subdivision and strategic locations in Delhi	DDMA	1-5 Years
9.	Establish Community Disaster Management Centers in each subdivision involving Civil Defence Volunteers and equip these centers with basic search and rescue equipments	DDMA & Civil Defence	1-2 Years
10.	Establish District Disaster Management Centres in each of 11 districts in coordination with DFS and procure Disaster Response equipments for these centers. Strengthen the existing MCDandNDMC disaster management centers by procuring additional equipments	DDMA	1-2 Years
11.	Convene coordination meetings with line ESFs, at least once in six months	Home Department	-

HEALTH & TRAUMA CARE

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare inventories of agencies that can provide medicines, equipments and medical care in emergency	Directorate of Health Services & Hospitals	0-6 Months
2.	Prepare inventory of equipments, manpower and specialization and develop information network	Directorate of Health Services, MCD, NDMC & Hospitals	1-2 Years
3.	Prepare Operational checklist for handling mass casualty and public health emergency	All	0-6 Months
4.	Maintain a stock of essential medicines, drugs and vaccines in all the health centers and prepare the details of resources and manpower to be prepositioned at strategic locations (eg. Low lying areas) in the advent of any disaster, based upon need analysis. Also update this list annually	Directorate of Health Services	0-6 Months
5.	Constitute Quick Response Teams (QRTs) at Sub-division level and in each hospital; and constitute disaster management groups at state, district and zonal levels	Directorate of Health Services	0-6 Months
6.	Establish Hospital Incident Command System	Hospitals	0-6 Months



19.	outbreak periods Establish more hospitals and expand the capacity of existing hospitals Convene coordination meetings with line ESFs, at least once in six months EQUIPMENT SUPPO	Health Department, DHS Health Department	2-5 Years
	Establish more hospitals and expand the capacity of existing hospitals Convene coordination meetings with line	DHS	2-5 Years
	Establish more hospitals and expand the capacity of existing hospitals	DHS	2-5 Years
18.	1		
17.	Conduct regular public awareness campaign on public health before and during disease	DHS, MCD, NDMC	-
16.	Impart regular training to staff on emergency management	All	-
15.	Ensure action plan for supply of drinking water for domestic animals in vulnerable areas	DJB	6-12 Months
14.	Prepare list of wholesale suppliers of food for domestic animals, ensure action plan for supply of them to disaster affected areas and implement animal insurance schemes	Development Department	6-12 Months
13.	Ensure appropriate vaccination of domestic animals before disaster period and also provision of mobile veterinary health camps in disaster vulnerable areas	Development Department	-
12.	Prepare action plan for veterinary response during disaster situation	Development Department	6-12 Months
11.	Prepare database of resources and SOP for psychosocial rehabilitation	Health Services, Department of Social Welfare	6-12 Months
10.	Establish disease surveillance mechanism in association with all the hospitals, and health centers and maintain rapid response teams	NDMC	6-12 Months
9.	Ensure distribution of chlorine tablets, ORS powder in flood vulnerable areas. Ensure regular fogging and decontamination of communicable diseases vulnerable areas	MCD, NDMC	-
8.	Ensure existence of alternate power supply system in the form of generator/inverter system, in each hospital. Increase the water storage capacity to 4 days in hospitals	DHS, Hospitals	6-12 Months
7.	and maintain Disaster Beds and Cupboard Prepare checklists of measures for maintaining hygienic conditions	Health Services, MCD, NDMC	0-6 Months

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare inventory of equipments, manpower and specialization. Prepare the details of	All	0-6 Months



1
0 1 1 1
0-6 Months
0-6 Months
-
0-6 Months
0-6 Months
1-2 Years
-
-
-

WARNING DISSEMINATION & MEDIA

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Develop and maintain an information base on each disaster for ready dissemination	Revenue Department	0-6 Months
2.	Prepare templates/formats for issuing press releases, bulletins and advisories	Revenue Department	0-6 Months
3.	Maintain a database of contact details of print and electronic media	Revenue Department, DIP	0-6 Months
4.	Design the web portal of DDMA for ready information dissemination	Revenue Department	0-6 Months
5.	Maintain regular updates of telephone directory	All	-
6.	Impart regular training to EOC staff	Revenue Department	-
7.	Develop protocol for collection and dissemination of information by the EOC and ensure timely dissemination of information to all the line departments	Revenue Department	0-6 Months



8.	Ensure dissemination of warning information across the different levels of the	All	0-6 Months
	Department/Agency		
9.	Prepare media plan for dissemination of warning and de-warning information on various disasters through TV & Radio channels, News Papers, etc.	Revenue Department	6-12 Months
10.	Establish networks of alternate early warning systems for disasters	Revenue Department	2-5 Years
11.	Convene coordination meetings with line ESFs, at least once in six months	Revenue Department	-

DRINKING WATER & SANITATION

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare inventory of equipments and procure resources required (Water storage tanks, water quality monitoring kits, water treatment kits and mobile plants, etc.) for disaster response. Also prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	DJB, MCD, DHS	0-6 Months
2.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	All	0-6 Months
3.	Prepare a checklist of emergency toolkit	DJB, MCD	0-6 Months
4.	Prepare a list of private agencies for providing support in restoration of drinking water supply	DJB	0-6 Months
5.	Prepare operational checklists	DJB, MCD, DHS, Revenue Department	0-6 Months
6.	Maintain a database of areas facing water scarcity and sewerage problems	DJB, MCD, I&FC	6-12 Months
7.	Prepare a guideline to identify and demarcate contaminated water source in disaster and provide early warning to community on contaminated water source	DJB, MCD	6-12 Months
8.	Procure and plan for preposition of sanitation materials (mosquito nets, polymer tanks, squatting slab with pans, materials for superstructure for temporary latrines and bathing (collapsible, tarpaulin), etc.) and hygiene kit (soap, antiseptic, tooth paste, kitchen utensils package, etc.)	MCD, Revenue Department, DUSIB	1-2 Years
9.	Convene coordination meetings with line	DJB	-



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HYHC	at least	Once	1n	CIV	months
LOI 3,	at icast	Once	ш	SIA	monus

ELECTRICITY

Sl.	Duananadnaga Maagunag	Agonov	Timeline
No.	Preparedness Measures	Agency	1 illielille
1.	Determine the types of damages to power infrastructure expected in different disasters also do historical analysis	All	6-12 Months
2.	Prepare an inventory of response equipments. Also prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	All	0-6 Months
3.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	BSES/TPDDL/DTL	0-6 Months
4.	Prepare a checklist of emergency toolkits and guideline for damage assessment	BSES/TPDDL/DTL	0-6 Months
5.	Prepare operational checklists for response teams	BSES/TPDDL/DTL	0-6 Months
6.	Keep a close liaison with IMD and EOC of DDMA for early warning information on disasters. Prepare each year an action plan, to deal with power shortage during extreme weather situation	BSES/TPDDL/DTL	-
7.	Impart regular training to staff	All	-
	Procure necessary additional equipments for effective emergency response	All	1-2 Years
8.	Convene coordination meetings with line ESFs, at least once in six months	Department of Power	-

RELIEF (FOOD & SHELTER)

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Identify warehouses of food grains and preposition food stuff near vulnerable location, if need is felt	F & S Department, DSCSC	6-12 Months
2.	Prepare an inventory of food stock available and standard list of items to be included in food packet. Prepare list of agencies/whole sellers to supply food packet and essential supplies such as polythene, candles, cooking gas, etc. Update the list before 30 June of each year.	F & S Department, DSCSC, Revenue Department	0-6 Months
3.	Constitute Quick Response Teams (QRTs) at	All	0-6 Months



1117	Sub-division level and disaster management		
	groups at state, district and zonal levels		
4.	Maintain list of private suppliers and NGOs who can support in food and shelter relief during emergency	All	0-6 Months
5.	Identify locations of temporary shelter and preposition shelter arrangements. Identify helipads and airdrop locations	Revenue Department	0-6 Months
6.	Prepare database of essential facilities available in identified relief centers, their service locations, shelter capacity and additional resources required in these centers	Revenue Department	6-12 Months
7.	Identify and establish warehouses for storage and develop guidelines for handling relief supplies and their storage	F & S Department, DSCSC, Revenue Department	2-5 Years
8.	Prepare operational checklists for relief	All	0-6 Months
	Prepare guideline for damage assessment	Revenue Department	6-12 Months
9.	Impart regular training to staff on damage assessment and relief distribution	Revenue Department	-
10.	Prepare subdivision wise list of most vulnerable locations for different disasters and also identify locations for associated relief centers.	Revenue Department	0-6 Months
11.	Prepare list of alternative locations to be used for education during disaster situations	Directorate of Education, Directorate of Higher Education	6-12 Months
12.	Prepare and update annually the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	All	0-6 Months
13.	Update the contact details of representatives of apex committee and sector committees of flood management before 30 th June of each year	Revenue Department, I & FC Department	-
14.	Convene coordination meetings with line ESFs, at least once in six months	Revenue Department	-

DEBRIS & ROAD CLEARANCE

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare inventory of equipments, manpower and specialization. Also prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster,	All	0-6 Months



	based upon need analysis		
2.	Prepare inventories of agencies that can provide equipments, manpower and specialization	All	0-6 Months
3.	Prepare Operational checklists and damage assessment guideline	All	6-12 Months
4.	Impart regular training to staff	All	-
5.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	PWD, MCD, Cantt. Board, DDA	0-6 Months
6.	Procure necessary additional equipments required for effective response	All	1-2 Years
7.	Constitute panel of experts for inspection of roads, buildings, etc.	All	0-6 Months
8.	Close the vulnerable bridges and other road infrastructure during disaster situations	PWD, MCD, NDMC	-
9.	Convene coordination meetings with line ESFs, at least once in six months	Director of Local Bodies	-

LAW & ORDER

Sl.	Preparedness Measures	Agency	Timeline
No.			
1.	Maintain database of vulnerable area	All	0-6 Months
2.	Prepare inventory of equipments, manpower and specialization. Procure equipments necessary for response	All	6-12 Months
3.	Prepare the details of resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis	All	0-6 Months
4.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	All	0-6 Months
5.	Prepare operational checklists for different events	All	6-12 Months
6.	Impart regular training to staff	All	-
7.	Convene coordination meetings with line ESFs, at least once in six months	Delhi Police	-

TRANSPORT

Sl. No.	Preparedness Measures	Agency	Timeline
1.	Prepare inventory of vehicles, manpower and specialization and also prepare the details of		0-6 Months



	resources and manpower to be prepositioned at strategic locations in the advent of any disaster, based upon need analysis		
2.	Prepare and update inventories of agencies that can provide vehicles, manpower and specialization and conduct regular coordination meetings with them	All	0-6 Months
3.	Prepare checklists for a quick assessment of damage to the transport sector	All	0-6 Months
4.	Constitute expert teams for emergency repair and restoration of transport	All	0-6 Months
5.	Prepare a transport and alternate transport plan for relief and distribution of food materials in the vulnerable areas	Transport Department	6-12 Months
6.	Constitute Quick Response Teams (QRTs) at Sub-division level and disaster management groups at state, district and zonal levels	Transport Department, DTC, DMRC	0-6 Months
7.	Make available vehicles requisition forms to the officials to be used during disaster situations	Transport Department	0-6 Months
8.	Notification and operationalisation of disaster management lanes	Transport Department, Delhi Traffic Police, DDMA	6-12 Months
9.	Impart regular training to staff	All	-
10.	Convene coordination meetings with line ESFs, at least once in six months	Transport Department	-

^{*} Timeline of activity is subject to availability of adequate fund

All the ESF Departments shall conduct **mock exercises** on regular basis.

6.1.14 Preparedness for Disables

Suitable warning system for various disabled people like:-

Auditory signals system/Alarms For visually impaired Announcements population • Visual Signal Signs – Red flag for danger or alert • Pictures with relevant messages For hearing Turning lights on and off to showcase as signals for danger impaired population Special Sign language For mentally Symbol and Sign impaired population Clear and brief announcement by the experts and trainers. Auditory Signals/Alarms Group of trained volunteers for their assistance For physically Correct announcement and directions impaired population



Community Support

Pre Disasters Measures:

- → Education and Vocational Training
- → Income Generation Activities
- → Building up Social capital
- → Advocacy and Policy Reform
- → Training people with disabilities and training emergency planners and responders from governmental and other agencies. Providing training in accessible format for people with disabilities.
- → Emergency preparedness exercises must include the real participation of people with disabilities.
- → Mock drill exercises to be carried out in institutions, organizations for disabled population. Analysis of the loophole sin such exercises and working on these to improve the preparedness level of such disabled people.
- → Deep analysis of the status of people with disabilities residing in hazardous locations will reveal the obvious and immediate needs.
- → Relevant human resources and specific scales in such areas like special diagnostics including prevention and early detection of disabilities in children.

Post Disasters Measures:

- → Community Based disaster rehabilitation
- → Education and Vocational training.
- → Shelters must meet minimal accessibility levels. Ensure appropriateness, accommodation, washrooms, etc for wheelchair and mobility aid users. Clothing, bedding and personal hygiene items may need to be adapted.
- → Accessible latrines ramps, large door, handrail along with space inside to accommodate wheelchair.
- → Accessible washrooms
- → Accessible distribution of facilities and strategies for food items and non-food items.
- → People with disability may need to be provided with additional blankets and warmer clothes as their mobility to procure these may be a hindrance.
- → Specific protection programs for abuses faced by disabled people.
- → General health services should be accessible for people with disabilities.
- → Assistive devices like crutches, wheelchair, etc need to be provided.
- → Specialized health services, specific nutrition specific diets, supplementary feeding programmes for children, additional ration for adults etc need to be ensured.
- → Additional measures may be needed to ensure that access to water is equitable.
- → Engage Disable People's Organizations as stakeholder in Disaster Response and Relief.



→ Department of Social Welfare has to play a vital role towards welfare of differently able people.

6.1.15 Crowd Management Planning

The roles and responsibilities of various stakeholders such as Police, Disaster Management Authorities, Fire Department, Civil Defence, etc. have been formulated in the latest guidelines of NDMA on crowd management, 2014. Role of Disaster Management Authorities shall be as follows:-

- a) Establish SOPs for EOC during events of mass gathering and disaster
- b) Implement NDMA guidelines
- c) Law enforcement at event venues
- d) Create awareness about hazards, vulnerabilities and possible preventive measures among various stakeholders
- e) Capacity building of resource teams to carry out crowd management tasks
- f) Develop and implement a coordination mechanism among various stakeholders
- g) Ensure that events are managed through approved plans prepared by the organisers / administrators
- h) Organise regular exercises and drills with trustees / administrators managing places of worships
- i) Undertake regular preparedness and mitigation audit of such places from time to time to identify gaps

The roles of Police during events of mass gathering are as follows:-

- a) To maintain law & order at events in close cooperation with local administration
- b) Actively participate in venue assessment and preparedness checks
- c) Restrict, guide and regulate traffic movement near the venue
- d) Prevent commission of offences and public nuisances at critical hazard points

The role of Civil Defence / NGOs / Voluntary Organisations:-

- a) To inform the local issues to be event/venue Managers, Police, and the administration.
- b) To constitute various focused group/committees viz. Traffic control, people flow control, information, medical assistance, food, water & sanitation, mock drill, etc.
- c) To help in search & rescue and to provide first aid in case of emergency.
- d) To mobilise local resources (food, shelter, clothing, vehicles, etc.) in case of disaster.
- e) To assist in relief distribution and recovery.

Role of Event Organizers / Venue Management:-

a) To acknowledge and accept the obligation to facilitate visitors is having safe, hassle free and memorable experience at the venue / event.



- b) To develop, implement, review and revise the crowd management plan by working closely with various stakeholders.
- c) To comply with the central, state, local laws and regulations.
- d) To get all the necessary approvals from local administration, police, fire, PWD and electricity departments etc.
- e) To share details of event schedules, venue, transport, medical, food, hygiene, and emergency facilities etc. with the concerned stakeholders.

Template for crowd management plan for events and venues has also been provided in the NDMA guidelines. The crowd management plan shall be prepared by the event organisers in close association with District authorities and other stakeholders.

STAMPEDE AT RELIGIOUS PLACES

In order to stop or prevent such mishaps the following measures are proposed to be taken:

- i) Ensure that the available infrastructure such as roads, corridors, entrances and exits are adequate for the gathering expected to assemble at religious places and there are no bottlenecks and compression points.
- ii) Every religious place where large gathering is expected will have a crowd management plan.
- iii) Contingency plans for evacuation in the strategic religious locations will be developed on priority.



Chapter VII

MITIGATION MEASURES

7.1 Disaster Mitigation

Disaster mitigation focuses on the hazard that causes the disaster and tries to eliminate or drastically reduce its direct effects. The best example of mitigation is the construction of dams or levees to prevent floods or coordination of release of water from various irrigation dams to avoid flooding in the downstream areas. Other examples include strengthening buildings to make them earthquake resistant, planting of crops that are less affected by disasters, 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.

A mitigation strategy however, cannot be successful unless it has the backing and support of all concerned – the administrative machinery, the research institutions, the non-officials and the community. So, it also becomes imperative to have built-in institutional arrangements and/or legislative backing to oversee the mitigation strategy over a period of time.

The main elements of mitigation strategy which can further broadly divided into non-structural and structural mitigation measures are:

- Risk Assessment and Vulnerability Analysis
- Applied Research and Technology Transfer
- Public Awareness and Training
- Institutional Mechanisms
- Incentives and Resources for

Mitigation Land Use Planning and Regulations

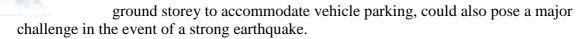
7.1.1 Non- Structural Mitigation

Many of the non-structural mitigation measures are being carried out by the Government of Delhi under the Disaster Risk Management Programme

1. Promotion of Research and Technology

Objective-To promote research projects for studies like microzonation, risk assessment, systematic study on evaluating construction typology, identification of cost effective methods to improve seismic safety and to facilitate the implementation of research outcomes.

As per Vulnerability Atlas of India (2007), for shaking intensity VIII, out of 33.8 Lakh buildings in Delhi, over 31 Lakh are at medium risk of being affected by an earthquake, while 1.46 Lakh are at high risk. These estimates are based on very simplistic assumptions. Systematic studies are needed on vulnerability of different types of constructions in the area. This will require experimental studies to evaluate strength, stiffness and ductility of different types of constructions as well as analytical studies such as the Push-Over Analysis. Experiences of past earthquakes both in India abroad have clearly outlined the vulnerability of multi-storey reinforced concrete buildings if not designed and constructed correctly. Huge number of multi-storey reinforced concrete buildings in Delhi, particularly those with open



Strategies

- Ensure availability of adequate funds
- Ensure applicability of study to state specific hazard risk reduction
- Monitor, review and evaluate the research activities

Outcomes

The results of microzonation study will enable the professionals to improve planning and design to achieve better performance and reduced hazard risk. The study for Cost effective techniques to retrofit existing structures in order to provide life safety will offer more options to the decision makers.

2. Capacity Building and Awareness Generation

Objective- To generate awareness about various types of hazards and associated vulnerabilities among professionals, policy makers, and the general public making them better prepared and enabling them to make effective decisions about reducing losses from earthquakes and to encourage them to undertake effective implementation action.

Strategies

- Increase public awareness through mass media campaigns
- Development of Information, Education and Communication Material
- Including the subject of Disaster Risk Management in the Syllabi of different courses.
- Sensitization of officers from the Administration, Ministry of Education, Delhi Police, Delhi Fire Service, Delhi Jal Board, TRANSCO, DISCOMs, Mahanagar Telecom Nigam Ltd. and all other parallel agencies.

Outcomes

Government officials, policy makers, professionals and public will be better educated and aware of their vulnerabilities and will have a positive attitude towards mitigation measures. The preparedness will reduce losses in the event of any disaster and considerably reduce the funds required for relief and response activities in a post disaster situation.

3. Training and Capacity Building

Objective- To develop a force of trained professionals, community members, specialized groups like first aid teams, search and rescue teams, Evacuation teams, damage assessment teams etc.

DDMA have few experts in disaster mitigation and planning. DDMA needs to focus the attention to the institutionally and manpower development at all levels. There is a need to train architects, engineers, planners and masons in developing safe housing and infrastructure facilities. State has already arranged about six state level trainings for engineers, masons and

architects of public and private sectors. But still many more are required to cover in the process. Manuals need to be developed outlining methodologies for new constructions and retrofitting of old ones. A strong legal and enforcement framework with appropriate incentives and punitive measures is required together with awareness programmes for general public. All these components must be taken up simultaneously; ignoring one aspect for the other could be counterproductive.

Strategies

Organize training programmes for specialized groups like, disaster management teams in district, sub division and community level, teachers and principals, doctors and engineers, architects and mason and builders & contractors etc.

Outcomes

A large number of skilled people shall be utilized in emergency services in a post disaster situation when time of response is critical. Trained disaster management teams can be involved in response functions by the government of NCT of Delhi.

4. Insurance cover for disasters

Objective- To develop a better understanding and general awareness of the insurance procedures and develop strategies for reducing the premium cost for a complete cover.

Insurance brings quality consciousness in the infrastructure and a culture of safety by insisting to follow building codes, norms, guidelines, quality materials in construction. It would enforce safety standards by bringing accountability. Hazardous area should be announced, notified and publicly displayed so that people would be motivated not to settle in those areas and insurance be mandatory in insurance prone areas. Premiums can be changed on the basis of risk proneness. Since many areas are prone to multi-hazards, there should be multi-hazard insurance provisions. Insurance should be made against all natural and manmade disasters for houses, buildings and other important resources. Incentives should be paid to the insurers who have followed building-codes and other prescribed guidelines prevailing in the area. Insurance companies should have their own experts and supervisors to check and determine insurance amount. Government may provide special incentives to cover the people in the areas not yet covered by insurance and district administration and other development agencies may take up steps to facilitate it. Issuing I-cards and preparation of insurance policy etc can also bring awareness and also facilitate insurance oriented information. In due course of policy, the provisions of compensation should be taken over by insurance.

Strategies

- Meetings with the heads of Insurance agencies and brainstorming on possible strategies for making insurance a better and cost effective option
- Review of tariff rates for Fire, Earthquake and STFI (Storm, tempest flood and inundation) cover with the help of Tariff Advisory Committee
- Implementation of the revised policies and tariffs by Insurance Regulatory and Development Authority (IRDA)



• Encourage insurance agencies to promote insurance against fire and other hazards by way of advertisements in media.

Outcomes

Public will be more aware about the benefits of insurance. Revised policies and tariffs for insurance will lead to cost effective mitigation.

5. Development of Delhi Earthquake Loss Scenario

Objective- To develop a scenario of possible losses to life and property in Delhi due to an Earthquake of expected intensity as per the Seismic Zone IV, in the region.

Strategies

- Allocate funds and engage experts to carry out the analysis.
- Ensure availability of all the information required for the study by coordinating with various departments.

Outcomes

Increased awareness of potential local earthquake risks to provide local emergency responders with reasonable descriptions of post earthquake conditions for planning purposes.

6. Amendments in Master Plan of Delhi

Objective- To incorporate amendments in the Master Plan of Delhi so that a balance is achieved between the needs of the state's increasing population and economic growth, growing commercialization and the constraints imposed by various hazards.

Strategies

- Promote the incorporation hazard risk reduction practices into general plans.
- Recommend inclusion of hazard mitigation features
- Incorporation of results of microzonation study into development and modification of Master plans.
- Incorporation of Urban Disaster management into development planning.

Outcomes

A development planning that incorporates urban disaster management and disaster mitigation strategies and minimizes the impact on life and property when disaster strikes.

7. Mitigation of Non Structural Risks

Objective- Aggressively promoting the securing or replacing of non structural hazards in places of human occupancy or of high property loss potential.

Strategies

- Develop awareness programmes on non structural mitigation
- Develop cost effective methods of non structural mitigation.



Develop manuals on non-structural mitigation measures.

Outcomes

Reduction in number of deaths, injuries and loss of property and movable assets from earthquakes. A sense of confidence in the community gained from mitigation activities.

8. Policy framework on disaster management

There is a need for developing NCT specific disaster management policy to implement the provisions of Disaster Management Act and Guidelines for disaster management developed by NDMA.

9. Conducting Multi-hazard Vulnerability Study

There is a need to conduct multi-hazard vulnerability and risk study and mapping on GIS platform.

7.1.2 Structural Mitigation

Structural mitigation is typically much more complex than non-structural mitigation, and usually has a higher associated cost. Mitigation plan for Delhi shall include all the activities that prevent a hazard or lessen the damaging effects of unavoidable hazards. Investing in preventive mitigation steps now such as repairing deep plaster cracks in ceilings and foundations, retrofitting of existing buildings and following local seismic building standards will help reduce the impact of earthquakes in the future. Microzonation of buildings on the basis of Rapid Visual Screening assessment shall be carried out. Important govt. and heritage buildings need urgent attention.

Broadly the components of structural mitigation plan shall be;

A. Ensure all existing lifeline buildings remain operational immediately after a Seismic event by 2020.

The Bureau of Indian Standards (BIS) has developed its first code on a seismic design in 1962 (IS:1893-1962). However, till date there is lack of efficient implementation of technolegal framework to implement seismic code provisions in Delhi. As a result most of the building in Delhi does not meet codal requirements on seismic resistance. Even if new constructions may fulfill the requirement of seismic code provisions in their buildings, still a very large inventory of old buildings will remain deficient for seismic safety. Therefore, we need to develop a **rational seismic retrofitting plan** for the government- owned buildings and private constructions on priority bases. Generally public buildings are given first priority because they are lesser in number and at the time of disaster people can take shelter in these public buildings. Some of the important public buildings are schools, hospitals, government officers, community halls, fire and police stations, cultural buildings, communication buildings, cinema halls, meetings halls, historical monuments and important installations etc. the second priority goes to the buildings like offices, warehouses, residential colonies, factories and hostels etc.



Following strategies are being adopted:

- 1. Two buildings namely Ludlow Castle School and "C Wing" of 5 Sham Nath Marg have already been retrofitted. The other identified buildings under Delhi Earthquake Safety Initiative, such as Delhi Police HQ, GTB Hospital and Delhi Secretariat have not been retrofitted yet. Subsequent identification of more life line buildings spread geographically around the state need to be undertaken.
- 2. Involvement of more agencies like MCDs, DDA, NDMC etc for retrofitting of their own buildings as well as other critical buildings.
- 3. All the concerned departments to make financial commitments and earmark funds in their budget plans every year for retrofitting.
- 4. Develop appropriate policy instrument for budget allocation for carrying out retrofitting of identified life line structures.
- 5. Identification and development of Retrofitting plans for all Lifeline buildings in Delhi by 2016 using the current project as a model.
- 6. Complete retrofitting of all Lifeline Buildings by 2020.
- 7. Training of all departments in Retrofitting methodologies.
- 8. Establish seismic performance standards for all life line buildings.
- 9. Promotion of retrofitting technologies

B. Ensure all existing lifeline bridges and flyovers remain operational after a Seismic event by 2020.

- 1. Establishment of Seismic performance standards for all lifeline bridges and flyovers.
- 2. Identification, assessment and development of Retrofitting plans for all Lifeline bridges and flyovers in Delhi by 2020.
- 3. Complete retrofitting of all Lifeline bridges and flyovers by 2020 to existing codal provisions of the day.

C. Ensure all new Governmental constructions are Earthquake resistant by 2016.

- 1. Setting up of Hazard Safety cells in various departments to oversee all Governmental constructions (Only a few departments have constituted this so far)
- 2. Developing integrated approach to seismic design.
- 3. Developing methodologies for seismic retrofit including minimum standards and enhanced performance- based standards for structural elements of buildings.
- 4. Training of all departments in Earthquake Resistant design and construction.



D. Ensure all new Private constructions are Earthquake resistant by 2016

- 1. Continued adoption of Model Building Byelaws (MHA-GoI Document) into building Bye-laws of Delhi State agencies
- 2. Enhance enforcement of byelaws.
- 3. Making mandatory, the use of disaster resistant codes and guidelines related to disaster resistant construction in the houses and buildings in all sectors of the society by law and through incentives and disincentives.
- 4. Training of staff in all departments dealing with construction.
- 5. Training of construction fraternity in all sectors.
- 6. Development of simple guidelines for aspiring house owners.
- (* Timeline of activity is subject to availability of adequate fund)

E. Construction Control

The best mitigation measure is to build strong built-in environment in the State. The State must ensure the implementation of building codes. The quality of buildings measured by their seismic resistance has its fundamental importance. Minimum designs and construction standards for earthquake resistant structures legislated nationally are an important step in establishing future minimum level of protection for important structure. India has building codes and regulations for seismic resistant design which needs to be enforced by municipal bodies.

Important Mitigation Measures

S.No	Strategies	Actions involved	Suggested Institutions Involved
1	Retrofitting of Buildings	Identification of vulnerable buildings in the District	MCDs/PWD Engineers
		Prioritization of buildings according to their importance during emergency.	PWD, MCD, District Disaster
		First priority buildings are:	Management
		1 Deputy Commissioner Office 2 All Hospitals	Authorities
		3 Nodal Hospital i.e. Army Base Hospital,	
		Army Research and Referral Hospital	
		And Safdarjung Hospital and other	
		Major hospitals	
		4 All Schools (Government, MCDs and	
		Public etc)	
		5 Residences of Deputy commissioner	



		(Revenue) and Deputy Commissioner of Police 6 Palam and Indira Gandhi Airports. Second priority buildings are: 1 Community centres 2 Residences of other key officials 3 Office buildings of MCDs, PWD, CD & HG and DDA Third Priority buildings are: Remaining Government Buildings and colonies Arrangement of teams to take-up above	MCDs and PWD
		mentioned retrofitting projects and fire- fighting arrangements	
2	Enforcement of Building Codes Community Awareness	Review and updating of building codes according to the required Implementation of codes in new engineered and non-engineered constructions Large-scaleinformationdissemination about basics of new constructions and retrofitting of existing buildings and encouraging fire-fighting arrangements in the building Information dissemination about dos' and don'ts at the time of earthquake event and fire-outbreak	BIS MCDs, PWD, District Administration, NGOs District Administration, social Organizations, Fire and police
3	Capacity Building	Priority-wise training to the engineers, architects, and masons for disaster-resistant buildings should be arranged. These people may further utilized for assisting in retrofitting and reconstruction exercise. First priority shall be given to government engineers, architects and masons Second priority shall be given to the private engineers, architects and masons Third priority should be given to contractors and builders	department. District Administration, MCDs, PWD and DDA
4	Insurance	Identification of hazardous areas in the district Provisions of insurance according to building bye laws, codes and hazard proneness	DC Office, MCDs Insurance Companies, MCDs



7.1.3 Why is this needed?

- Delhi consists of weak and illegal constructions which compounds its vulnerability to earthquake and fires.
- Buildings constructed through good design are not necessarily built with earthquake safe design
- There is a need of an urgent of mitigation planning under which new constructions should come up as per building-byelaws and standard codes.
- Retrofitting techniques are very much important to re-strengthen old and weak constructions which need to be taken up by MCDs and district administration.
- Fire safety assessments and fire-fighting arrangements shall be promoted in multistoried buildings and residential communities
- Insurance of buildings according to their hazard proneness is important to promote in the district under the supervision of local administration
- Although various steps have been undertaken by deputy commissioner to train government-engineers, architects and masons but more steps towards this are highly required.
- Life-line buildings like Major hospitals, deputy-commissioner office, residences of key officials, schools, community spaces, police and fire stations etc. shall be retrofit on priority basis.

7.1.4 Structural & Non Structural Mitigation Measures for Floods

- > Strengthening and up gradation of existing flood forecasting system
- Establish infrastructure for flood warning and dissemination
- ➤ Improvement of design for flood protective measures
- Construction of flood protection wall, flood diverting channels, etc.
- > Strengthening/repair of existing roads and bridges and other critical infrastructure
- Strengthening of canals
- Regular dredging of river Yamuna
- > Development of catchment area of the flood plain (land sloping, small reservoirs/embankments/ponds, forestation)
- > Specific building bye-laws for flood plains
- Regulation of developmental activities in flood plains
- ➤ Capacity building (flood contingency plan, departmental action plans, training of stakeholders)
- Awareness generation on flood disaster preparedness and response



7.1.5 Role of Media in Mitigation

Reducing the losses in life and property caused by disasters, is a compelling objective now receiving worldwide attention. Scientists and engineers now believe that, the knowledge and technology base potentially applicable to the mitigation of hazards, has grown so dramatically in recent years that, it would be possible, through a concerted co-operative international effort, to save many lives and reduce human suffering, dislocation and economic losses. Communications are central to this effort for public education, early warning, evacuation, and post-disaster relief. The media acts as the link between the common man and technical information about the risk and the hazards. They absorb and transform technical information provided by either experts or mediators and relay the information to the public in a simple manner.

The strengths of the mass media lie partly in their independence from governments or other agencies, and partly in their ability to attract large audiences who regard them as reasonably credible information sources. The capabilities of communications, data-gathering, and data-management technology have leaped forward with our increasing knowledge about the origins and behaviour of disasters, and the mitigation of their effects. Indeed, advances in telecommunications and computer sciences are among the major contributors to the recognition that technology can do much to blunt the effects of hazards.

Mass communication is inextricably entwined with disasters and hazard mitigation. The electronic and print media, reflecting great public interest and concern, provide extensive coverage of disasters, particularly those with strong visual impact. And increasingly-as forecasters have gained the ability to predict, the media have covered the near-term prediction and relief planning phases of the event. The media have significantly improved the level and sophistication of their pre and post-disaster coverage in recent years by using new technology and consulting technical experts better able to describe the causes and mitigation of disaster. The print media, too, have benefited from advanced technology. Facsimile transmission and closer linkages between reporters and specialists in government and academia have deepened understanding of the causes and impacts of these disastrous events, and, no doubt, have had some effect in reducing long-term exposure and risk.

Clearly, mass communications technology already has had a significant impact on how the public learns of and perceives the impact of disasters. And as the costs are further reduced and the capabilities of these technologies improve, the level and sophistication of information presented to the public will also be enhanced.

In addition to the vastly improved opportunities that telecommunications technologies have provided, to report on prospective, ongoing and recent disasters and relief efforts, their capabilities have slowly shifted our thoughts from post-disaster relief to more effective means of coping with sudden disasters.

Better linkages between the public, media and the community of disaster mitigation researchers and practitioners, whether scientific, technological, or service-oriented can make disaster management efforts more effective and more importantly, can accelerate the shift in both the public's and the administrations' thoughts towards effective pre-disaster initiatives.



To this end, the electronic and print media could embark on a two-step process to enhance the quality of its hazard-related services.

Media Facilities

The first step is to foster still-closer linkages with the research community, and share their vast information-gathering and transmission resources, when appropriate and available, with disaster mitigation organizations.

In the post-disaster phase, for example, the facilities established by the media to report on an event are often far more robust and more promptly operational than those of relief organizations, whether governmental or voluntary. These channels should be available as means for better assessing the nature and extent of damage, local relief requirements, the need for specialized recovery equipment, and unique problems or opportunities.

Integration of the Media into Disaster Mitigation Activities

The second step in building links with the news organizations is to more effectively link the media into an intensified effort in disaster mitigation, including such activities as

- Risk assessment
- Avoidance measures
- Early warning and evacuation
- Public awareness and education
- Organization for self-help and effective response to risk.

The media is seen as spreader of official information and measures, which the citizens are expected to undertake immediately and at the same time are conduits for relaying information through inter-governmental structures and channels, to bring the citizens, concerns to official attention.

In the event of a disaster, media has a responsibility of reporting the same on a day-to-day basis.

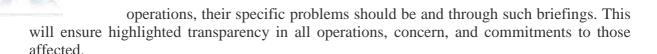
Such reporting can contribute to

- Bringing true stories of disaster to public
- Stimulating public response to needs and sufferings caused by disaster
- Creating tremendous pressure on agencies and government to get involved
- Injecting efficiency by reducing response time
- Motivating public and generating disaster assistance and resources.

However, care should be taken to safeguard the authenticity of the information and the credibility of the media. This can be done by

- Avoiding reinforcing stereotypes that the people carry about disaster "victims"
- Promoting sensitivity as against sensationalism
- Highlighting both the positive and the negative aspects of disaster management
- Cross-checking information from the disaster site as well as the official sources.

During disasters, it is important to organise regular press meetings and issue press releases. The importance of the efforts of various non-governmental agencies engaged in relief



A rational approach to media involvement in disaster management would depend that the media is familiarised as a part of preparedness with the disaster management action plans, roles and responsibilities, strengths and limitations with respect to administrative capabilities. This will prepare the ground for utilising the technological and human resources available with mass media. Tapping the media's capabilities can, and will improve the preparedness and response to disasters. Conversely, the study and application of disaster mitigation techniques can enhance the quality of, and interest in the services the media can provide. The media have the definitive opportunity to play a leadership role in the transition in thinking and action away from post disaster relief and towards, preparedness and disaster mitigation.

7.1.6 Application of geospatial information in disaster management

Disaster management is a multi-sectoral and multi-disciplinary effort. As much as community participation and government involvement both at state and local is essential, the role of Geographic Information Science (GIS) and Remote Sensing in equally paramount in achieving fool-proof preparedness in disaster management. While GIS and Remote Sensing are technology based tools, these technologies have significant role in raising awareness and preparedness. In designing awareness and preparedness programmes as part of SDMP action plan, use of spatial data becomes imperative. Disaster preparedness needs thorough understanding of geospatial, socio-economic and scenario and intensity based computer simulations. Geographical Information System (GIS) and Remote Sensing tools are appropriate technical tools to achieve this objective. GIS allows spatial analysis of parameters such as population density, economic losses, and loss of infrastructure due to disasters along with the progression of hazards such as floods and winds.

Delhi state has translated the data on Geo-Spatial Data base portal and all the major Emergency Support Functions have been marked on the map. The information about the exact location of ESF offices, its nodal officer and equipment at the location are to be updated in the database.

7.1.7 To facilitate the Mock exercises

adequacy, efficacy and preparedness of the departments and district administration and identify gaps in resources and systems, the State Disaster Management Authority in coordination with the vulnerable districts embark on conducting mock exercises on various types of natural and manmade disasters. This helps in inculcating culture of preparedness.

The Mock Exercises is conducted in a systematic step-by-step approach as follows: **Step 1. Coordination and Orientation Conference**, to sensitize the various stakeholders and delineate their roles during the Table Top and Mock Exercises.

Step 2. Conduct Table Top Exercise by projection of the scenarios at various levels from preparedness to early warning to rescue and relief phases and response of the stakeholders.

Step 3. Actual conduct of the Mock Exercise takes place by mobilization of the resources according to developing situations. The situations are conceptualized to derive certain lessons and final gaps if any in the resources/systems.

DDMA in coordination with NDMA has conducted several Mega Mock Exercises on various types of natural and manmade disasters.

7.1.8 Establishment of First Disaster Resilient City

DDMA intends to create Delhi as the first disaster resilience city of India on the pattern of Los Angeles, USA. This involves;

- The survey of the city for at risk infrastructure in the event of a major earthquake
- To access how efficiently, the city is using the water and electricity
- Urban planner to prepare master plans incorporating lanes and by-lanes for escape and recovery during disasters.
- Building department/civic agencies to outline a list of vulnerable residential buildings
- Preparation and implementation of Fire fighting plans for congested and crowed places of Delhi by Delhi Fire Services in association with Civic bodies
- Compulsory checkup of all older buildings at risk for retrofitting
- Grading of buildings (old / new) for seismic safety.
- Creation of mobile infrastructure for fire fighting in narrow and congested locations
- Creation of new fire stations / rationalization of existing locations of fire stations, hospitals and other life line building.
- Strict implementation and enforcement of Building bye Laws and structural and fire safety norms by Civic Agencies, DDA, Delhi Fire Service and Delhi Police
- Deploying Quick Response Vehicles in each subdivision of Delhi

7.2 Disaster Specific Mitigation Plans

Summary of disaster specific mitigation plans along with agencies responsible and timeline has been prepared for various natural and manmade disasters and are given below:

Flood (Including Urban Flood):

Sl.	Action	Coordin	nator	A	gencies	}	Timeline
No.				R	esponsi	ble	
1.	Identification of flood prone area and	I &	FC	I	&	FC	6-12
	water logging area. Strengthening of	Departm	ent	Dep	artment	,	Months
	existing flood forecasting system and			Rev	enue		
	community early warning system			Dep	artment		
2.	Identification of flood management	I &	FC	I	&	FC	0-6
	schemes	Departm	ent	Dep	artment		Months
3.	Formulation of action plan for study of	UD		I	&	FC	6-12
	storm water drainage pattern and taking	Departm	ent	Dep	artment	,	Months
	remedial measures for urban flooding			UD	Departr	nent	
4.	Preparation of Digital Elevation Model	I &	FC	I	&	FC	2-5 Years
	(DEM) of flood prone areas	Departm	ent	Dep	artment		
5.	State Urban Flood Disaster	DDMA		DDN	МА, I &	FC	2-5 Years



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Table: Flood Mitigation Plan



Earthquake & Structure Collapse:

Sl.	Action	Coordinator	Agencies	Timeline
No.			Responsible	
1.	a) Identify lifeline structures and		· · · · · · · · · · · · · · · · · · ·	2-5 Years
	ensure all existing lifeline	Department	Department	
	buildings, schools, bridges, fly-			
	overs remain operational immediately after a Seismic			
	immediately after a Seismic event, by adequate strengthening			
	and retrofitting measures.			
	b) Carryout retrofitting of all the			
	hospitals and minimum one			
	public building in each ward to be			
	used as shelter during disaster.			
	Building separate resilient			
	shelters in district North East,			
	where there are semi-permanent			
	school buildings. c) Construction of new bridges			
	across Yamuna upstream of			
	Wazirabad and East-West			
	Corridor (Anand Vihar to New			
	Delhi)			
2.	Ensure all new constructions are	UD	PWD, MCD,	2-5 Years
	earthquake resistant	Department	DDA	
3.	Categorization of residential colonies	UD		2-5 Years
	in terms of structural vulnerability by	Department	DDA, UD	
	visual survey and safety audit. Vulnerability assessment of existing		Department, Financial	
	buildings and utility structures and		Institutions	
	voluntary retrofitting through various		Institutions	
	incentives of Government. Initiative			
	for Licensing of Structural Engineers			
4.	Regulation of unauthorized		MCD, NDMC	1-4 Years
		Department		
	enforcement mechanism to ensure the			
	compliance of safety norms of			
	building byelaws by existing and new constructions. Early authorization of			
	unauthorized colonies. Structural			
	safety of buildings in general to be			
	ensured in unauthorised colonies.			
5.	Review of land use planning/zoning	UD	MCD, NDMC,	1-2 Years
	regulations and building codes &	Department	DDA	
	bye-laws on the basis of seismic			
	hazard microzonation study of Indian			
	Meteorological Department			
6.	Development of standardized	UD	MCD, NDMC,	1-2 Years



	construction design types for	Department	DDA	
	different types of soils in Delhi	1		
7.	Incorporation of disaster management in local area planning. Strengthen structural safety units and upgradation of Disaster Management Centres	Directorate of Local Bodies	MCD, NDMC, DDA	2-5 Years
8.	Increase the strength of structural engineers on roll in local bodies and make provisions for easy availability of their service to public	UD Department	MCD, NDMC	1-2 Years
9.	Amendments in Master Plan based upon microzonation study	UD Department	DDA	1-2 Years
10.	Mitigation of Non Structural Risks in Public Buildings	PWD	MCD, NDMC, PWD, DDMA, Schools, Hospitals & & other lifeline buildings	1-2 Years
11.	Strengthening of training and academic institutes for capacity building on safe construction practice and inclusion of earthquake mitigation measures in education sector		DTTE, DHE, Universities in Delhi	1-2 Years
12.	Priority-wisetrainingtothe engineers, architects, and masons for disaster-resistant buildings	UD Department	MCDs, NDMC, PWD, DDA, DTTE, Labour Department	2-5 Years
13.	Community awareness building on seismic safety practices on regular basis	DDMA	DDMA, MCD, NDMC	-
14.	Ensure all public places & buildings to be disable friendly	PWD	PWD, MCD, NDMC	1-2 Years
15.	Development of Delhi Earthquake Loss Scenario	DDMA	DDMA	1-2 Years
16.	Promotion of research & Technology on seismic hazard mitigation	DDMA	DDMA, Directorate of Higher Education, DTTE	
17.	State Earthquake Management Committee (SEMC) is to be set up having a nodal officer responsible for seismic safety. The SEMC will consist of specialists with field		DDMA, Department of Urban Development	6-12 Months



	experience in earthquake		
	management, as well as		
	representatives of the various		
	stakeholders. Hazard Safety Cell is to		
	be established in DDMA.		
18.	All artisans involved in both public	UD	State Council of 1-2 Years
	and private construction projects are	Department	Vocational
	to be certified for their skills in		Training, NGOs,
	ensuring seismic safety. A five year		Building
	licensing cycle is to be followed,		Centres, MCD,
	wherein the certification is renewed		NDMC
	every five years. Training centres		
	for artisans are to be set up		
19.	Devise affordable insurance plans	UD	UD Department, 1-2 Years
	and financing provisions for	Department	RBI,
	earthquake resilient constructions,		Commercial
	retrofitting and reconstructions		Banks of Delhi
20.	Knowledge sharing workshops to	UD	Department of -
	disseminate the methodology and	Department	Urban
	important experiences of seismic		Development,
	strengthening and retrofitting of		Professional
	lifeline structures to the professional		Bodies in
21	community, are to be organized.	DDMA	Engineering
21.	Corporate sectors shall prepare	DDMA	DDMA, 1-2 Years
	continuity plan and contingency plan		Department of
22	Forthered and the state of the	DDMA	Industries 1.2 Variation
22.	Earthquake safety related materials	DDMA	DDMA, 1-2 Years
	are to be made available in multiple		Department of Urban
	formats, for different groups of stakeholders. Websites and portals		
	are to be created to disseminate all		Development
	earthquake safety related information to stakeholders.		
	to stakenoiders.		

Table: Earthquake Mitigation Plan

Heat Wave:

Sl.	Action	Coordinator	Agencies	Timeline
No.			Responsible	
1.	Identifying vulnerable groups and	DDMA	MCD, NDMC,	6-12
	locations		DDMA, DUSIB,	Months
			DHS	
2.	Facilitation of safe public shelters	DUSIB	MCD, DUSIB,	1-2 Years
			NDMC	
3.	Ensuring real-time public access	DDMA	DDMA	0-6
	information about the risk of			Months
	extreme heat and preventive			
	measures through media and web			



	portal			
4.	Long term urban planning to reduce	UD	MCD, NDMC,	2-5 Years
	urban heat island effect	Department	DDA, UD Department	
5.	Incorporate a variety of urban design strategies that includes external shading and insulation to reduce indoor temperature	UD Department	MCD, NDMC, PWD, DDA	2-5 Years
6.	Restrict timing of engagement of labourers/workmen at construction sites, etc. during severe heat wave conditions	Labour Department	Labour Department	0-6 Months
7.	Preparation of Climate Change Action Plan for Delhi	Department of Environment	Department of Environment	6-12 Months

Table: Heat Wave Mitigation Plan

Cold Wave:

Sl.	Action	Coordinator	Agencies	Timeline
No.			Responsible	
1.	Identifying vulnerable groups and	DDMA	MCD, NDMC,	6-12
	locations		DDMA, DUSIB,	Months
			DHS	
2.	Facilitation of safe public shelters	DUSIB	MCD, NDMC,	-
	and Relief materials (Blanket,		DUSIB, Revenue	
	food, medicine, etc.) to the needy		Department	
3.	Ensuring real-time public access	DDMA	DDMA	0-6 Months
	information about the risk of			
	extreme cold and preventive			
	measures through media and web			
	portal			
4.	Restrict timing of engagement of	Labour	Labour	0-6 Months
	labourers/workmen at construction	Department	Department	
	sites, etc. during severe cold wave			
	conditions			
5.	Preparation of Climate Change	Department	Department of	6-12
	Action Plan for Delhi	of	Environment	Months
		Environment		

Table: Cold Wave Mitigation Plan

Epidemics:

Sl. No.	Action	Coordinator	Agencies Responsible	Timeline
1.	Ensuring good quality health	DHS	DHS and Major	1-2 Years
	database creation and real time		Hospitals	
	updating for decision support and			



				1
	monitoring			
2.	Ensuring collaboration and exchange of information between health professionals and researchers		DHS and Major Hospitals	1-2 Years
3.	Create an effective mosquito control programme	Directorate of Local Bodies	MCD, NDMC, DHS	1-2 Years
4.	Establish partnerships with health care NGOs for management of epidemics	DHS	MCD, NDMC, DHS	1-2 Years
5.	Identifying vulnerable groups and locations	DHS	MCD, NDMC, DHS	1-2 Years
6.	Ensuring real-time public access information about the risk of epidemics, symptoms and preventive measures through media and web portal		DHS, MCD NDMC	2-5 Years

Table: Epidemics Mitigation Plan

Industrial Disaster:

Sl. No.	Action	Coordinator	Agencies Responsible	Timeline
1.	Ensuring safe design of installations, process safety and safe handling of HAZCHEM materials and wastes	Labour Department	Department of Industries, DFS, Labour Department	6-12 Months
2.	Ensuring preparation of onsite and offsite Disaster Management plans for major installations	DDMA	DDMA, Labour Department, DFS	6-12 Months
3.	Officers in-charge of Chemical Disaster Management (CDM) safety matters are to be designated. Recognizing the enormity and criticality of CDM, the DDMA is required to preferably identify and enlist officers with sole charge of matters related to chemical disaster risk management as a first step towards ensuring effective implementation of the CDM guidelines		DDMA	0-6 Months
4.	Ensuring no or minimal environmental impact owing to operations and possible accidents at the site of MAHUs	Environment Department	Concerned MAHU, Environment Department	0-6 Months
5.	Ensure safe electrical conditions and that electrical hazards will not trigger chemical accidents	Labour Department	Concerned MAHU, BSES, TPDDL	6-12 Months



6.	Sensitizing local community on chemical disaster	DDMA	DDMA, Concerned Industry	6-12 Months
7.	Ensuring following of fire safety guidelines, building codes and bye laws by factories and industries	DFS	DFS, MCD	1-2 Years
8.	Emergency response plans for transport of HAZCHEM	Delhi Traffic Police	Concerned MAHU, Delhi Traffic Police	6-12 Months
9.	Land use policy on no population buffer zone around MAHUs	Directorate of Local Bodies	MCD, NDMC	6-12 Months
10.	Development of Inspection manuals	Labour Department	Labour Department, Department of Industries	6-12 Months
11.	Identifying vulnerable factories/industries by survey	Labour Department	Industries, DFS, Labour Department	1-2 Years
12.	Establish coordination network between MAHUs for disaster response	Department of Industries	Department of Industries, MAHUs	0-6 Months
13.	Maintain database of factories/complexes/installations using different categories of HAZCHEM materials	Department of Industries	Department of Industries	6-12 Months
14.	Establishing an information networking system with appropriate linkages with transport department, Delhi Police and other emergency services	DDMA	DDMA	1-2 Years
15.	Prepare database of specific health facilities available around MAHUs, industrial complexes and strengthen the facilities after need analysis	DHS	DHS, Department of Industries	1-2 Years
16.	Preparing action plan for training & capacity building on regular basis	DDMA	Concerned MAHUs, Labour Department, Department of Industries, DDMA	6-12 Months

Table: Industrial Disaster Mitigation Plan



Road Accident:

Sl.	Action	Coordinator	Agencies	Timeline
No.			Responsible	
1.	Ensuring hazard safety design and	PWD	PWD, MCD,	
	construction practice for roads		,	Months
			Department	
2.	Building plan for traffic and safe	Delhi Traffic		1-2 Years
	driving awareness and	Police	Police	
	sensitization on regular basis			
3.	Ensuring adequate use of traffic	Delhi Traffic	PWD, MCD,	
	signals, road signs and markings	Police	I&FC	Months
	for safe driving		Department, Delhi	
			Traffic Police,	
			Transport	
			Department	
4.	Road safety audit of roads catering	Delhi Traffic		1-2 Years
	high density traffic	Police	Police, Transport	
			Department, PWD	
5.	Safety improvement in public	*		1-2 Years
	transport system	Department	Police, Transport	
			Department, DTC,	
	G 1	DILID	DMRC	1.037
6.	Survey and correction of poor	PWD		1-2 Years
	road environment and engineering		NDMC, I & FC	
7	faults in existing roads	DWD	D.11.: Tff:	1.0 W
7.	Ensure pedestrian facilities in rush roads	PWD		1-2 Years
	Toaus		Police, Transport Department,	
			MCD, NDMC,	
			PWD	
8.	Improvement of road and Metro	UD		2-5 Years
0.	network on the basis of needs of	Department	NDMC, DMRC	2-3 1 cars
	actual road users	Department	Tiblic, Divinc	
9.	Policy for regulation of non-	Transport	Delhi Traffic	0-6 Months
/.	destined heavy and high speed	Department	Police, Transport	
	vehicle movement through city		Department Department	
10	Removing encroachments on road	Revenue		0-6 Months
	& footpath	Department	Police, Revenue	2 2 1.10111111
	. . .	T	Department	
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Table: Road Accident Mitigation Plan

Fire Accident:

Ī	Sl. No.	Action	Coordinator	Agencies Responsible	Timeline
	1.	Identification of vulnerable area and buildings and set up new fire stations	DFS	DFS, MCD, NDMC	1-2 Years



2.	Ensuring following of fire safety guidelines, building codes and bye laws	DFS	MCD, NDMC, DDA, DFS	1-2 Years
3.	Fire Safety audit and ensuring of fire safety and planning of high rise buildings, factories, Cinema Halls, Malls, MAHUs, market complex, hospitals, schools, Factories, Slums, etc.	DFS	DFS	6-12 Months
4.	Preparing action plan for sensitization of public on fire safety on regular basis	DFS	DFS	0-6 Months
5.	Maintain database of factories/complexes/installations using different categories of inflammable substances	DFS	DFS, Department of Industries	0-6 Months
6.	Audit of electrical wiring and load in localities prone to fire hazard and undertaking remedial safety measures	Department of Power	BSES/TPDDL	1-2 Years
7.	Prepare database on congested lanes and localities and formulate fire fighting and safety plans for such localities	DFS	DFS, Delhi Traffic Police, DDMA, MCD, NDMC	1-2 Years

Table: Fire Accident Mitigation Plan

Groundwater Depletion & Pollution:

Sl.	Action	Coordinator	Agencies	Timeline
No.			Responsible	
1.	Groundwater study and identification	Environment	Environment	6-12
	of vulnerable area and reasons	Department	Department	Months
2.	Develop water sustainability plan for	DJB	DJB,	1-2 Years
	Delhi using futuristic water need		Environment	
	scenarios of Delhi based on current		Department	
	demand, historical and demographic			
	trends			
3.	Ensure proper treatment of industrial	Environment	Environment	1-2 Years
	effluents water and sewer water	Department	Department,	
	before release to water bodies		MCD, NDMC,	
			DJB, I&FC	
			Department	
4.	Ensure pollution free sustainable	Environment	MCD, NDMC	6-12
	landfill of solid waste	Department		Months
5.	Preparation of action plan for	Environment	Environment	6-12
	recycling and energy recovery from	Department	Department,	Months
	solid waste		MCD, NDMC	
6.	Identify inadequacy in sewer system	Directorate	MCD, NDMC,	1-2 Years
	and fulfil the deficiency	of Local	DJB, I&FC	
		Bodies	Department	
7.	Establish time bound action plan of	I&FC	MCD, NDMC,	0-6 months
	desilting of drains before monsoon	Department	DJB, I&FC	



			Department	
8.	Ensure economic & sustainable distribution of potable water to all the localities of Delhi, thereby reducing dependency of households on groundwater	DJB	DJB	1-2 Years
9.	Implementation of measures for conservation of existing water bodies and building public awareness on water conservation	Environment Department	Environment Department	6-12 Months

Table: Groundwater Depletion & Pollution Mitigation Plan

Drowning:

Sl.	Action	Coordinator	Agenc	ies	Timeline
No.			Respons	sible	
1.	Fencing of canals and bridges	DDMA	PWD,	MCD,	
			I&FC		Months
2.	Establishing permanent sign posts on	DDMA	PWD,	MCD,	6-12
	Dos and Don'ts near the Ghats, canal		I&FC		Months
	& drain sides for preventing				
	accidental drowning				

Table: Drowning Mitigation Plan

Nuclear & Radiological Emergencies:

Sl.	Action	Coordinator	Agencies	Timeline
No.			Responsible	
1.	Mock-drills and emergency preparedness exercises are to be conducted, on regular basis. Since such mock-drills may create panic in the public, it should be conducted as part of other emergency preparedness exercise.	DDMA	DAE, DDMA (Support by NDRF), Delhi Police	-
2.	Specialized response teams are to be raised, specially trained for nuclear/radiological emergency/disaster and fully equipped at the state level		DDMA, Delhi Police	1-2 Years
3.	With the help of specialists from DAE and in consultation with the district/local authorities, DDMA has to make detailed nuclear emergency management plan		DDMA	6-12 Months
4.	To establish a coordination mechanism with all the agencies viz.	DDMA	DDMA, Delhi Police	6-12 Months



	MHA, DAE, fire & emergency services, civil defence, etc.		
5.	The places of shelters are to be identified, to house the evacuated persons in event of any nuclear/radiological emergency. New shelters to be created.	DDMA	1-2 Years
6.	Sufficient inventory of radiation monitoring instruments and protective gear are to be procured in order to ensure their availability during emergencies	DDMA, Delhi Police	1-2 Years
7.	Regular education and awareness generation programmes to be organized for the community on preparedness	DDMA	-

Biological Disaster:

Sl. No.	Action	Coordinator	Agencies Responsible	Timeline
1.	Manufacturers of antibiotics, chemotherapeutics and anti-virals to be listed and their installed capacity ascertained	DHS	DHS	6-12 Months
2.	Drugs for mass chemoprophylaxis, vaccines, laboratory reagents, diagnostics, PPEs and other consumables to be stocked. Medical stores / organizations /depots to be identified	DHS	DHS	1-2 Years
3.	First responders and health care workers to be equipped with gloves, impermeable gowns, N-95 masks, powered air-purifying respirators and other PPEs.	DHS	DHS, MCD, NDMC	6-12 Months
4.	Action plans and SOPs on social distancing measures, quarantine and containment to prevent spread of infection, epidemic or pandemic and also on response mechanism	DHS	DHS, MCD, NDMC	6-12 Months
5.	Emergency Operation Center (EOC) to be established in Health Department for coordinating a well orchestrated response	DHS	DHS	1-2 Years
6.	Shortfall of public health specialists,	DHS	DHS, MCD,	-



	epidemiologists, clinical microbiologists and virologists to be filled over a stipulated period of time.		NDMC	
7.	Table-top exercises using different simulations to be used for training at different levels followed by full-scale mock drills twice a year	DHS	DHS, Major Hospitals	-
8.	Development of demographic maps of areas with dense/scarce population of livestock	Development Department	Development Department	6-12 Months
9.	The vaccination status of all livestock willbe periodically checked	Development Department	Development Department	-
10.	Draft a comprehensive animal emergency management plan that includes response, relief, rescue and rehabilitation	Development Department	Development Department	6-12 Months

^{*} Timeline of activity is subject to availability of adequate fund



Chapter VIII

INSTITUTIONAL MECHANISM

8.1 Institutional mechanism and their functions

DM Mechanism	Institutions/Nodal	Functions
	Department	
National Level Mechanism	National Disaster Management Authority(NDMA)	For better co-ordination of disaster management at national level, National Disaster Management Authority (NDMA) is constituted. This is a multi disciplinary body with nodal officers from all concerned department/ministries/organisations. Apart from these developments, the government of India National Contingency Action Plan prepared by the nodal ministry of disaster management. Also a national emergency operation centre has been started functioning in the
State Level Mechanism	Delhi Disaster	ministry of home affairs with all sophisticated equipments and most modern technologies for disaster management. Delhi Disaster Management
	management Authority(DDMA)	Authority (DDMA) is constituted under the chairmanship of Lt. Governor of Delhi and the chief minister of Delhi as vice chairperson and secretaries of relevant Departments as members. For Delhi, the Department of Revenue has been identified as nodal department to tackle disasters, being the Divisional Commissioner as its nodal officer and convener of the DDMA
District Level Mechanism	District Disaster Management Authority	District Disaster Management Authorities (District DMA) have been constituted under the Chairmanship of District Magistrates.



8.2 Institutional Arrangements at National Level:

At the national level the ministry of Home Affairs is the nodal Ministry for all matters concerning disaster management. The Central Relief Commissioner (CRC) in the Ministry of Home Affairs is the nodal officer to coordinate relief operations for natural disaster. The ministries / Department/organisations concerned with the primary and secondary functions relating to the management of disasters include:

- Ministry of Urban Development
- Department of Communications
- Ministry of Health
- Ministry of Water Resources
- Ministry of Petroleum,
- Department of Agriculture & Cooperation
- Ministry of Power
- Department of Civil Supplies
- Ministry of Railways
- Ministry of Information and Broadcasting
- Planning Commission
- Cabinet Secretariat
- Department of Surface Transport
- Ministry of Social Justice
- Department of Women and Child Development
- Ministry of Environment and Forest
- Department of Food

Each Ministry/Department/Organisation nominates their nodal officer to the Crisis management Group chaired by Central Relief Commissioner. The nodal officer is responsible for preparing sectoral Action Plan Emergency Support Function Plan Emergency.

• 8.2.1 National Crisis Management Committee (NCMC):

Cabinet Secretary, who is the highest executive officer, heads the NCMC. Secretaries of all the concerned Ministries /Departments as well as organizations are the members of the Committee. The NCMC gives direction to the Crisis Management Group as deemed necessary. The Secretary, Ministry of Home Affairs is responsible for ensuring that all developments are brought to the notice of the NCMC promptly. The NCMC can give directions to any Ministry/Department/Organization for specific action needed for meeting the crisis situation.

• 8.2.2 Crisis Management Group:

Jt. Secretary (DM), MHA is the Chairman of the CMG, consisting of senior officers (called nodal officers) from various concerned Ministries. The CMG formulates the National Crisis Management Plan under guidance from NCMC. CMG manages national level crisis like hijacking, rioting, etc. The CMG's functions are also to review every year contingency plans formulated by various Ministries/Departments/Organizations in their respective sectors,

measures required for dealing with natural disasters, coordinate the activities of the Central Ministries and the State Governments in relation to disaster preparedness and relief and to obtain information from the nodal officers on measures relating to above. The CMG, in the event of a natural disaster, meets frequently to review the relief operations and extend all possible assistance required by the affected States to overcome the situation effectively. The Resident Commissioner of the affected State is also associated with such meetings.

• 8.2.3 National Disaster Management Authority

At the national level National Disaster Management Authority (NDMA) has been constituted, with the Prime Minister of India as its Chairperson along with other members, for the better coordination for managing disasters. National Executive Committee chaired by Home Secretary and composed of Secretaries of concerned 14 nos. of Ministries/Departments has been formed to implement policies of NDMA. NEC prepares National DM Plan and coordinates response at national level.

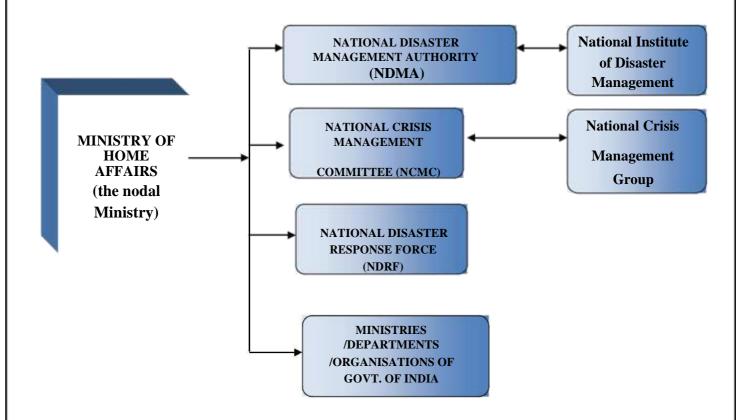
• 8.2.4 National Disaster Response Force (NDRF)

NDRF has been constituted under Section 44 of the DM Act, 2005 by upgradation/conversion of eight standard battalions of Central Para Military Forces i.e. two battalions each from Border Security Force (BSF), Indo-Tibetan Border Police (ITBP), Central Industrial Security Force (CISF) and Central Reserve Police Force (CPRF) to build them up as a specialist force to respond to disaster or disaster like situations.

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Fig. DISASTER MANAGEMENT STRUCTURE AT NATIONAL LEVEL



8.3 Institutional Arrangements at State Level:

At state level office of Divisional Commissioner is the nodal office for management of different types of disasters. Divisional Commissioner of State revenue department is the nodal authority to monitor and direct disaster management activities in the state. Divisional Commissioner is responsible to identify and nominate with various nodal departments in case of emergency. Delhi Disaster Management Authority (DDMA), State Executive Committee are active at the state level.

Looking at the extremely complex requirements in terms of the manpower and material resources, all the line departments of the district administration are involved for managing emergency under the direct control of the Revenue Department.

• 8.3.1 State Disaster Management Authority

As per the powers conferred by sub sections (1) and (2) of section 25 read with clause (s) of section 2 of the Disaster Management Act ,2005 (53 of 2005) the "Delhi Disaster Management Authority" under the chairpersonship of the

Honourable Lt. Governor was first constituted on 19.03.2008 and reconstituted on 19/01/2015 with the following persons as member of the DDMA (for short called "State Authority") for the National Capital Territory of Delhi:

Approved Structure of the DDMA

Sl. No	Office-bearers	Designation
1.	Lt. Governor of NCT of Delhi	Chairperson, ex-officio
2.	Chief Minister, Govt. of NCT of Delhi	Vice Chairperson, ex-officio
3.	Minister-in-Charge (Revenue),	Member, ex-officio
	Govt. of NCT of Delhi	
4.	Chief Secretary, Govt. of NCT of Delhi	Chairperson of the State Executive
		Committee Member, ex-officio
5.	GOC (HQ.) Delhi Area	Member ex-officio
6.	Principal Secretary (Home), Govt. of	Member, ex-officio
	NCT of Delhi	
7.	Commissioner of Police, Delhi	Member, ex-officio
8.	Director of Local Bodies, GNCTD	Member, ex-officio
9.	Joint Secretary, (Disaster Management)	Member, ex-officio
	Ministry of Home Affairs, Govt. of India	
10.	Principal Secretary (Revenue)-cum-	Convenor/Member
	Divisional Commissioner	

The State Disaster Management Authority (SDMA) has the mandate to lay down the state policies and approval of State Disaster Management Plan, with the assistance of SEC. The State Policy for disaster management would be formulated soon by DDMA. There is a need to establish a fully fledged secretariat of DDMA and engage regular staff.

The vision of the authority is:

- → To create a dedicated body that will assess, plan and implement the vital aspects of disaster management (Prevention, mitigation, preparedness and response) for Delhi.
- → To ensure smooth coordination between Central and State Governments in the event of a disaster.
- → To create a unified command, control and co-ordination structure for disaster management in Delhi, integrating the various wings and agencies of government that are necessary for emergency response, as well as for preparedness, mitigation and prevention activities. For purposes of Disaster Management, the nodal department shall have the authority to command the services of all partner departments and agencies, as pre-decided through Memoranda of Understanding.



• 8.3.2 The State Executive Committee (SEC)

As per the powers conferred by the sub section (1) and (2) of the section 20 clause(s) of section 2 of the Disaster Management Act 2005 (53 of 2005), the State Executive Committee of the Delhi Disaster Management Authority has been constituted on 19.03.2008 under the chairmanship of Chief Secretary of NCT of Delhi. The committee consists of the following members:

Sl. No	Officials	Designation
1.	Chief Secretary, Govt. of NCT of Delhi	Chairperson, ex-officio
2.	Pr. Secretary (Home), Govt. of NCT of Delhi	Member ex-officio
3.	Pr. Secretary (PWD), Govt. of NCT of Delhi	Member, ex-officio
4.	Pr. Secretary / Secretary (Revenue), GNCTD	Member, ex-officio
5.	Pr. Secretary (Urban Development), GNCTD	Member, ex-officio

• 8.3.3 State Crisis Management Group

At present, effort to constitute a Separate Crisis Management Group as per MHA guidelines is under process. Crisis management has always been a part of Governance. In the present day the nature and dimensions of the crisis have undergone a major change and Governmental responses to these have to be far more effective and swift. The types of crisis referred to here are not those which can be dealt with by routine administrative measures and with the routine resources of the State Government. The Crisis Management Group works in accordance with the crisis management plan of the state which addresses situations of largescale human induced problems such as major extremist attacks, suicide attacks, sabotages, bomb explosions, taking of hostages, major breakdown of law & order, mutiny, large scale desertion in Central Para Military Forces and State Police Forces, terrorist attacks using chemical weapons, radioactive material, biological agents and major natural calamities like cyclones, floods, landslides and earthquakes. The State Crisis Management Group's function includes formulated reviewing every vear contingency plans by various Ministries/Departments/ Organizations in their respective sectors.

• 8.3.4 Delhi Disaster Response Force (DDRF)

Presently NCT of Delhi is in process of carving out the state disaster response force. To start with, DDMA aims at equipping and training a few units. They will also include women members for looking after the needs of women and children. NDRF battalions and their training institutions will assist the DDRF in this effort. It would also be encouraged to include DM training in the basic and in-service courses of civil services training institutions.



• 8.3.5 Control Room of Delhi Disaster Management Authority (DDMA)

There is a State Disaster Control Room in the office of the Divisional Commissioner, 5 Sham Nath Marg, and Delhi to provide Secretarial support to the Delhi Disaster Management Authority and also facilitate the functioning of the authority. 1077 is the helpline no. of state disaster control room which is operational 24x7. This control room will receive the information from various sources. It shall be in constant contact with the district disaster control rooms, police control rooms. The state disaster control room will receive the information, record it properly and put up to the Delhi disaster management authority is involved in the management of large scale disasters. The divisional commissioner in consultation with other members of the authority shall decide its involvement after the receipt of the report from the district magistrate of the districts.

State Executive Committee (Chief Secretary, Delhi) Lieutenant Governor, Delhi Delhi Disaster Management Chief Minister, Delhi Authority **Emergency Support** (DDMA) Functionaries (Lieutenant Divisional Commissioner cum Pr Governor, Delhi) Secretary, Revenue, Delhi State Crisis Management group (Chief Secretary, Delhi) District(s) Disaster Management Authority (Deputy Commissioner Delhi) State/District Control Room

Fig. DISASTER MANAGEMENT STRUCTURE AT STATE LEVEL (NCT of DELHI)

8.3.6 Emergency Support Functionaries

Twelve emergency support functions have been identified and accordingly emergency support functionaries (ESFs) have also been identified for each function. Each ESF shall have an ESF Nodal agency, and a number of support agencies. The ESF *Nodal agency* shall be

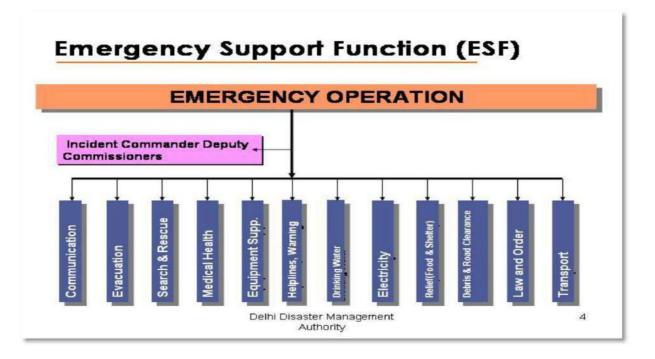
directly linked to the Incident Commander/Divisional Commissioner and the State EOC, and will be the main coordinator in charge of the ESF. The support agencies to the ESF shall support the *Nodal agency* in establishing and managing the emergency shelter and rehabilitation. At the district level, the Nodal Agency will lead the ESF with direct link to the Incident Commander of the District, the Deputy Commissioner Revenue and the district EOC. The Nodal and Support Agencies must together or separately (as decided according to need of the specialized function) constitute QRTs with members, and appropriate (at least two) backstopping arrangements. All persons nominated, and all teams must go through a sensitization, training and must be acquainted with the Standard Operating Procedures of the ESF Plan. They must practice and update their plan and SOP regularly (at least twice a year). The success of ESF will be of critical importance and would reflect in the lives saved in the golden hour.

Table: Structure of Nodal and Support Agencies of Emergency Support Functions in Delhi

ESF	Function	Coordinator	Members
ESF1	Communication	Executive Director, MTNL	NIC, Delhi Police, Revenue Department, TETRA Wireless Service Provider & Private Telecoms
ESF2	Evacuation	Secy. Home	Army, Delhi Police, Civil Defence, Delhi fire Service, NCC
ESF3	Search and Rescue	Secy. Home	Delhi fire Services, Police, Civil Defence, Army, NDRF
ESF4	Medical Health/Trauma	Secy. Health	Major Hospitals, CATS, St. John Ambulance, Civil Defence, MCD
ESF5	Equipment Support	Secy. Urban Development	MCDs, PWD, NDMC, Cantonment. Board, DDA, DMRC, DJB, NDRF
ESF6	Help lines, Warning Dissemination & coordination Media coverage	Pr. Secretary (Revenue/Disaster Management)	All Emergency Support Functionaries (ESFs), Media Agencies
ESF7	Drinking Water	CEO, Jal Board	DJB



ESF8	Electricity	Secy. Power	Transco, Power Companies (TPDDL/BSES)
ESF9	Relief (Food and Shelter)	Pr. Secretary (Revenue/Disaster Management)	Food & Supplies Department, DSCSC, Civil Defence, DUSIB, NGOs
ESF10	Debris and Road Clearance	Director of Local Bodies	PWD, MCDs, NDMC, Cantonment Board, DDA, MES, CPWD, Traffic Police
ESF11	Law and Order	Commissioner, Delhi Police / Secy. Home	Traffic Police, Civil Defence, Home Guards
ESF12	Transport	Secy. Transport	DTC, DMRC, Traffic Police



8.4 Institutional Arrangements at District Level:

At district level, Deputy Commissioner acts as the nodal officer for all types of disaster preparedness, response and recovery activities. District Disaster Management Authority and District Crises Group are two major groups that have been constituted. The power of sanction of relief is also vested with the officials of revenue department at different level depending upon the need. The Deputy Commissioner is to ensure participation of district and state government in the response and recovery phase. He also manages to get support from managerial, materials, resources and NGOs.



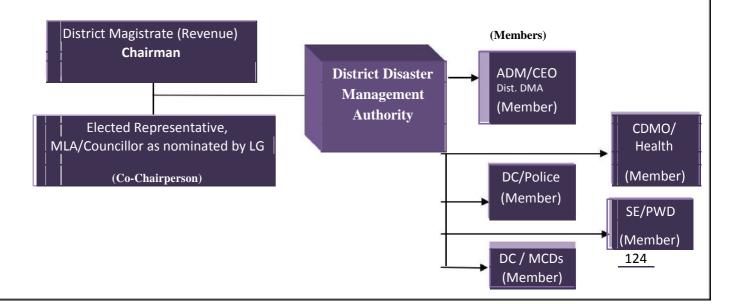
• 8.4.1 District Disaster Management Authority (DDMA)

In exercise of the powers conferred by the sub –section (1) and (2) of section 25 read with clause (s) of section 2 of the Disaster Management Act, 2005, (53 of 2005) and in suppression of all previous orders/notifications issued in this behalf Hon'ble Lieutenant Governor of the National Capital Territory of Delhi has established a District Disaster management Authority (for short called the "District Authority") for each of the districts in the National Capital territory of Delhi. Every District Disaster Management Authority shall consist of members as mentioned below.

COMPOSITION OF THE DISTRICT DISASTER MANAGEMENT AUTHORITY

Sl.	Official	Status in DDMA
No.		
1	Deputy Commissioner of the District	Chairperson ,ex-officio
2	Elected representatives(MLAs/Councillor) of the District	Co-Chairperson ,ex-
	nominated by Lieutenant Governor	Officio
3	Additional District Magistrate of the District /Ex-officio	Member, ex-officio
	Chief Executive Officer of the District Disaster	
	Management Authority	
4.	Deputy Commissioner of Police, Delhi in the District	Member, ex-officio
5.	Zonal Deputy Commissioner, Municipal Corporation	Member, ex-officio
6.	Chief District Medical Officer, Directorate of Health	Member, ex-officio
	Services, GNCTD	
7.	Superintendent Engineer, Public Works Department,	Member, ex-officio
	Govt. of NCT of Delhi.	

Fig. DISASTER MANAGEMENT STRUCTURE AT DISTRICT LEVEL (NCT OF DELHI)





At present, Quick Response Teams (QRTs) have been formed by various Departments/Local Bodies at subdivision level involving Team Leader, Alternate Team Leader and Members. Those Departments which have not established their QRTs at sub-division level are required to form it urgently for effective and timely response in disasters. The QRTs should immediately leave for the affected site after the declaration of emergency. Team should be self-sufficient in terms of resources, equipments, survival kits and response work.

8.5 Institutional Arrangements by Government Departments/Agencies:

Each Department/Local Body shall form Disaster Management Groups at State and District/Zone level to be called as State Disaster Management Group (SDMG), District Disaster Management Group (DDMG) and Zone Disaster Management Group (ZDMG). SDMG/DDMG/ZDMG will consist of chairperson, vice chairperson and such number of administrative personnel and personnel having technical expertise, deemed to be necessary by the concerned Department. These Groups shall be supported by secretarial staff. Usually the administrative Heads of the Department at State and District/Zone levels shall be appointed as Chairpersons of SDMG/DDMG/ZDMG. The SDMG/DDMG/ZDMG shall meet at least twice a year to review the disaster preparedness of the Department at State/District/Zone level. Focal persons for SDMG/DDMG/ZDMG shall be appointed by the respective groups for coordinating with State and District EOCs.

The contact details of SDMG and any updates thereof shall be forwarded by the concerned department/agency to the State EOC. Similarly the contact details of DDMG/ZDMG and Sub division level QRTs and any updates thereof shall be forwarded to District EOC by the respective department/agency of GNCT of Delhi.

Role of State Disaster Management Group

- 1. Prepare the Department Disaster Management Plan at state level and submit it to State Disaster Management Authority.
- 2. Coordinate with other line departments of State and Central Government and State Disaster Management Authority, State Executive Committee and State level Incident Response Team.
- 3. Activate disaster management plan
- 4. Prepare status report of disaster response
- 5. Visit the spot and guide the DDMG/ZDMG in pre disaster planning
- 6. Assess the staff and other logistic requirement for field operation

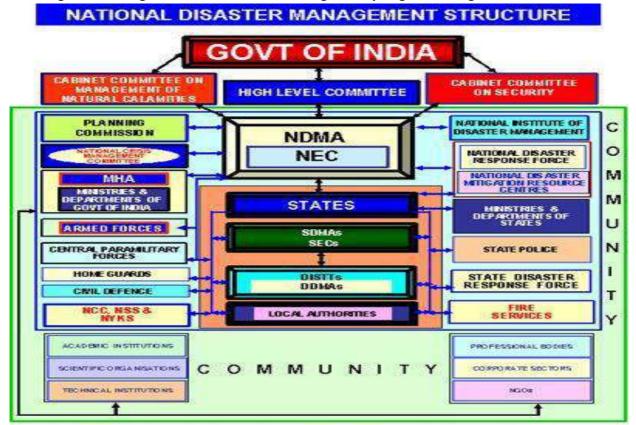


- 7. Monitor the response functions carried out by the Department
- 8. Ensure availability of fund for effective response and mitigation
- 9. Integrate disaster management into development plans and programmes of the Department
- 10. Document the lessons learnt and make suggestions for improvement of disaster management set up

Role of District Disaster Management Group

- 1. Prepare the Department Disaster Management Plan at district level and submit it to District Disaster Management Authority
- 2. Coordinate with other line departments of State and Central Government at district level and District Disaster Management Authority and District/Sub-divisional Incident Response Team
- 3. Activate Disaster Management Plan
- 4. Coordinate the overall response activities carried out by the department in the field
- 5. Maintain inventory of resources of the Department
- 6. Visit the spot and guide QRTs in disaster response
- 7. Assess the staff and other logistic requirement for effective response
- 8. Monitor the response activities
- 9. Ensure availability of funds for effective response
- 10. Collect, store and forward disaster related information to HQ and District Disaster Management Authority for post incident analysis

Figure: This diagram reflects interactive linkages for synergized management of disasters





Chapter IX

RESPONSE & RECOVERY PLAN

Disasters cause sudden disruption to the normal life of a society and cause damages to property and lives to such an extent that normal social and economic mechanisms available to the society all get disturbed. People and officials are both caught unawares and in the circumstances lose their sense of initiative and direction. Consequently, relief work is hampered and unnecessarily delayed.

In such cases, the existence of a disaster preparedness plan can be extremely useful. The distraught officials then have at their hand, a complete set of instructions which they can follow and also issue directions to their subordinates and the affected people. This has the effect of not only speeding up the rescue and relief operations, but also boosting the morale of victims.

The need for an effective disaster management strategy is to lessen disaster impact which can be achieved through strengthening the existing organizational and administrative structure at district and state level.

The Response Plan is a first attempt to follow a multi-hazard approach to bring out all the disasters on a single platform and incorporates the *'culture of quick response'*. Under the plan, common elements responsible for quick response have been identified.

Disaster plans are also useful in pre-disaster situations, when warnings have to be issued. The plan again serves as a guide to officials and precious time is saved which might otherwise be lost in consultations with senior officers and getting formal approval from authorities.

As it is neither economical nor practicable to protect every item and the entire population against extremely rare events, response plans are formulated by separate agencies. For example, the authority in-charge of electricity supply would be responsible for making such a plan that following a disaster event, to restore full services, in the least possible time. The response plan is of two kinds: 1- Short-term Plan and 2-Long-term Plan.

9.1 State Disaster Response Plan (SDRP)

Providing public safety, minimizing damages to property and protecting public lives are the primary goals of disaster response plan.

The Disaster Management Act, 2005 requires that the State Disaster Response Plan (SDRP) incorporates the results of vulnerability and risk assessment of the state. The response plan includes 'plans, procedures and identification of support functions and the agencies that will be responsible for the support functions.

The response plan also provides framework for the standard operating procedures to be further developed by the state government departments.



At the time of situations arising out of disasters and hazards, villages, Mandals or municipality are worst affected; the first line of defence and response mechanism at this level will be developed. If the response required exceeds available resources at the local levels, support will be sought in the order: Villages/mandals/municipality with the district; districts with the state and finally state with the central government. In the event of multistate disasters, optimal utilization of resources and coordination between states is essential.

9.2 Short-term Plan

Short-term plans are action based and aimed at restoring normalcy in the shortest possible time. One of the foremost requirements of any plan would be to define the area where it would be applicable and the agencies that would be responsible for its implementation and coordination. Once the boundaries are defined, the following inputs would be required:

- The amount of resource material required to be mobilized as relief may be based on the statistics of the intensity and spread of various disasters in the area in the past disaster records.
- Certain areas are prone to disaster and each time relief is provided, a number of shortcomings come to light; these become lessons to serve as inputs for future planning of relief and rescue exercises.
- Short-term plans should be based on the declared vulnerability of the area to particular types of disasters. Forecasts on future disasters should be usefully interpreted in action plans on exercises which would be most required.
- Short-term plans should incorporate suggestions and capabilities of all departments concerned of the district/state, non-government organizations and community based organizations. Therefore plans may be prepared by setting up committees at appropriate level to incorporate their inputs.

9.3 Long-term Plan

The situation may not always warrant long-term plans, but such plans should have the ability to build a culture of disaster mitigation and be aimed at reducing vulnerability of the area. As such any long-term plan should incorporate policy directives on preparedness as well as post disaster reconstruction and rehabilitation phases (the later as a follow up of the short-term contingency plans).

- The foremost requirement for the preparation of a long-term plan is establishing its need in an area. Need may be established on the basis of the vulnerability of the area and the resource trade off between the cost of its implementation and other competing needs for overall development. In this context the long-term disaster mitigation plan or rehabilitation plan as part of overall development plan becomes significant.
- In case of rehabilitation plan, the level of damage that has taken place in the community decides whether long-term intervention is required or not. The strategies of the rehabilitation would depend considerably on the damage assessment report.
- A detailed survey of the community, which studies its needs and expectations in detail and seeks out their traditions and customs which they would like to preserve, has to be



carried out. This would serve as an input in deciding an intervention strategy that is acceptable to the community.

- The long-term plan should seek an objective of achieving overall development and satisfying basic needs-shelter, economic and social of the community. Reducing disaster vulnerability should be a means to achieve the objective and not an end in itself.
- Long-term plans are resources intensive; many of the interventions decided therein should be based on resources available. In many cases, where the need for rehabilitation through relocation is established the same may not be implemented due to non-availability of land.
- Long-term plans may be implemented successfully only through partnerships with NGOs and community participation. The involvement of these bodies should be solicited at the outset itself while deciding the interventions required.

9.4 Disaster Response Plan – Nine Core Elements:

The State Disaster Response Plan is based on the following key elements that are instrumental in making the response plan fool-proof.

- → Activation mechanism
- → Levels of disasters
- → Response management arrangements
- → Disaster support functions (DSF)
- → Emergency operations centre (EOC)
- → Incident Response System (IRS)
- → Disaster response structure
- → Delegation of powers
- → Personnel safety

→ 9.4.1 Activation Mechanism of State Disaster Management Plan

Revenue (Disaster Management) Department is the coordinating body for disaster management in the state, other line departments have critical role to play in the management of disasters. The Standard Operating Procedures (SOPs) and action plans of all key departments come into play when the state disaster management plan is activated. Finally, the management of disasters is to bring organizational network of the departments, optimal utilization of available resources with the departments.

Activation of the plan is dependent on the concerted efforts that the Revenue (Disaster Management) Department can muster in coordination with other critical departments to quickly identify the magnitude of the incident; alert district administration and arrange critical infrastructure for evacuation and relief.



On receipt of early warning and signal of an impending disaster or on the occurrence of sudden disaster, the response and mitigation mechanisms of the state disaster management plan will be activated simultaneously.

→ 9.4.2 Levels of Disasters

Based on severity of the disaster, degree of material and physical losses and assistance requirements different levels of disasters are being identified. The activation of the plan will be dependent on the declared level of disaster.

- Level 0 (L₀) This is a level during peace and normal times; time will be utilized for monitoring, prevention and preparatory activities. Capacity building of key departments, mock rescue, rehearsals, testing evacuation plans is rehearsed during this level. Similarly, response and recovery mechanisms are reviewed at state, district, level.
- Level I (L_I) At this level, district machinery can manage the disaster; state and central governments will monitor the progress and remain alert to activate other mechanisms if needed.

General inundation, crop losses, livestock losses, minor property losses and disrupted normal life due to disaster/incident.

- Level II (LII) At this level, active participation of state departments, mobilizing resources at the state level and close monitoring in coordination with district machinery is warranted. Mobilizing rescue and recovery teams consisting of paramilitary forces may be required at this level. In addition to losses identified in LI, human and livestock losses and substantial property losses such as damaged homes, damaged infrastructure and isolation of an area due to the severity of the disaster are part of Level II.
- Level III (Liii) This is critical and highest level. State and district machinery would need active assistance from the union government. Mobilizing rescue and recovery teams consisting of paramilitary forces may be required at this level. Early warning mechanisms both at state and central government play significant role in identifying situations that may be declared as Level III disasters. Similar levels of losses are identified in Li and Lii at higher proportions.

Activation of the plan would vary depending on the level of disasters and intensity as identified; however, at all levels, certain activities especially preparedness, prevention and capacity building are round the year functions. Based on the information received from competent agencies like IMD, district administration and the degree of intensity, the State Executive Committee (SEC) in consultation with Revenue (Disaster Management) Department will identify the level of disaster and notify the impacted districts.

→ 9.4.3 Response management arrangements

The response management task is to optimally utilize resources for effective response operations. Three 'C's define the response management tasks; Command, Control and Coordination.



Command

Command reiterates the hierarchical administrative set up in existence in the department that has either primary or secondary function. Command outlines the amount of physical, financial and personnel resources that would be handled at different levels in the performance of that department's role in the Disaster Support Functions (DSF). Existing department's administrative hierarchy shall be basis in setting up the command system.

Control

Control is similar in nature to command when it comes to exercising administrative authority; with a basic difference that Control provides the general direction of best possible utilization of resources and optimal deployment of personnel during disasters.

• Coordination

Coordination is the key element of disaster response plan. Coordination brings together departments and agencies to execute command and control of DSFs. It is primarily concerned with the systematic acquisition and application of resources (rescue material, personnel, equipment etc.) in accordance with the requirements imposed by emergencies. Coordination aims at bringing out synergy in operation and execution of SDRP.

→ 9.4.4 System of Emergency Support Function (ESF)

Emergency Support Function system is developed to identify responsibilities and functions of key government department's pre, during and post disasters. The system is constituted of key coordinating agencies to manage and coordinate specific functions that are common to all hazards identified above. For each DSF, there will be a primary department or agency and support departments or agencies. The primary department identified in each ESF will coordinate with their counterpart departments at the district level during LII disasters and with central government ministries/agencies during LII and LIII disasters. When emergencies or situations such as earthquakes (in recent past Delhi did not encounter this situation); biological and nuclear installation disasters – either under LII or LIII, the state government will seek assistance and guidance from NDMA or NDRF

• Primary support department

The primary department for the Emergency Support Functions (ESF) is responsible for the management of the disaster support function in close coordination with support departments. While the primary department may vary depending on the ESFs, for instance for Health function Department of health will be the primary support department; the overall responsibility lies with Revenue (Disaster Management) Department and DDMA. During the response, the primary department's role may be changed according to the need and situation. The administrative head of the primary department may delegate the authority by nominating a subordinate or one of the support department as primary department based on the situation and need.



• Secondary support departments

Secondary support departments are a group of departments discharging functions under the ESFs based on their strengths. The administrative head of the primary department may identify a reputed NGO or rope in departments not included in the identified list of secondary support departments to discharge support functions based on the situation and need. Each secondary support department will also identify a deputy incident commander or nodal officer to coordinate with the Incident Commander during disasters.

Nodal Officer or Incident Commander

A nodal officer is to be nominated from each department. In the event that the nominated nodal officer is not the administrative head of the primary support department for each ESF, the administrative head may nominate a separate nodal officer or take charge him/herself based on the need and situation. Incident Commanders are designated at the Sub-Division level (SDM), District (ADM) and State (Secretary DM). DC/DM of districts will be incident commander only in case of CBRN disaster.

• Emergency Response Management Team

The nodal officers from the Primary support department (or Incident Commander in case of Primary support department) and secondary support departments (or their representatives) will be the core members of the emergency response management team. Based on the need and situation, additional members to the team may be nominated by the Incident Commander.

Table: Nodal Support Agencies of Emergency Support Functionaries in Delhi

ESF	Function	Coordinator	Members
ESF1	Communication	Executive Director, MTNL	NIC, Delhi Police, Revenue Department, TETRA Wireless Service Provider & Private Telecoms
ESF2	Evacuation	Secy. Home	Army, Delhi Police, Civil Defence, Delhi fire Services, NCC
ESF3	Search and Rescue	Secy. Home	Delhi Fire Services, Police, Civil Defence, Army, NDRF
ESF4	Medical Health/Trauma	Secy. Health	Major Hospitals, CATS, St. John Ambulance, Civil Defence, MCD
ESF5	Equipment Support	Secy. Urban Development	MCDs, PWD, NDMC, Cantonment. Board, DDA, DMRC, DJB, NDRF

ESF6	Help lines, Warning Dissemination & coordination Media coverage	Pr. Secretary (Revenue/Disaster Management)	All Emergency Support Functionaries (ESFs), Media Agencies
ESF7	Drinking Water	CEO, Jal Board	DJB
ESF8	Electricity	Secy. Power	Transco, Power Companies (TPDDL/BSES)
ESF9	Relief (Food and Shelter)	Pr. Secretary (Revenue)	Food & Supplies Department, DSCSC, Civil Defence, DUSIB, NGOs
ESF10	Debris and Road Clearance	Director of Local Bodies	PWD, MCDs, NDMC, Cantonment Board, DDA, MES, CPWD, Traffic Police
ESF11	Law and Order	Commissioner, Delhi Police / Secy. Home	Traffic Police, Civil Defence, Home Guards
ESF12	Transport	Secy. Transport	DTC, DMRC, Traffic Police

Search and Rescue Operations

After disaster of Level-III immediately, Secretary Disaster management would act as the focal point for control and co-ordination of all activities. His/her responsibilities have been identified as follow:

- Get in touch with the local Army/ Navy/ Air Force units for assistance in rescue, evacuation and relief;
- He/she will have the authority to requisition resources, materials and equipment from all the Departments/Organizations of the government and also from the private sector;
- He/she will have the power to direct the industry to activate their onsite and offsite disaster management plans;
- He/she will ensure set up of 'Site Operations Centre' (SOC) in the affected area with desk arrangements;
- He/she will send 'Preliminary Information Report' and 'Action Taken Report' to the State Executive Committee and members of State Disaster management Authority;
- He/she will monitor immediate evacuation, and establishment of transit and/or relief camps, feeding centres and cattle camps whenever necessary.

i) Relief Operations

After the rescue phase is over, the State administration shall provide immediate relief assistance either in cash or in kind to the victims of the disaster. The office of Secretary, Disaster Management is responsible for providing relief to the victims of either natural or human-made disasters like earthquake, fire, flood, riots, terrorist attack etc. in the district.



ii) Rehabilitation

In short term response rehabilitation is the final step. The incident response system shall be deactivated as the rehabilitation phase is over. Thereafter, the normal administration shall take up the remaining reconstruction works in the disaster affected areas. These activities shall be performed by the working group for relief and rehabilitation under the direction of the DDMA.

→ 9.4.5 Emergency operations centre (EOC)

EOC is an offsite facility which will be functioning from the State / District headquarters and which is actually an augmented control room having communication facilities and space to accommodate the various ESFs. It is a combination of various line departments of Government and other agencies whose services are generally required during incident response.

The EOC will take stock of the emerging situation and assist the RO in mobilising the respective line department's resources, manpower and expertise along with appropriate delegated authorities for the on-scene IRT(s). EOC will keep the RO informed of the changing situation and support extended.

EOC is a nodal point for the overall coordination and control of response work in case of any disaster situation. In case of any disaster district level EOC have to be activated. The primary function of EOC is to facilitate smooth inflow and outflow of relief and other disaster related activities. These EOCs act as bridges between State and Centre government.

At present Emergency Operation Centre is operational on 24X7 basis at DDMA (HQ) at 5, Shamnath Marg, Civil Lines, Delhi-110054. The EOC has Helpline No.-1077. All the Districts have districts EOC operational on 24X7 basis. All together 12 EOCs are presently functional in Delhi.

Desk Arrangements

EOC will expand to include desk arrangements with responsibilities for specific tasks. The desk arrangement may continue to operate from EOC till the time long term plan for rehabilitation being finalized. The desk arrangements provide for divisions of tasks, information gathering and record keeping and accountability of the desk officer to the district commissioner. The Team leaders of Emergency Support Functions shall be deputed as Desk Officer and perform duties under the direction of Operation Section Chief.

→ 9.4.6 Incident Response System (IRS)

The Incident Response System (IRS) is an effective mechanism for reducing the scope for ad-hoc measures in response. It incorporates all the tasks that may be performed during DM irrespective of their level of complexity. It envisages a composite team with various Sections to attend to all the possible response requirements. The IRS identifies and designates officers



to perform various duties and get them trained in their respective roles. If IRS is put in place and stakeholders trained and made aware of their roles, it will greatly help in reducing chaos and confusion during the response phase. Everyone will know what needs to be done, who will do it and who is in command, etc. IRS is a flexible system and all the Sections, Branches and Units need not be activated at the same time. Various Sections, Branches and Units need to be activated only as and when they are required.

Need for IRS

The DM Act 2005 has heralded a paradigm shift in DM from a post-event response to one of pre-event prevention, mitigation and preparedness. Though India has a long history of battling disasters and providing adequate response, it was clearly realized that there were a number of shortcomings like;

- a. Lack of accountability because of ad-hoc and emergent nature of arrangements and no prior training for effective performance;
- b. Lack of an orderly and systematic planning process;
- c. Unclear chain of command and supervision of response activity;
- d. Lack of proper communication, inefficient use of available resources, use of conflicting codes and terminology and no prior communication plan;
- e. Lack of predetermined method / system to effectively integrate inter-agency requirements into the disaster management structures and planning process;
- f. Lack of coordination between the first responders and individuals, professionals and NGOs with specialized skills during the response phase; and
- g. Lack of use of common terminology for different resources resulting in improper requisitioning and inappropriate resource mobilization etc;

In view of the paradigm shift towards improved pre-disaster preparedness, there is an urgent need for a proper and a well prepared response system which would have;

- a. Well thought out pre-designated roles for each member of the response team;
- b. Systematic and complete planning process;
- c. System of accountability for the IRT members;
- d. Clear cut chain of command;
- e. Effective resource management;
- f. Proper and coordinated communications set up;
- g. System for effectively integrating independent agencies into the planning and command structure without infringing on the independence of the concerned agencies; and
- h. Integration of community resources in the response effort.

The introduction of IRS will ensure that the response to disasters in future will definitely be swift, efficient and effective since every stakeholder / responder will be properly trained in the role he has to perform and will have a clear chain of command.

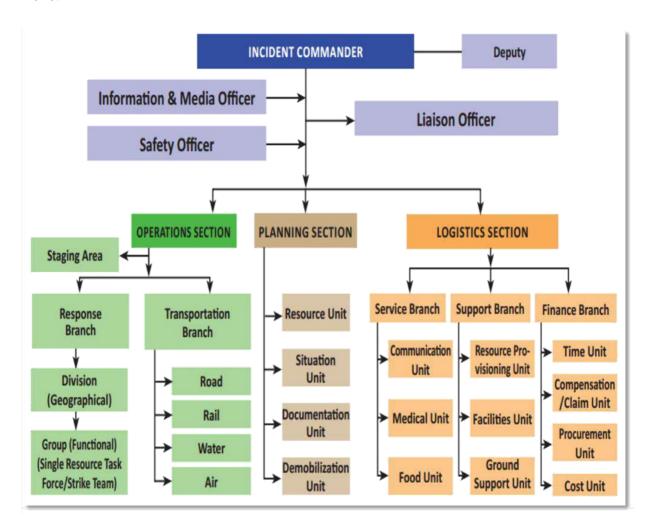
The main purpose of these Guidelines is to lay down the roles and responsibilities of different functionaries and stakeholders, at State and District levels and how coordination



with the multi-tiered institutional mechanisms at the National, State and District level will be done. It also emphasises the need for proper documentation of various activities for better planning, accountability and analysis. It will also help new responders to immediately get a comprehensive picture of the situation and go in for immediate action.

Activation of Incident Response System

The emphasis of disaster response has shifted from reaction to well coordinated response. Guideline on Incident Response System (IRS) has been developed by NDMA in the year 2010.



Structure of Incident Response Team

Delhi Disaster Management Plan State level Incident Response Team (IRT):

SI. No	IRS Position	Rank and position for NCT level	Name & Contact No.
1	Responsible Officer (RO)	Chief Secretary	Sh. Vijay Kumar Dev off:- Mob:-
2	Incident Commander (IC)	Secretary (Revenue)/Divisional Commissioner	Sh. Rajeev Verma Off:23962825/23914805 Mob:
3	Deputy Incident Commander	Sp.CEO (Disaster Management)	Sh. K.S Meena Off: 011-23936477 Mob:- 9212034395
4	Liaison Officer	Sub Divisional Magistrate (DDMA)/ HQ)	Sh. Ajay Kumar Arora Off: 011-23982164 Mob:
5	Information and Media Officer	Spl. Director, DIP, GNCTD, Deputy Commissioner New Delhi	Sh. Sandeep Mishra Off: 011-23814616 Mob:
6	Safety Officer	Director (Fire Safety , DFS, GNCTD	Dr. G.C.Misra Off: 011-23414000 Mob:
7	Operations Section Chief	Sp.CEO. (Disaster Management)	Sh. K.S Meena Off: 011-23936477 Mob:- 9212034395
8	Staging Area Manager	DC Central and All the ADMs of the Districts , GNCTD	DC Central :- Sandip Jacques Mob: 9891585100
9	Response Branch Director	Deputy Chief Fire Officer (Fire Prevention Wing), DFS	Sh.Virendra Singh Off:011-23412025, Mob :9891010690
10	Transportation Branch Director	Spl. Commissioner (Operations), Transport Department, GNCTD	Sh K K Dahiya Off:011- 23950782, Mob:
11	Planning Section Chief	Additional Secretary/DC HQ- I (Revenue)	Sh. Mohammed A Abid Off:011-23983036 Mob:9999125923
12	Situation Unit Leader	Jt. Director, Directorate of Economics & Statistics, GNCTD	Mrs. ManjuBala Sahoo Off:011- 23392048/23812851, Mob:9868276044
13	Resource Unit Leader	DC- I HQ (Resources & Evaluation Unit), Planning Department, GNCTD	Sh. Mohammed A Abid Off:011-23983036 Mob:9999125923
14	Documentation Unit Leader	SDM & Project Officer, DDMA(HQ)	Sh. Ajay Kumar Arora Off: 011-23982164 Mob:
15	Demobilization Unit Leader	Sp.CEO (Disaster Management)	Sh. K.S Meena Off: 011-23936477 Mob:- 9212034395

16	Technical Specialist	Dy. Chief Fire Officer (Fire Safety	Sh. Vipin Kental
		Management	Off: 011-23412235
		Academy), DFS, GNCTD / Specialist	Mob:9818023583
		from DDMA	
17	Logistic Section Chief	Spl. Secretary (Revenue)/DC(Hqrs)	Sh. Rajeev Verma
			Off:23962825/23914805
			Mob:
18	Service Branch	Sub Divisional Magistrate - II	Sh. Arun Kumar Jha
	Director	(Revenue Department, HQ)	Off:
			Mob:
19	Communication Unit	General Manager (Operation),	Shri B.K Tiwari
	Leader	MTNL	Off: 011-26188080
			Mob: 9868135135
20	Food Unit Leader	Spl. Commissioner (Distribution),	Sh. A.K Mishra
		Food & Supplies	Off: 23379311
		Department, GNCTD	Mob:
21	Medical Unit Leader	Director (Health & FW), GNCTD	Dr. Ashok Kumar
			Off: 011-22309220
22	Support Branch	Sub Divisional Magistrate - II	Sh. Arun Kumar Jha
	Director	(Revenue Department, HQ)	Off:
			Mob:
23	Finance Branch	Controller of Accounts(Rev)	Sh. Puran Mal,
	Director		Off:011- 23936404
			Mob:



In case of CBRN disasters RO will act as IC for offsite incident response. District and sub division level IRTs shall also be formed by District DMA as per the guidelines of NDMA. The lowest administrative unit (Sub-Division, Tehsil) will be the first responder as the case may be. If the incident becomes complex and is beyond the control of local IRT, the higher level IRT will be informed and they will take over the response management. In such cases the lower level IRT will merge with higher level IRT.

Incident Command Post (ICP):

The ICP is the location at which the primary command functions are performed. The IC will be located at the ICP. There will be only one ICP for each incident. This also applies to situations with multi-agencies or multi jurisdictional incidents operating under a single or Unified command. The ICP will be located with other incident facilities like Incident Base. The ICP may be located at Headquarters of various levels of administration and in case of total destruction or non availability of any other space, the ICP will be located in a vehicle, trailer or tent with adequate lighting, effective communication system.

Deployment of IRT:

On receipt of information regarding the impending disaster, the EOC will inform the RO, who in turn will activate the required IRT and mobilize resources. The scale of their deployment will depend on the magnitude of the incident. In the event of occurrence of disaster without warning local IRT (District, Sub-Division, Tehsil) will respond and inform the higher authority and if required seek reinforcement and guidance.

Roles and Responsibilities under Incident Response System

Responsibility of Chief Secretary as RO of the State:

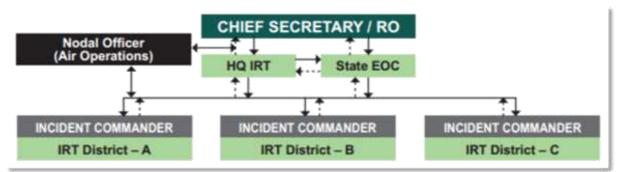
- a) The CS who is the head of the State administration and also chairperson of SEC and CEO of SDMA, will perform responsibilities laid down under clause 22 (2) and 24 of the DM Act, 2005;
- b) Ensure that IRTs at State, District, Sub-Division, and Tehsil/Block are formed and IRS is integrated in the State and District DM Plan;
- c) Ensure that a reasonable amount of interest fund is sanctioned clearly delineating the procedure for emergency procurement;
- d) Ensure funds of 13th Finance Commission (FC) for capacity building of administrative machinery in DM is spent appropriately;
- e) Ensure that IRS is incorporated in the training syllabus of ATIs and other training institutions of the State;



- f) Ensure that effective communication and Web based / online Decision Support System (DSS) is in place in the SEOC and connected with District, Sub-Division, Tehsil/Block level IRTs for support;
- g) Ensure that toll free emergency numbers existing in the State for Police, Fire and Medical support and are linked to the EOC for response, command and control;
- h) Activate IRTs at State headquarters when the need arises and issue order for their demobilization on completion of response;
- i) Set overall objectives and incident related priorities;
- j) Identify, mobilize and allocate critical resources according to established priorities;
- k) Ensure that local Armed Forces Commanders are involved in the Planning Process and their resources are appropriately dovetailed, if required;
- 1) Ensure that when NDRF, Armed Forces arrive in support for disaster response, their logistic requirements like, camping ground, potable water, electricity and requirement of vehicles etc. are taken care of;
- m) Coordinate with the Central Government for mobilization of Armed Forces, Air support etc. as and when required;
- n) Identify suitable nodal officer to coordinate Air Operations and ensure that all District ROS are aware of it;
- o) Consider the need for the establishment of Area Command, if required;
- p) Establish Unified Command (UC) if required and get the approval of Chief Minister;
- q) Ensure that telephone directory of all ESF is prepared and available with EOC and IRTS;
- r) Ensure use of Global Positioning System (GPS) technology in the vehicles (Police, Fire, Ambulance etc.) To get connectivity for their effective utilization;
- s) Keep the chairperson of SDMA informed of the progress of incident response;
- t) Ensure that the Non-Governmental Organizations (NGOs) carry out their activities in an equitable and non-discriminatory manner;
- u) Conduct post response review on performance of IRTs and take appropriate steps to improve performance; and
- v) Take such other necessary action as the situation demands.

Secretary (Revenue) as alternate RO will have the overall responsibility of effective incident response and also responsibilities of Chief Secretary delegated upon him. The hierarchical representation of RO with State EOC, Headquarters IRT and its lower level of IRTs at District levels are shown in the following figure;





Hierarchical Representation of RO

Responsibility of Incident Commander:

- Incident Commander (IC) shall rush to the Emergency Operation Centre (EOC) where technical experts and section chiefs shall join him. He shall remain in the contact of EOC to know the updated status of incident.
- Obtain updates of the incident situation from ICP and establish a link for continuous communication through dedicated telephone lines with speaker phones, set of walkie-talkies, computer link etc. with the help of coordinator
- Supervise the overall management of each function through respective members of DDMA and expediting response whenever required
- Identify the hazardous and threatened areas based on map and information received from ICP
- Take a decisions on requirement and priorities of evacuation and organize the resources to execute the same
- Based on the inputs from the first responders, and experts available at ICP, identify the additional resources requirement and initiate mobilization with the help of section chiefs.
- Coordinate with the other district authorities and state Departments
- He shall also take decisions in demobilizing the resources after the incident
- Provide updates on incident to RO on regular basis

Following three officers will support Incident Commander along with Operation, logistic and planning section chiefs.

Safety Officer:

- Recommend measures for assuring safety of responders and to assess or anticipate hazardous and unsafe situations and review it regularly;
- Ask for assistants and assign responsibilities as required;
- Participate in planning meetings for preparation of IAP (Incident Action Plan);
- Review the IAP for safety implications;
- Obtain details of accidents that have occurred within the incident area if required or as directed by IC and inform the appropriate authorities;



• Review and approve the Site Safety Plan, as and when required;

Liaison Officer:

- Maintain a list of concerned line departments, agencies (CBOs, NGOs) and their representatives at various locations.
- Carry liaison with all concerned agencies including NDRF and Armed forces and line department of Government.
- Monitor Operations to identify current and potential inter-agency problems.
- Participate in planning meetings and provide information on response by participating agencies.
- Ask for personnel support if required.
- Keep IC informed about arrival of all Government and Non government agencies and their resources.
- Help in organizing briefing sessions of all Government and Non-governmental agencies with IC.

Information & Media Officer:

- Prepare and release information about the incident to the media agencies and others with the approval of IC.
- Jot down decision taken and directions issued in case of sudden disasters when Incident Response Team has not been fully activated.
- Ask for additional personal support depending on the scale of incident and workload.
- Monitor and review various media reports regarding the incident that may be useful for incident planning.
- Organize Incident Action Plan meeting as directed by the Incident Commander.
- Coordinate with IMD and other agencies to collect weather and related early warning information and disseminate it to all concerned.

Responsibility of Operation Section Chief:

- Responsible for the management of all operations directly applicable to the primary mission. He will activate the emergency support functions and will coordinate with the team leaders of ESFs.
- Activates and supervises organization elements in accordance with the Incident Action Plan (IAP) and directs its execution
- Determine need and request additional resources
- Review suggested list of resources to be rebased and initiate recommendation for release of resources
- Make expedient changes to IAP as necessary
- Report Information about special activities, events or occurrences to Incident Commander



• Maintain Unit / Activity details

Responsibility of Planning Section Chief:

- Collection, evaluation, dissemination and use of information about the development of incident and status of resources. Information is required to understand the current situation and to prepare alternative strategies and control operations
- Supervise preparation of Incident Action Plan (IAP)
- Provide input to Incident Commander and Operation Chief in preparation of IAP
- Reassign out of service personnel already on site to other positions as appropriate
- Determine need for any specialized resources in support of the incident
- Establish information requirements and reporting schedules for Planning Section Unit (e.g. Resources, Situation Unit).
- Compile and display incident status information
- Facilitate the preparation and implementation of Incident Demobilization Plan.
- Incorporate Plans (e.g. Traffic, Medical, Site Safety, and Communication) into IAP.
- Maintain Unit / Activity details.

Responsibility of Logistics Section Chief:

- Assign work locations & tasks to section personnel
- Participate in preparation of IAP
- Identify service and support requirements for planned and expected operations
- Coordinate and process requests for additional resources
- Provide input to / review communication plan, Traffic plan, medical plan etc
- Prepare service and support elements of IAP
- Maintain Unit/ Activity and financial details.

The roles and responsibilities of other officers of IRT shall also be as per the guidelines framed by NDMA.

Role of State & District Crisis Management Groups:

- Crisis Management Plan 2013 (CMP 2013) of MHA envisages State Crisis Management Group (SCMG) and District Crisis Management Group (DCMG) to be responsible in the State and District level for management of emergency.
- CMP 2013 is stipulated for the emergency situations namely public disorder, terrorist outrage, mutiny, large scale exodus, major natural calamity, emergency of metro railways.
- Home Secretary shall be the convener of the SCMG.



- The State Emergency Operation Centre will be responsible for informing MHA and all concerns agencies about any emergency.
- All operational decision shall be taken by DCMG during response. However, directions and advice wherever necessary may be obtained from SCMG, CMG of MHA or NCMC.
- The State Govt./district authorities will liaise with Air Force authorities and NEC, MHA for requisitioning of helicopters for rescue and relief.
- The agencies for preparing food packets for air dropping and items/quantity to be included in food packet are to be communicated in advance by District Administration.
- Mock drills for flood shall be carried before monsoon and drills for earthquake shall be carried out in the month of March.
- Annual review of preparedness measures shall be done at state, district and sub divisional level
- Detailed SOP for responding to various disasters have been given in the CMP 2013

Preparedness and having functional systems in place that are tested significantly reduces the severity of the disasters; a better prepared community may force disaster level to be lowered from higher levels to lower.

→ 9.4.7 Disaster response structure

Preparedness and having functional systems in place that are tested significantly reduces the severity of the disasters; a better prepared community may force disaster level to be lowered from higher levels to lower.

Early warning dissemination

Response activities	Responsibility
Setting up Control Rooms round the clock	- Secretary (Rev/DM)
at the site/district	- Revenue (<u>Disaster Management</u>) Department
- Assigning duties/functions to the District	- Government Departments, both
officials and	at state and district level
ADMs/SDMs/Tehsildars.	- Deputy Commissioner
- Arranging vehicles and sound system for	- Emergency Officers
information broadcasting	- All district level officials
- Alerting NGOs and seeking assistance	- Local cable operators and radio
from them; assigning responsibilities	stations
- Early warning to communities close to	- State and local NGOs
coast and fishermen	
- Holding District-level natural calamity	
meeting by the District Magistrate	
- Insure functioning of warning systems	
and communication systems	
- Drafting local cable operators to broadcast	
alerts as running flashes on the TVs/SMS	
- State-wide amber alerts	



- Drafting local radio stations/Ham radios with early warning message
- Undertaking mock drills and rehearsals of preparedness

Evacuation

Response activities

Prepare and communicate community level evacuation plans, especially for the most vulnerable areas

- Early warning to most vulnerable areas of impending disaster as declared by competent authorities
- Coordination with civil defense/NGOs/ and local police departments
- Alerting communities on earmarked boats and vehicles for evacuation; arranging boats and vehicles to most vulnerable areas
- Evacuation of people from areas most affected and administering emergency relief
- Train and organize community level task force for emergencies; identify NGO to take up the responsibility of training the task force
- Drafting local cable operators to broadcast alerts as running flashes on the TVs
- State-wide amber alerts
- Deploying police to maintain law and order; peace keeping during evacuation
- Identifying disaster shelters (such as high grounds/schools if not affected or other such places) and managing people mobility to these shelters
- Deployment of power boats/country boats as needed

Responsibility

- Secretary (Rev/DM)
- Deputy Commissioner and other district level officials
- Government functionaries at Sub-division and district level
- Local cable and radio operators
- Doordarshan and All India Radio
- Police, Army (based on level of disaster), Civil Defence
- NGOs

Medical Aid

Response activities	Responsibility
-Stock piling of life saving drugs; water	- Secretary (Rev/DM)
treatment tables such as Halogen tablets	Deputy Commissioner
- Prepare protocol and train local youth	- Commissioner & Director of Health
and similar groups on the use of medical	- Commissioner of Women and
kits	Child Development
- First-aid treatment of injured and	- Information and Public Relations Officer
transporting injured to nearest hospitals	- Chief Medical Officers of District/PHCs
- Awareness and public outreach on the	- The Accident Relief Medical
outbreak of epidemics post disasters	Vans (ARMVs)
- Surveillance of the outbreaks, diseases	- St. Johns Ambulance Services
and developing mechanisms in	- NGOs
transmitting information to medical and	
relief authorities at the state and district	
level.	
- Arranging vaccination for common	
diseases pre and post disasters	
- Constitute mobile medical teams and	
deploy such teams to most affected areas	
- The Accident Relief Medical Vans	
(ARMVs) of the Railways where available	
will be utilized for emergency medical	
response.	
- Protection/treatment and disinfection of	
drinking water sources	
- Coordination with local Veterinary	
Hospitals and insuring fodder/medicine	
availability for the livestock	
- Identify ideal carcass disposal	
locations away from habitation; monitor	
proper carcass disposal	
- Forming youth brigades for emergency	
operations; training and equipping the	
groups with first-aid kits under the	
supervision of respective sub-division	

Shelter Management

Response activities	Responsibility
	Secretary (Rev/DM) /
Inventory of pucca and kutcha; temporary	Deputy Commissioner
shelters; identify capacity of these shelters	- Commissioner MCDs
- Identification of shelters/temporary	- Education Officers in Districts

structures in higher grounds (if available)

- Supply of tents in advance to critically vulnerable areas
- Arrangement of food/drinking water/medicine in the shelter places
- Identify and assign responsibility to key functionary for each shelter or group of shelters
- Identify means of transportation to the shelters by foot/boat/vehicle or other means
- Identify animal shelters and supply fodder and essential medicines
- For emergency backup, identify shelters with alternate lighting facilities
- Temporary supply of safe drinking water

- Director of Health Services
- Information and Public Relations
- Chief Medical Officers of District/PHCs
- NGOs
- Local private hospitals

Infrastructure Restoration

Response activities

- Emergency cleaning of debris to enable review and assessment by Revenue Department
- Coordinate road-cleaning activities to assist relief work in close coordination with Transport Commissioner
- Formation of task force and identifying team leaders to clear debris; local people willing to volunteer and work on dailywages to be roped in; providing tool kits
- Preparing inventory of private companies that supply earth moving equipments, cranes to clear concrete debris and any dilapidated homes
- Contacting companies that have available resources to remove debris
- Assess damage to roads; repair roads that need minor maintenance and prepare road repair and reconstruction plan of heavily damaged roads
- Assess damage to water bodies; undertake minor repairs and prepare reconstruction plan of water bodies and structures based on the assessment
- Assess damage to water tanks, bunds and

Responsibility

- Secretary (Rev/DM)
- Deputy Commissioner (Rev) and other district level officials
- Commissioners of MCDs
- Engineer-in-Chief, PWD
- Government functionaries at Sub-division and district level
- National Highways Authority
- R & B
- All line departments
- Police



dams; undertake repair of minor dam breaches; prepare reconstruction plan to restore irrigation channels and dams

- Clear highways and state highways by removing fallen trees and other debris; prepare and identify source of electrical saw and other tree removal machinery; enlist this machinery during cleaning operation

Search and Rescue Operations

Response activities	Responsibility
- Deployment of Police and/or Fire Brigade	- Secretary (Rev/DM)
for search and rescue	- Assistant Commissioner of Police
- Deployment of Quick Response Team of	- Home Department
DDMA for Communication and initial	- QRT of DDMA
response from incident site	- SDRF/NDRF
- Deployment of Army and paramilitary	- Deputy Commissioner and other
forces depending on the level of disaster	district level officials
- Seeking help and coordinating with NCC,	- Government functionaries at sub-division
NSS and other such civil defence structures	and district level
- Organize and make available rescue	- Local cable and radio operators
materials	- Civil Defence structures such
- Prepare inventory of disaster shelter	as NCC/NSS
places; broadcast their location in advance	
and direct people movement to the	
shelters in orderly fashion	
- Identify most vulnerable	
villages/mandals/locations based on	
historical data; equip the communities	
with rescue kits; train village youth	
and such groups in the use of these kits	

Emergency Relief/free kitchen operation

Response activities	Responsibility
- Identifying and deploying vehicles	-Secretary (Rev/DM)-
- Identifying and assigning one high	-Deputy Commissioner
ranking district official to coordinate	- District Collector and other district level
setting up kitchen operations	officials
- Procuring and transporting relief	- Government functionaries at Sub-division
materials to affected areas	and District level
- Setting up free kitchen for affected areas	- Civil supplies department
in the vicinity of shelter camps or in	- Police
shelter camps itself	- Civil Defence structures such
- Coordinating with the NGOs/CBOs and	as NCC/NSS



other	- NGOs
voluntary groups to continue kitchen	
operations beyond required period	
- Monitoring and assessing the need to	
continue kitchen operations by assigned	
authority	

Carcass Removal

Response activities	Responsibility
Each district to identify ideal locations	- Secretary (Rev/DM)
that	- District Collector and other
are far from human habitations and water	district level officials
bodies for emergency carcass disposal	- Government functionaries at
- Identify and enumerate number of	Sub-division and district level
vehicles available with local Bodies for the	- MCDs/NDMC
purpose of carcass removal	- Government and private hospitals
- Identify religious heads of villages willing	- Police
to perform last rites as per customs for	- Civil Defence structures such
mass carcass disposal	as NCC/NSS
- Identify ideal locations far from human	- NGOs
habitations and water bodies for livestock	
and animal carcass burial	
- Deployment of local police for law and	
order during carcass removal operations;	
and for search of carcass	
- Disinfecting areas/streets where dead	
animals and human bodies were	
recovered to prevent disease spread	

All the districts would have to identify the relief centers falling in their districts, in their disaster management plan and also plan for the essential materials that would be required in these centers during any disaster situation.

→ **9.4.8 Delegation of powers**

Quick response and mobilization of resources; timely decision-making and acquiring essential resources are critical to mitigate the impact of emergencies and disasters. Government hierarchy impedes achieving desirable efficiency and management. While coordination between states, district administration with state, with district established protocols; to effectively manage activities on ground, a mechanism of delegating special powers during disaster management will be evolved. A systematic mechanism of power delegation and emergency procurement rules for each department will be developed; these rules and appropriate financial and power delegation will come into play during emergency situations or with the activation of the state plan. The mandated standard operating procedures that are to be prepared by the state government departments will identify the



mechanism of 'power delegation' as principal function of the operational procedures of each department.

→ **9.4.9 Personnel safety**

Disaster management, preparedness and mitigation measures are mostly for the vulnerable population. Incidentally, personnel involved in executing the plan on the ground get exposed to hazardous situations. Government department personnel in-charge of mitigation and relief operations, their residential property/quarters also gets impacted equally. District and sub-divisional administration shall include safety measures of government officials responsible for executing the state as well as district disaster management plans. The standard operating procedures that each department is mandated to prepare as part of the state disaster management plan must prominently identify and prepare exclusive precautionary measures to be observed by the government officials for their family safety

Operational – Coordination Structure

Each organization generally has a framework for direction of its operation and coordination between its different units. Disaster Management generally requires partnership between organizations and stakeholders. An effective and early response requires mobilization of manpower, equipments and materials belonging to different originations which may not be working together during normal times. Therefore, a framework has been developed in Delhi as a part of emergency planning for operational directions and coordination during response phase. This plan recognizes role of Divisional Commissioner in providing overall operational direction and coordination for all the response functions. With the help of other departments of Delhi Government and other organizations 12 Emergency Support Functions have been identified. The coordination structure is mentioned below.

→ 9.4.10 Trigger Mechanism

As soon as Emergency Operation centre gets the information about any event, the staff on duty in EOC passes the information to the concerned authority and seeks his instruction for further actions. If the information pertains to the occurrence of a disaster in any part of the district, the staff on duty informs District Disaster Management Committee members, Emergency Support Functions-team leaders, Major hospitals and Delhi Disaster

Management Authority etc. The staff on duty is also Public) Delhi Police(Help Trigger Mechanism for District EOC CATS **District Emergency Operation Centre** MCD EOC (HQ) NDMC PWD Dist. EOCs Self Action Designated EOC in-charge Desk Arrangements: ESF Commanders Sections of Incident Communication Command Teams Health Logistics DDMC/DDMA Electricity Planning Members Search and Rescue Operation Law and Order Finance and Relief and Shelter Administration Water Supply Debris Clearance and Sanitation Help Lines Transport 149



responsible to reclaim information related to type, magnitude and location of the disaster and also inform it to responsible authorities. The EOC in-charge will also inform all the details to Divisional Commissioner and State EOC. All the desk officers/team leaders and Incident Command Team members will also be informed to immediately report at District EOC. Incident Command team and Desk officials would respond as per their standard operating procedures and directions of Incident Commander(IC).

9.4.11 Disaster Management Centre

Delhi has set up Disaster management centres in collaboration with Municipal Corporations of Delhi, New Delhi Municipal Corporation and Delhi Fire Service. At these centres heavy equipment has been kept.

MCDs: Heavy Equipments located in 10 Disaster Management Centers

- 1. Road No.29, Baba Ramdev Marg near MCD Cement Godown, Raghubir Nagar, New Delhi-58.
- 2. MCD Disaster Management Office, opposite Mathur Automobile, Okhla Industrial Area, Phase-II, New Delhi.
- 3. MCD Disaster Management Centre, Opp. District Court, Rohini
- 4. MCD Disaster Management Centre, Sec-9, near MCD primary school, R.K. Puram.
- 5. MCD Disaster Management Office, Malaria Clinic Building complex, Jhandewalan.
- 6. MCD Disaster Management Office, near Radhaswami Satsang Ashram and Rajendra Place Metro Station, Karol Bagh.
- 7. MCD Disaster Management Centre, Dhansa Stand, Nazafgarh.
- 8. MCD Disaster Management Centre, behind Old Hanuman Mandir, Jamuna Bazar.
- 9. MCD Disaster Management Centre, Nand Nagri, Shahdara
- 10. MCD Disaster Management Centre, Gazipur, Shadara South.
- Delhi Fire Service: Three DMCs have been established at:
 - 1. Rohini, North Delhi
 - 2. Laxmi Nagar, East Delhi
 - 3. Nehruplace, South Delhi
- NDMC : Disaster Management centre at Prithviraj Road
- Hazard Safety Cells(HSCs) have been formed in DDA,NDMC

9.4.12 Road Map for Hazard Risk Management

DDMA is currently working on the following strategic projects for effective hazard management in Delhi;

a) Notification and operationalisation of Disaster Management Lanes by identifying arterial roads of Delhi. These lanes would help the emergency responders in timely management of disaster situations.



- b) Establishing warehouses for essential commodities and response equipments and material. DDMA envisages establishing four such master warehouses and one subsidiary warehouse in each subdivision.
- c) Raising of Delhi Disaster Response Force (DDRF) on the lines of NDRF in Delhi, initially having strength of around 300 personnel. Personnel for the DDRF would be pooled from Fire Service, Delhi Police, Paramilitary Forces, etc. on deputation basis.
- d) Procurement of small vehicles and equipments such as motor bikes, etc. for effective response in congested localities of Delhi.

9.5 Disaster Recovery Plan

9.5.1 Defining Recovery

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

Recovery, which consists of interdependent and mutually reinforcing activities, is planned and implemented dynamically. It begins within the humanitarian setting and addresses recovery needs in various sectors as ascertained through the damage, losses and needs assessment. Over a period of time the recovery efforts bring about long-term development as peoples assets, capabilities and livelihoods profiles improve. Thus, decisions and priorities set early in the process will have a progressive impact on the quality and sustainability of recovery.

The recovery process is usually planned and implemented in the following three stages, based on which recovery policies and programmes are calibrated to achieve stage- and context-specific objectives:

- i) **Early Recovery** takes place within three to eighteen months after a disaster event and includes activities such as cash for work, resumption of markets, commerce and trade, restoration of social services, transitional and temporary shelters, provision of medical care, psychosocial support and mental health services (PSSMHS) and health surveillance;
- ii) **Medium-term Recovery** is usually implemented within five years of a disaster event, depending upon the scale of the disaster. It includes recovery plans for assets and livelihoods, reconstruction plans for housing, infrastructure, public buildings and cultural monument, and engaging support network and ensuring continuity for ongoing PSSMHS and health care; and
- Long-Term Recovery is implemented along with developmental plans, within a time-span of five to ten years. It includes activities such as long-term infrastructure strengthening, urban and regional planning, environmental regulations and developments, and planning to meet psychosocial and health care needs of adults and



children. Many of these activities actually commence within the medium-term recovery phase.

The Disaster Management Act, 2005 highlights multiple aspects of disaster management: prevention, mitigation, preparedness, capacity building and response coordination. Although the Act briefly addresses responsibilities of the Central Ministries to undertake rehabilitation and reconstruction activities, it does not explicitly refer to 'recovery'. The National Policy on Disaster Management 2009 recognizes 'recovery' as one of the six elements in the Disaster Management continuum and links 'recovery' of physical, social and economic assets with 'safe development'.

For effective recovery of households and communities affected by disasters, the following three broad aspects need to be considered:

- i) **Physical aspects of recovery,** i.e. restoration and reconstruction of damaged community infrastructure, critical infrastructure, private houses and cultural heritage buildings;
- ii) **Economic aspects of recovery,** i.e. livelihoods, productive activities and market services; and
- iii) **Social recovery** i.e. social and psychological aspects of personal, family and community functioning and wellbeing.

9.5.2 Key Intervention Areas

The key recovery interventions fall under four main heads viz: Physical, Economic, Social, and Cross Cutting interventions. These four heads cover some key sectoral areas as mentioned below:-

A. PHYSICAL INTERVENTIONS

	Early Recovery	Medium-Term Recovery	Long-Term Recovery
Shelter & SettlementPlanning	intervention would	damages and understanding of the need of the community and preparation of a plan for reconstruction that is participatory, inclusive and encompasses local knowledge	A systematic approach to addressing habitat and land use planning,; hazard-resistant technologies and appropriate building materials (preferably locally available and with owner participation); improved risk sensitive community infrastructure; provision of technical support or expert supervision, financial assistance and effective monitoring.





Critical A Com munity Infrastru cture	intervention would be debris clearing; restoration and repair of community	construction practices and introduction of risk sensitive technologies and sensitization of	regime if required; planning that is based on natural systems in mind like drainage and vulnerability of the area to
Cult Build ural Heritage ings	conservation agencies, undertaking detailed damage and needs analysis of damaged structures and		areas with heritage buildings to ensure their inclusion in DRR

B. ECONOMIC INTERVENTIONS

	Early Recovery	Medium-Term Recovery	Long-Term Recovery
Sect Primary or	fisheries sector. Further, interventions like clearing	Detailed assessments, restoration of degraded land or ponds provide micro-credit and/or soft loans, training and capacity building for alternative/adaptive crops, new breeds of livestock etc.	metrological scenario, strengthen early warning mechanism, enhance insurance coverage and



	Early recovery	Review of local economic	Detailed mapping and
	intervention activities like	resources and livelihood	vulnerability assessments of
Reco very	restoration of individual or	opportunities including labour	economic activities and
	community assets, debris	market surveys and analysis. The	livelihoods in both pre-and post-
	removal through cash or	interventions would range from	disaster stage. Interventions
_		skill diversification training,	would also include skill
Livel ihood	and conducting rapid	introduction of soft loan	diversification trainings,
	damage, needs and	provisions or micro credit/grants	strengthening the MFIs,
	capacity assessment for	and involving and enhancing	encouraging risk transfer
	livelihood recovery can be	capacities of local groups like	mechanism besides
	initiated.	women self-help or farmers.	strengthening the basis
			infrastructure and social
			protection safety nets.

C. SOCIAL INTERVENTIONS

	Early Recovery	Medium-Term Recovery	Long-Term Recovery
Healt h		Detailed assessment of damages and needs of the health sector; invest in training of the medical and paramedical staff and restore infrastructure and equipment.	Focus on ensuring adequate access health system with safer infrastructure; greater preparedness (trained staff & plans) for key public health hazards and future disasters, and facilitating provision of equitable and affordable services to all.
W at Samit	damaged systems; making provisions for safe drinking	infrastructure and ensure risk sensitive reconstruction through repair and upgrading of damaged system and promote WATSAN committees.	Ensure new water facilities are based on risk analysis; retrofit old facilities; enhance capacities of service providers; promote hygiene in communities, universities and schools and draw up long term plans for solid waste disposal.



	1 0		Safe school construction based on risk assessment and undertaking
	infrastructure; providing alternative places for schools	based on safe construction practices; restructure examination dates and building	retrofitting of old schools;
Support	Individual or group counseling using various methods, encouraging community activities monitoring of affected communities especially the most vulnerable e.g.	strengthening community interaction and cohesiveness, monitoring the situation through regular home and community visits and providing counseling to the service providers.	building a cadre of PSS providers who are professionals and volunteers besides monitoring the service provider as they may

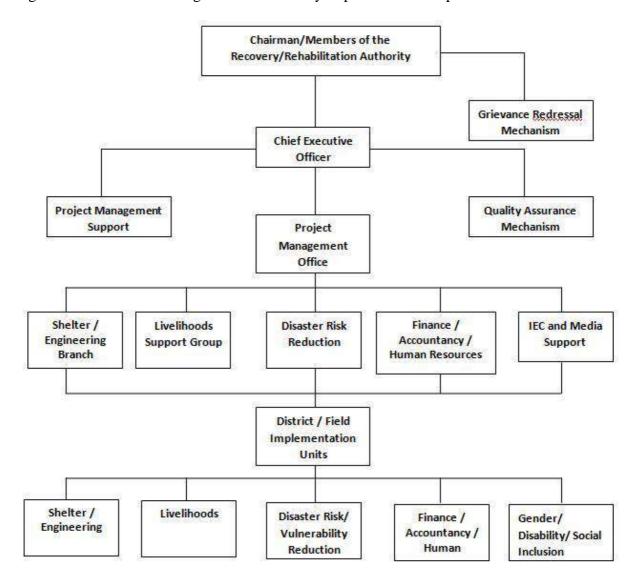
9.5.3 Financial Mechanisms and Resource Mobilization

The financial framework calls for convergence of recovery programmes with ongoing national and state level schemes like Sarva Shiksha Abhiyan, National Rural Health Mission, etc. Recovery programmes can be supported through allocations from these schemes by use of flexi-funds available under Centrally Sponsored Schemes, Central Plan Assistance and State Plan Assistance. International Assistance, Corporate Social Responsibility Funds and contributions by NGOs, CSOs, private sector etc. are also potential funding sources. Role of insurance sector is also important. Protocols/processes for mobilizing fund and multi-sector resource allocation are prescribed in **India Disaster Recovery Framework** prepared by MHA.



9.5.4 Institutional Mechanism

A generic institutional arrangement for recovery implementation is provided below:



9.5.5 Measures for Disability Inclusive Rehabilitation and Reconstruction

- → Inclusion of universal design in reconstructions that any space, building, product, service or information is design in a way to be accessible, usable and understandable.
- → Input of disability experts in the planning process.
- → Providing people with disabilities access to housing and land rights.
- → Involvement of people with disabilities and their representative organizations in assistance in rehabilitations.



- → Facilitate rehabilitation programmes that increase the mobility and independence of people with disabilities in order to make them economically productive and socially accepted.
- → Special counselling for disabled people at Relief Camps.
- → Disaster relief and recovery plans, programmes, and outreach efforts (including early warning system) should be available in formats accessible to people with disabilities example in Braille, Large Print, Audio Tapes, Text Format etc.
- \rightarrow Ensure that cash for work programmes pay the disable workers fairly. In Kind relief may be needed to replace assets such as wheelchairs, crutches etc.
- → Provide Opportunities for people with disabilities to improve self sufficiency.
- → The process following relief can be used to include people in the work force, access to credit, create livelihood Opportunities and economic resources including vocational training, training on business, market networking.
- → Provide support to family caregivers.
- → The inclusion of people with disabilities in livelihood measures must be monitored.
- → Special arrangements for physiotherapy and psychosocial rehabilitation for disable people by Department of Social Welfare and DHS.



Chapter 10

PARTNERSHIP WITH OTHER STAKEHOLDERS

Disaster Management is an inclusive field and requires contribution from all stakeholders in order to effectively manage the emergency situation. Coordination amongst various stakeholders hence becomes extremely important to achieve the desired results. There are various agencies / organizations / departments and authorities that constitute a core network for implementing various disaster management related functions / activities. It also includes academic, scientific and technical organizations which have an important role to play in various facets of disaster management. A brief note on the role and activities of such functionaries and the existing system of coordination established by the State Government with them is mentioned below;

10.1 NATIONAL DISASTER MANAGEMENT AUTHORITY (NDMA)



The National Disaster Management Authority (NDMA), as the apex body in the GoI, has the responsibility of laying down policies, plans and guidelines for DM and coordinating their enforcement and implementation for ensuring timely and effective response to disasters.

- The guidelines assist the central ministries, departments and states to formulate their respective plans. It also approves the National Disaster Management plan prepared by the National Executive Committee (NEC) and plans of the central ministries and departments.
- It takes such other measures as it may consider necessary, for the prevention of disasters, or mitigation, or preparedness and capacity building, for dealing with a threatening disaster situation or disaster.
- It also oversees the provision and application of funds for mitigation and preparedness measures. It has the power to authorize the departments or authorities concerned, to make emergency procurement of provisions or materials for rescue and relief in a threatening disaster situation or disaster. It also provides such support to other countries in times of disasters as may be determined by the central government.
- The State keeps in touch with the NDMA for implementing various projects / schemes which are being funded through the Central Government. The State also appraises the NDMA about the action taken by the State Government regarding preparation of DM plans and implementation of guidelines issued by NDMA for various hazards from time to time.



NDMA has the power to authorise the departments or authorities concerned, to make emergency procurement of provisions or materials for rescue and relief in a threatening disaster situation or disaster. The general superintendence, direction and control of the National Disaster Response Force (NDRF) is vested in and will be exercised by the NDMA. The National Institute of Disaster Management (NIDM) works within the framework of broad policies and Guidelines laid down by the NDMA.

The NDMA is mandated to deal with all types of disasters, natural or manmade, whereas such other emergencies including those requiring close involvement of the security forces and/or intelligence agencies such as terrorism (counter-insurgency), Law and Order Situations, Serial Bomb Blasts, Hijacking, Air Accidents, Chemical, Biological, Radiological and Nuclear Weapon Systems, Mine Disasters, Ports and Harbour emergencies, Forest Fires, Oilfield Fires and Oil Spills will continue to be handled by the extant mechanism i.e. National Crisis Management Committee (NCMC). NDMA may, however, formulate Guidelines and facilitate training and preparedness activities in respect of CBRN emergencies. Cross-cutting themes like Medical Preparedness, Psycho-Social Care and Trauma, Community Based Disaster Preparedness, Information & Communication Technology, Training, Preparedness, Awareness Generation etc., for natural and man-made disasters in partnership with the stakeholders are concerned. NDMA will guide the conduct of mock exercises and sensitising the IRTs whenever requested.

A list of all trained officers from different states, which is easily accessible by the all concerned, has already been collated by NDMA which is also posted on the NDMA website. (www.ndma.gov.in)



10.2 NATIONAL INSTITUTE OF DISASTER MANAGEMENT (NIDM)

NIDM will train all the concerned officers on IRS as per the guidelines issued by NDMA.

It will also conduct some of the capacity building programmes recommended as per the guidelines.

Resources available with the DM authorities at all levels ,which are capable of discharging emergency support functions, will be made available to the nodal ministries and agencies concerned during times of such disaster(s) /impending disasters (s).

- The NIDM, in partnership with other research institutions has capacity development as one of its major responsibilities, along with training, research, documentation and development of a National level information base. It networks with other knowledge-based institutions and function within the broad policies and guidelines laid down by the NDMA.
- It organizes training of trainers, DM officials and other stakeholders as per the training calendar finalized in consultation with the respective State Governments.



 NIDM provides technical support to the state governments through the Disaster Management Centers (DMCs) in the Administrative Training Institutes (ATIs) of the States and Union Territories. Presently NIDM is supporting thirty such centers. Six of these centers are being developed as Centers of Excellence in the specialised areas of flood risk management, earthquake risk management, cyclone risk management, drought risk management; landslides risk management and management of industrial disasters.

10.3 NATIONAL DISASTER RESPONSE FORCE (NDRF)



For the purpose of specialized response to a threatening disaster situation or disasters/ emergencies both natural and man-made such as those of CBRN origin, the National Disaster Management Act has mandated the constitution of a National. Disaster Response Force (NDRF).

The general superintendence, direction and control of this force is vested in and exercised by the NDMA and the command and supervision of the Force is vested in an officer appointed by the Central Government as the Director General of Civil Defence and National Disaster Response Force. Presently, the NDRF comprises eight battalions and further expansion may be considered in due course. These battalions are positioned at different locations across the State.

NDRF units maintains close liaison with the designated State Governments and are available to them in the event of any serious threatening disaster situation. While the handling of natural disasters rests with all the NDRF battalions, four battalions are equipped and trained to respond to situations arising out of CBRN emergencies.

Training centers are also set up by respective paramilitary forces to train personnel from NDRF battalions of respective forces and also meets the training requirements of State/UT Disaster Response Forces. The NDRF units also impart basic training to all the stakeholders identified by the State Governments in their respective locations.

In addition, the State Government also utilizes the services of the NDRF whenever required during emergency search, rescue and response.



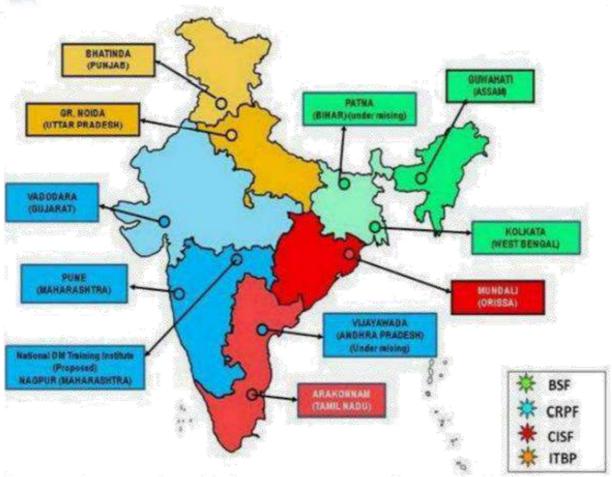


Figure 1 Map showing NDRF bns. locations.



10.4 ARMED FORCES

Conceptually, the Armed Forces are called upon to assist the civil administration only when the situation is beyond the coping capability of the State Government. In practice, however, the Armed Forces form an important part of the Government's response capacity and are immediate responders in all serious

disaster situations.

On account of their vast potential to meet any adverse challenge, 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. These include communication, search and rescue operations, health and medical facilities, and transportation, especially in the immediate aftermath of a disaster. Airlift, heli-lift and



movement of assistance to neighbouring countries primarily fall within the expertise and domain of the Armed Forces.

The Armed Forces also participate in imparting training to trainers and DM managers, especially in CBRN aspects, high-altitude rescue, watermanship and training of paramedics. At the State and District levels, the local representatives of the Armed Forces have been included in their executive committees to ensure closer coordination and cohesion in all aspects related to Disaster Management.

10.5 AIRPORT AUTHORITY OF INDIA (AAI)

- When disaster strikes, the airports are quickly overwhelmed with the tons of relief materials (like food, bottled water, medical supplies, cloths, tents, etc.) arriving from all over the world. This material is urgently needed to be in the field.
- In such cases, AAI should appoint senior officer at the airport for proper handling and distribution (which includes precise unloading, inventory, temporary storage, security and distribution of relief material) of relief material during disaster situation.

Deputation of team of official along with necessary infrastructure at the airports will be made by the Commissioner of Relief for necessary transport and accounting of relief material during emergency situation.

10.6 INDIAN RAILWAYS

Indian Railways is spread over a vast geographical area over 63000 route kilometres.

- Unlike in other countries where the role of Railways, in the event of a disaster, is restricted to clearing and restoring the traffic, in our country Indian Railways handles the rescue and relief operations. Railways are preferred mode of transport both for the movement of people and relief material in bulk, if accessible.
- Railways should have a provision for transportation of mass community and proper handling and distribution of relief material (through special trains, if required) in their disaster management plan.

10.7 INDIAN METEOROLOGICAL DEPARTMENT (IMD)

The role of IMD has already been discussed in previous chapters

- The meteorological department undertakes observations, communications, forecasting and weather services. IMD was also the first organization in India to have a message switching computer for supporting its global data exchange.
- In collaboration with the Indian Space Research Organization, the IMD also uses the Indian National Satellite System



(INSAT) for weather monitoring of the Indian subcontinent, being the first weather bureau of a developing country to develop and maintain its own geostationary satellite system.

• Earthquakes occurring in the State which are of magnitude 3.0 and above on Richter Scale are also reported by the IMD to the State Government immediately.

10.8 STATE FIRE SERVICES

The State Fire Services are crucial immediate responders during any disaster. They are the first responders (during the Golden Hour after a disaster) and hence play a vital role in saving lives and property immediately after a disaster.

The State Government has therefore paid apt attention in equipping and strengthening the capacities of the Fire Services in responding to various disasters.

Continuous training is also being provided to the fire staff in using and maintaining the equipment. Several officers of fire services are also sent to training organized by NIDM and other institutes of the Central Government from time to time.

10.9 MEDIA

Reducing the losses of life and property caused by natural hazards is a compelling objective now receiving worldwide attention. It is now being increasingly believed that the knowledge and technology base potentially applicable to the mitigation of natural hazards has grown so dramatically that it would be possible, through a concerted cooperative effort, to save many lives and reduce human suffering, dislocation, and economic losses simply by better information, communication and awareness.

Timely mass media communication about impending disasters can lead to appropriate individual and community action, which is the key to implementing effective prevention strategies including evacuation and survival of people. Such communications can educate, warn, inform, and empower people to take practical steps to protect themselves from natural hazards.

The role of media, both print and electronic, in informing the people and the authorities during emergencies thus, becomes critical, especially the ways in which media can play a vital role in public awareness and preparedness through educating the public about disasters; warning of hazards; gathering and transmitting information about affected areas; alerting government officials, helping relief organizations and the public towards specific needs; and even in facilitating discussions about disaster preparedness and response. During any emergency, people seek up-to-date, reliable and detailed information.

Both print and electronic media is regularly briefed at predetermined time intervals about the events as they occur and the prevailing situation on ground. The State Government has also

ensured that the interaction with media is a two way process through which not only the State Government provides the information / updates to the media but the media too, through their own sources / resources draws the attention of the Government officials to the need and requirement of the affected people. This helps the State Government to control the flow of information and prevent rumours which could create a panic situation during the disasters. The State Government also partners with the media during Information Education and Communication (IEC) campaigns carried out for creating awareness amongst general public towards the precautions to be taken for prevention and mitigation of various hazards / events. A similar set up is also active at the District Emergency Operation Centre (DEOC).

Apart from coordination with the media during disasters, the State Government regularly partners the print and electronic media to publish / broadcast safety messages during important festivals such as Chhath and Ganesh Puja.

10.10 KNOWLEDGE MANAGEMENT

10.10.1 Approach:

There is a need to create a network of knowledge institutions in the field of DM, to share their experiences and knowledge. The DDMA would forge ties with knowledge institutions such as NITs, IITs, etc., and UN Agencies and other national and international agencies dealing with emergency response will be done to utilize their experience and knowledge for DM.

In acknowledgment of the need for a knowledge sharing platform on DM, and to facilitate interaction and dialogue with related areas of expertise, the DDMA website within the district website would be created. It will connect all Government Departments, statutory agencies, research organizations/institutions and humanitarian organizations to share collectively and individually their knowledge and technical expertise. ICT would be utilized to disseminate knowledge to the stakeholder so that they can benefit from it.

10.10.2 Documentation of Best Practices:

The indigenous technical knowledge would be documented and promoted. And in the immediate aftermath of any disaster or incident, field studies will be carried out, with the help of experts wherever needed, as an institutional measure. These studies will concentrate on identifying gaps in the existing prevention and mitigation measures and also evaluate the status of preparedness and response. Similarly, the lessons of past disasters will also be compiled and documented. The recovery and reconstruction process will also be analyzed for further refining the DM processes and training needs.



Chapter XI

FINANCIAL ARRANGEMENTS

Disaster management in the present form is a new subject both to the government as well as the general public. The already existing calamity relief fund in the Central and State level as well as the other allocations are nominal to cater the need of increasing devastations. In the case of the NCT of Delhi, even calamity relief fund is not available. Fortunately, the concept is developing such a way that the Planning Commission has conceptually agreed to have an exclusive mechanism to fund and to monitor the financial arrangements of disaster management.

To ensure the long-term sustenance and permanency of the organisation funds would be generated and deployed on an ongoing basis. There are different ways to raise the fund in the State as described below.

11.1 State Budget

The Authority, submit to the State Government for approval a budget in the prescribed form for the next financial year, showing the estimated receipts and expenditure, and the sums which would be required from the State Government during that financial year. As stated in the section (48) of the DM Act 2005, the state government shall establish for the purpose of the Act the following funds:

State Disaster Response Fund: This fund will be constituted and made available to the State Executive Committee (SEC) for meeting the expenses for the emergency response, relief and rehabilitation.

District Disaster Respond Fund: This fund will be constituted and made available to the District Disaster Management Authority for meeting the expenses for emergency response, relief and rehabilitation.

State Disaster Mitigation Fund: This fund will be constituted and made available to the SEC for meeting the expenses on mitigation activities.

District Disaster Mitigation Fund: This Fund will be constituted and made available to the District Disaster Management Authority for meeting the expenses on mitigation activities.



11.2 13th Finance Commission

13th Finance Commission had observed that effective disaster response requires trained manpower to deal with the complex situations. Therefore it is necessary to continuously undertake measures to build capacity amongst those responsible for disaster response and augmenting public awareness. Accordingly, 13th Finance Commission recommends a grantin-aid of certain amount for each state for building capacity within the administrative machinery for better handling of disaster response and for preparation of district and state level disaster management plans. This grant is released in five equal annual instalments during the years 2010-15.

Under section 48 of the Disaster management Act 2005, state governments have the responsibility of establishing state and district disaster response and mitigation funds. The erstwhile State Calamity Relief Fund (CRF) is to be merged with the State Disaster Response Fund. Actions need to be taken at state level for creation of such funds. In case of NCT of Delhi there is no CRF. There is police modernization fund, which is utilized mostly to modernize the police department to fight against disaster.

According to the recommendations of the 13th Finance Commission, money from the Calamity Relief Fund (CRF) is provided for providing emergency relief to the calamity hit populace. Both the Central and State Governments contribute to this fund at a ratio of 75:25 for general category states and 90:10 for special category states.

11.3 Grant in aid

Further State may receive a grant in aid from Central Govt., World Bank and/or other departments/agencies to carry out specific projects/schemes related to disaster management/mitigation/ capacity building.

11.4 Partnerships

There are projects/schemes in which funding can be done by a public sector authority and a private party in partnership (also called on PPP mode funding). In this State Govt. along with Private organizations and with Central Govt. share their part.



11.5 Financial Arrangements for NCT of Delhi

11.5.1 Union Territory Disaster Response Fund

As per draft guidelines of MHA, the UT Disaster Response Fund for Delhi shall be 100% centrally funded and the same will be non interest bearing and non lapsable. Section 48 of Disaster Management Act, 2005 seeks to provide for the constitution of the following funds:

- State Disaster Response Fund (Available to State Executive Committee)
- State Disaster Mitigation Fund (Available to State Disaster Management Authority)
- District Disaster Response Fund (Available to District Disaster Management Authority)
- District Disaster Mitigation Fund (Available to District Disaster Management Authority) The draft accounting procedure and guidelines for Disaster Response Fund of NCT of Delhi has been prepared.

11.5.2 Allocation of Funds by Ministries and Departments

Section 49 of Disaster Management Act, 2005 seeks to enjoin upon every ministry or department of Government of India to make provision of funds in its annual budget for the purposes of carrying out the activities or programmes set out in its Disaster Management Plan. Section 39 seeks to enjoin upon each department of the State Government to allocate funds for prevention of disaster, mitigation, capacity building and preparedness. Finance/Planning Department of GNCTD shall identify the Plan Heads in consultation with the Departments of Government, from which funds can be pulled over during major disasters, if need arises. 10% of funds allocated under centrally sponsored schemes can also be used as flexi funds for disaster management purpose.

11.5.3 Emergency Procurement, Accounting & Compensation

As per Section 50 of the DM Act, 2005 the financial provisions are as under:

Where by reason of any threatening disaster situation or disaster, the National Authority or the State Authority or the District Authority is satisfied that immediate procurement of provisions or materials or the immediate application of resources are necessary for rescue or relief,-

It may authorize the concerned department or authority to make the emergency procurement and in such case, the standard procedure requiring inviting of tenders shall be deemed to be waived;

A certificate about utilization of provisions or materials by the controlling officer authorized by the National Authority, State Authority or District Authority, as the case may be, shall be deemed to be a valid document or voucher for the purpose of accounting of emergency, procurement of such provisions or materials.



Section 66 of the DM Act, 2005 provides norms for payment of compensation for emergency requisition of resources, vehicles, premises, etc. for rescue operation.

Budget Allocation

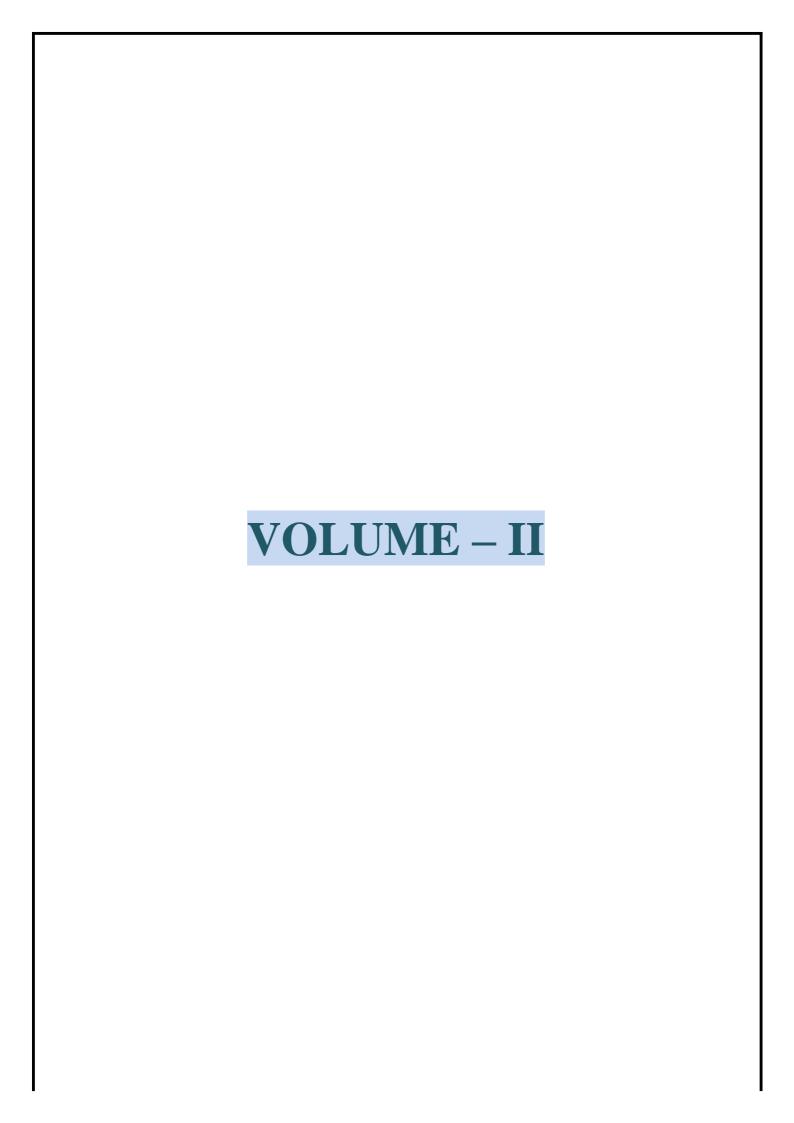
For the 12th five year plan, Rs. 200 Cr has been allocated to DDMA by the Govt. of NCT of Delhi for carrying out the activities of disaster management. Rs. 20 Cr under Revenue Head has been allocated for the financial year 2015-16 for carrying out activities of Disaster Management. This fund has been allocated to each district and HQ for carrying out pre and post disaster management activities. Under National School Safety Programme, a 100% centrally sponsored scheme, approximately 22 Lakhs have been allocated to DDMA by NDMA for carrying out school safety activities.

11.5.4 Delhi Disaster Management Authority's Annual Budget

Delhi Disaster Management Authority receives an annual budget of certain amount for the DM specifically the preparedness and prevention activities to be conducted. The state authority gets 100% financial assistance from Govt. of NCT of Delhi for carrying out various activities such as sensitization programmes, trainings, street plays, mock drills etc. Accordingly, in the year 2015-16 budget of Rs. 20 crore has been allocated by Delhi Government to DDMA under Revenue Head and Rs. 5 crore has been allocated under capital head.

The above fund is allocated under Major Head- "2245" (Relief on Account of Natural Calamities), Sub Major Head- "80" (General), Minor Head- "102" (Management on National Disaster Contingency Plan in Disaster Prone Area), Sub Head 96: 00: 42 – Disaster Management Cell (Plan) in Demand No. 10. This fund has been allocated to the districts and headquarter under the office of Divisional Commissioner, as given below:-

Sl. No.	Name of Districts	Amount Allocated in lakh (Rs.)
1	H.Q. (DDMA)	1175.00
2	East	75.00
3	West	75.00
4	South	75.00
5	North	75.00
6	South-East	75.00
7	Central	75.00
8	New Delhi	75.00
9	North East	75.00
10	Shahdara	75.00
11	South West	75.00
12	North West	75.00
	Total	2000.00





Chapter VI

STANDARD OPERATING PROCEDURES (SOPs) OF EMERGENCY SUPPORT FUNCTIONS

6.1 Introduction:

A disaster causes immense loss to human lives in a massive scale. If a formalized and timely response would not take place death toll can increase immensely. Therefore, Emergency Response Plan consists several Emergency Support Functions (ESFs) related to Communication, Search and Rescue, evacuation, law and order, medical response and Trauma Counseling, electricity, warning and transport etc. All of these emergency functions consist of emergency plans that would be activated at the time of emergency.

The ESF Plan document outlines the objective, scope, organization setup and Standard Operating Procedures (SOPs) for each ESF that is to be followed by the respective ESF agencies when the Incident commander will activate the response plan. Standard Operation Procedures (SOPs) provides a basic concept of the operations and responsibilities of Disaster Management Team, Nodal and Secondary agencies.

6.2 Standard Operating Procedures for ESFs

The Standard Operating Procedures of response for ESFs, during natural and manmade disasters are given below. It may be noted that these procedures are of guiding nature and individual Emergency Support Agencies need to develop their agency specific SOPs based upon their experience and expertise. The State Emergency Operation Centre and District Emergency Operation Centres will remain in constant touch with the officials of ESFs during disaster situations, in order to gather updates in status of disaster response for effective management of the situation. Therefore, concerned officials of ESFs shall cooperate with the EOCs by providing requisite information. All the ESFs shall coordinate with external agencies such as NDRF, Army, etc. if requisitioned, in response operations.

1. Early Warning

Hazards	P	rimary Agency		Supporting Agencies
Flood	Irr Cont	rigation & Flood rol		Revenue Department DIP NIC Delhi Police Food and supplies Municipal Corporations/Council DTC Development Department
Hailstorm, Extreme Temperature, Wind Sto Heavy Rain		Revenue artment	Indian Meteorological Department Delhi Police DIP Development Department Food and Supplies Municipal Corporations/Council DTC	

Departments	Tasks	Responsible Person	Time Frame
	Monitor situation round the Clock in coordination with CWC and constantly update Flood Control Room of Revenue Department	In charge Officer, I&FC Control Room	Ongoing
	Monitor water level for all the surface water bodies like canal, drainage, etc	Secretary, I&FC	Ongoing
' Irrigation & Flood Control	3. Provide information for rising water level and any breach of embankment or likely incident to DC Office and District Control Room	In charge Officer, I&FC Control Room	Every 24 hrs at fixed time during monsoon and immediately in case of any sudden change
	Activate District Control Room	DM as RO	Immediately on receiving notification
Revenue Department	2. Issue warning based on information received from I&FC, IMD, CWC and other departments/ agencies. Also notify through SMS to Nodal Officers of ESF Departments	DM as RO and Team Leader, Central Flood Control Room and Team Leader EOC (HQ)	Immediately
	3. Forward these warnings for dissemination to all concerned departments.	DM as RO	Within 5 minutes



	4. Ensure dissemination of early warning to concerned SDMs & Tehsildars	Team Leader, District EOC	Within 5 mins of notification received
	5. Ensure dissemination of early warning to concerned Patwaris	Tehsildar	Within 10 mins of notification received
	6. Patwari will spread the warning and report back to respective tehsildar	Patwari	Within ½ an hour of notification received
	7. Finalise safe location for relief camps and temporary shelters	Concerned SDM	Within 1 hour of notification received
	8. Ensure dissemination of early warning to concerned Gaon Sabha Chairpersons	Concerned Tehsildar	Within 10 mins of notification received
	9. Inform hazardous units/industries about the situation for necessary actions.	Concerned SDM	Within 5 mins of notification received
MCDs and	Ensure dissemination of early warning to concerned DCs of MCDs, Councilors, District Agriculture & Veterinary Officers	Team Leader, MCD Control Room and Development Commissioner	Within 15 mins of notification received
Development Department	2. Ensure dissemination of early warning to concerned villages and areas with the use of public address system available in places like temples, mosque, Gurudwara, and other possible means.	Concerned Dy. Commissioner of MCDs	Within ½ an hour of notification received
	1. Ensure dissemination of early warning received to concerned police stations.	ACP, Police Control Room	Within 5 mins of notification received
Delhi Police	2. Ensure dissemination of the information to concerned police posts.	SHO of Police Station	Within 15 mins of notification received
	3. Police Stations and Police Posts will be responsible for warning people with the help of public address system.	Concerned SHOs	Within 15 mins of notification received
NIC	Upload and update warning status District administration & DDMA website	DIO of the concerned district & Programmer, Revenue Department (HQ)	Within 15 mins of notification received
DIP	1. Disseminate information to Newspapers, TV channel including local cable channels and radio which would involve information about current status of Hazard and warning related information	Director, DIP	Within 1 Hour or depending upon the need it can be done earlier also



	2. Prepare a standard message format (in Hindi and English) for use in radio/television broadcast or outdoor notification through megaphone to facilitate and reduce time necessary to alert the public of a problem and inform them of the protective actions to be taken.	Director, DIP	Within 1 Hour or depending upon the need it can be done earlier also
Food & Supplies	Inform all godowns and market committees for necessary action	Commissioner, Food & Supplies	Within ½ an hour of notification received
DTC	Keep buses in stand-by for evacuation and relief activities	MD, DTC	Within 15 mins of notification

2. Communication

Hazards	Primary Agency	Supporting Agencies
All types of Hazards	MTNL	Revenue Department
		NIC
		Delhi Police
		Private Telecom Operators
		HAM Radio Operators

Departments	Ta	nsks	Responsible	Time Frame
		10.	Person	·
Revenue	1.	Activate State and District EOCs	Divisional	Immediately on
Department			Commissioner and	receiving
			Concerned DMs	information
	1.	Ensure continuous communication	Divisional	Ongoing
		at local, state, national level.	Commissioner and	
State & District			Concerned DMs	
EOCs	2.	Maintain communication with	Divisional	Ongoing
		various departments and other	Commissioner and	
		control rooms in the district.	Concerned DMs	
3. Ensure continuous communication		Divisional	Ongoing	
		with various facilities like Incident	Commissioner and	
Base, Incident Command I		Base, Incident Command Post,	Concerned DMs	
		Staging Area, Relief Camp, etc.		
		4. Inform HAM radio operators	Concerned DMs	Ongoing
		about the current requirement		
		and coordination mechanism		



2. Ensure that in special cases like bomb blast, terrorist attack Police Control room acts as District Control Room and follows the crisis	
management plan	
Police 3. Establish (temporary) control room wherever required DCP of the District within 1 hours of the district notification of	
4. Provide emergency communication using TETRA, VHF Radios, Wireless Sets & Walkie Talkie sets, etc. Within 1 he notification	
NIC 1. Facilitate video conferencing DIO of the District and Programmer at Revenue Deptt. HQ	.y
1. Provide communication facility as and when required (WLL, Mobile Phone, etc.) GM of Telecom Companies Companies	.y
Telecom 2. Send Quick Response Team(QRT) at the incident site with required equipments Companies Immediatel Companies	ı y
Companies and resources 3. Restore communication in the GM of MTNL Immediately	V
affected areas as early as possible and coordinate with other service providers in restoration work.	. 9
4. Provide First Information Report to District Nodal Within 1 H District EOC Officer of MTNL notification	
5. Establish help lines for public as required by incident commander GM of MTNL As required	
All Departments 1. Maintain continuous communication of departmental control room with field level and District EOC District nodal officers of each Department Department District nodal officers of each Department	

3. Evacuation:

Hazards	Primary Agency	Supporting Agencies
All types of Hazards	Delhi Police	 Delhi Fire Service Revenue Department & Civil Defence Home Guards DTC NCC DHS & CATS MCDs NGOs Traffic Police



Departments	Tasks	Responsible Person	Time Frame
Revenue Department	Ensure information of evacuation to be disseminated to all tehsildars	Concerned SDM	Within 10 minutes of notification
	Disseminate evacuation information to Patwaris and Wardens of Civil Defence	Tehsildar of affected area	Within ½ an hour of notification
	3. Ensure evacuation in coordination with Police	Tehsildar of affected area	Immediately on notification
	4. Ensure grievances and doubts of people to be addressed.	Tehsildar of affected area	Ongoing
	5. Ensure cattle are set free so that they can find safe evacuation	Patwari of respective village	Immediately
Municipal Corporations	Ensure dissemination of information regarding evacuation with help of ward members, RWAs, etc.	Concerned Dy. Commissioners of MCDs	Within ½ an hour of notification received
/ Councils	2. Ensure dissemination with the use of public address system of various places like temple, mosque, gurudwara	Concerned Dy. Commissioners of MCDs	Within ½ an hour of notification received
	1. Cordon off the area	SHO of affected area as	Immediately
	2. To maintain law and order at evacuated sites	SHO of affected area	Immediately
Police	3. Ensure safety of evacuating people specially old aged, disabled, girls and women (including widow), orphan children.	SHO of affected area	Ongoing
Tonce	4. Ensure that each and every person is being evacuated.	SHO of affected area	Ongoing
•	5. Ensure control of human trafficking with special consideration of women, girls & children	SHO of affected area	Ongoing
	6. Ensure information on safe route	DCP (Traffic)	Within 15 mins of notification
	7. Arrange measures for crowd control	SHO of affected area	Immediately
	8. Evacuation routes should be clearly spelt out in warning signals as also the location of the shelters to where people with automobiles should proceed and people without automobile should gather	DCP (Traffic)	Immediately



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	9. Ensure availability of traffic flow information to the District EOC	DCP (Traffic)	Ongoing
Civil Defence	1. Follow deployment plan of police and assist police and Revenue Officers in the process of evacuation and crowd management.	Concerned Wardens	Immediately
and Home Guards	2. Control access to and within an affected area so as to assist rescue, medical, fire, and other essential services.	Concerned Wardens	Immediately
	3. Assist Police in protection of property and provision of security of evacuated areas.	Concerned Wardens	Ongoing
DTC &	1. Provide appropriate vehicles for	MD, DTC	Immediately
Transport	evacuation of people and also that for		
Department	livestock		
DHS & CATS	1. Ensure provision of ambulances for evacuation of sick, old age people	Administrative Officer CATS and concerned	Within 15 minutes of call for
	and people with disability	CDMO	evacuation
Fire Services	Activate response teams	Concerned Divisional Fire Officers	Within 15 minutes of call for evacuation
DIP	1. Provide information of evacuation and safe sites to TV channel, radio, newspaper in consultation with Revenue Department	Director, DIP	within 30 mins of notification of evacuation
NIC	1. Provide information of evacuation, safe sites, and shelter on the website of District and DDMA (HQ)	DIO of the District and Programmer at Revenue Department (HQ)	Within 15 mins of notification
Indian Railways	1. Provide railway services for evacuation if needed	General Manager (Railway Operations)	Immediately

4. Search & Rescue

Hazards	Primary Agency	Supporting Agencies
For all the	Fire Services	Civil Defence
Hazards		Electricity
		Police
		Transport Department
		Health
		Home Guard
		• MCDs
		Red Cross Society
		Irrigation & Flood Control
		Indian Railway
		Civil Aviation



Departments	Tasks	Responsible	Time frame
		Person	
	1. Cordon off the affected area	SHO of the area	Immediately
Police	Mobilise specialised human resources and equipments required for the operation	SHO of the area	Immediately
	3. Provide security to personal belongings and corpses	SHO of the area	Ongoing
	4. Ensure safe transportation of dead bodies	SHO of the area	Ongoing
Electricity	1. Cut and restore power supplies to affected area as required.		Immediately
	2. Arrange power supply to facilitate search and rescue operation	Concerned SDO	Immediately
	1. Control fire to facilitate other operations	Concerned Divisional Fire	Immediately
Fire Services		Officer	
	2. Conduct search and rescue operation	Concerned Divisional Fire	Immediately
		Officer	
	3. Coordinate with Labour & Environment Department for handling, control and disposal	Concerned Divisional Fire	Immediately
	of hazardous material	Officer	
MCDs	1. Clear routes/ debris/ building structures to carry out the necessary search and rescue	Concerned Dy. Commissioner	Immediately
	operation.	(MCD)	
Home Guard	1. Provide volunteers required for the operation	Commandant	Immediately
Civil Defence	1. Provide volunteers and equipments required for the operation	Concerned Warden	Immediately
Irrigation & Flood Control	1. Deploy trained human resources, divers and swimmers, if required.	Secretary (I & FC)	Immediately
	2. Provide equipments like boats, Etc. for search and rescue operation	Secretary (I & FC)	Immediately
DTC	1. Provide vehicles for execution of search and rescue operation.	MD, DTC	Immediately
Transport Department	Procure and provide vehicles wherever required	Secy. Transport	As required
Indian	Provide human resources and	Director (Safety)	As required
Railway	equipments for search and rescue operation, in case of railway accident		
Civil Aviation	Provide aircraft and air support for execution of search and rescue operation, if required	Jt. Secretary (Ministry of Civil Aviation)	As required



5. Fire Fighting:

Hazard	Primary Agency		Supporting Agencies
Fire	Fire Services	•	Municipal Corporations/ Council
		Home Guard	
		• DJB	
		Electricity	
		•	Police

Departments	Ta	isks	Responsible	Time
			Person	Frame
	1.	After getting the information, quickly rush to the scene of emergency/disaster.	Concerned SO	Immediately
	2.	Check for supply of power and then cut power supply of incident area as and when required.	Concerned SO	As required
Fire Services	3.	Assess type of fire and start fire fighting operation.	Concerned SO	Immediately
	4.	Deploy personnel, equipment and supplies during fire fighting operations as per requirement.	Concerned Divisional Fire Officer	As required
	5.	Procure personnel, equipment and supplies from private agencies as required.	Concerned Divisional Fire Officer	As required
	6.	In case of hazardous material mishap, equip the fire fighting teams with Personal Protective Equipments	Concerned SO	As required
	7.	Carry out necessary evacuation in and around cident area.	Concerned SO	Immediately
	8.	Safe guard the adjacent property/ population from fire by confining the fire spread.	Concerned SO	Immediately
	9.	Search and rescue injured/ trapped/ buried persons and casualties.	Concerned SO	Immediately
Police	1.	Cordon-off affected area.	SHO of the area	Immediately
	2.	Clear traffic for emergency service vehicles.	Traffic Inspector	Immediately
Home Guard	1.	Assist in carrying out necessary evacuation, search and rescue operations in and around incident area.	Commandant	As required
Electricity		Cut and restore power supply of incident area and when required.	Concerned SDO	As required
DJB	1.	Provide water for fire tenders	Concerned Dy. Director (SDM)	As required
MCDs/NDMC	1.	Provide fire tenders and manpower for assistance	Concerned SO	As required



6. Law & Order:

Hazards	Primary Agency		Supporting Agencies		
All types of Hazards	Delhi Police	•	Home Guard Civil Defence		

Departments	Tasks	Responsible Person	Time Frame
	1. Assess initial situation of the affected area	ACP of the area	Immediately
,	2. Issue Official statements concerning the state	DCP of the	Immediately
	of Law and Order	District	
Police	3. Determine status of staff and facilities and	DCP of the	Immediately
1 once	deploy additional staff and resources, if	District	
	needed according to deployment plan.		
	4. Cordon-off the affected area	SHO of the area	Immediately
	5. Provide safety and security at affected sites,	DCP of the	Immediately
	evacuated sites, demolition sites, shelters and	District	
	camps, medical post, distribution sites,		
	staging area, godowns/warehouses, etc.	DCD -f th-	0
	6. Keep a check on hoarding and black marketing of relief material.	DCP of the District	On going
	7. Provide security to personal belongings	DCP of the	On going
	recovered from evacuated and demolished sites.	District	On going
	8. Carry out preventive arrests where required.	DCP of the District	As required
	9. Make security arrangements for orphans and destitute women to save them from human trafficking.	SHO of the area	As required
	10. Keep a check on theft and looting during or after disaster.	SHO of the area	Ongoing
	11. Protect dead bodies to avoid false claims	DCP of the	As required
		District	
	12. Provide additional security as required to	DCP of the	As required
	VIPs and VVIPs visiting the affected sites.	District	
	13. Secure and prevent public access to damaged or impassable routes.	DCP, Traffic	Immediately
	14. Ensure rumour control in coordination with DIP	DCP (HQ)	On going
	15. Set up missing person squad post at incident site	DCP of the District	Within 1 hrs of notification
Home Guards	Assist the police department in maintaining	Commandant	As required
Home Guards	law and order situation	Commandant	As required
Civil Defence	1. Assist the police department in maintaining	Concerned	As required
	law and order situation	Warden	



7. Medical Response & Counseling:

All Hazards Output Output Hazards Output Output Hazards Output Output	Hazards	Primary Agency	Supporting Agencies	Others
Welfare		DHS	 Major Hospitals MCD Health Department Indian Red Cross Society Civil Defence NCC St. John Ambulance Department of Social 	Private Health InstitutionsNYKS

Departments	Tasks	Responsible Person	Time Frame
	1. Conduct triage and provide health care as per need.	District	Immediately
	2. Screen and isolate the patients from that area if needed.	CDMO of the District	Immediately
	3. Assess the medical needs of the affected area.	CDMO of the District	Within 1 hour
	4. Increase patient treatment capacities and surgical capacities as per the need.	Director, DHS	Ongoing
DHS, CATS & Department of Social Welfare	5. Ensure adequate stock of regulated drugs biologics (including blood and vaccines) medical devices (including radiation emitting and screening devices), and other medical products.		Within 1 hour
	6. Ensure quality check on medical supplies received during relief.	Drug Inspector	Within ½ an hour
	7. Ensure availability of blood and blood products through Blood Bank Officer.	CDMO of the District	Within 15 mins
	8. Provide behavioural and mental health ca wherever required and set up a separate unit for it.	Welfare Officer of the District	Within ½ an hour
	9. Facilitate adequate ambulance service for the affected area.	Administrative Officer, CATS	Within ½ an hour
	10. Ensure proper medical waste disposal.	CDMO of the District	Ongoing



	11. Establish electronic display board for patient information and Public Information Booth in the hospitals	CDMO of the District & concerned Medical Superintendent	Immediately
	12. Coordinate with IMA to provide with the additional medical necessities and doctors and nurses from private hospitals in times of disaster when the local resources are inadequate/ limited.	CDMO of the District	Ongoing
	14. Establish medical posts at shelter and camp site.	CDMO of the District	Immediately
	15. Conduct health surveillance within the affected area	Public Health Officer of MCD/NDMC, CDMO of the District	Ongoing
	16. Issue official statements concerning the post-disaster health situation.	Director, DHS	Every Day
	17. Ensure that adequate number of medical professionals reach at the site	CDMO of the District	Immediately
	18. Coordinate the logistic arrangement of mobile health vans, drugs and equipment stocks.	CDMO of the District	Within 1 Hour
	19. Ensure sanitation standards in the affected area	Public Health Officer of MCD/NDMC	Within a day
District Red Cross Society	1. Assist the Health department in providing the volunteers.	Secretary, Red Cross	Immediately
	2. Provide blood to Health Department.	Secretary, Red Cross	As required
Civil Defence	1. Assist the Health department in first aid by providing the volunteers.	Warden	Immediately
St. Johns Ambulance	Provide ambulance and first aid assistance	Dy. Commissioner, St. Johns Ambulance	Immediately

8. Food & Supplies:

Hazards	Primary Agency	Supporting Agencies	Others
For all the Hazards	Food and Supplies Department	 Revenue Department MCDs/NDMC Transport Department Market Committees Delhi Police 	 NGOs Civil Defence NDRF Defence forces Donor agencies



Departments		Tasks	Responsible Person	Time Frame
	1.	Based on 'Need Assessment' and availability of stock, procure essential food items with special care for baby food, pregnant ladies, old persons, etc	Concerned Asst. Commissioner of the District	Within 24 hours after Need Assessment
Food and	2.	Arrange storage facilities within the staging area for sufficient food storage. If required arrange warehouses in coordination with FCI and Market Committees, etc.	Concerned Asst. Commissioner of the District	Within 2 Hours of notification
Supplies	3.	Ensure safety of stored food grains in godowns/ warehouses, etc against inundation and water logging, fire, pest attack and other possible hazards	Concerned Asst. Commissioner of the District	Ongoing
	4.	Ensure proper arrangement for set-up of community kitchens & ensure its maintenance.	Concerned Asst. Commissioner of the District	Within 6 Hours of notification
	nee	Prepare food packets/ kits as per the ed assessment. Control quality & antity of food	Concerned Asst. Commissioner of the District	Within 6 Hours of notification
	6.	Distribute food items with the help of depot holders, fair price shops, NGOs and voluntary agencies.	Concerned Asst. Commissioner of the District	Within 6 Hours of notification
	7.	Provide cooking kits (utensils, cooking oil, stove, fuel, match box/lighter, spices, etc) to affected families.	Food Inspectors in charge of the area	Within a day
	8.	Monitor and coordinate flow of food items to the affected area.	Concerned Asst. Commissioner of the District	Ongoing
	9.	Keep a check on hoarding and black marketing of relief food material in association with Police.	Concerned Asst. Commissioner of the District	Ongoing
Delhi Police	1.	Ensure safety and security of food and other commodities in godowns, warehouses and community kitchen and also during transportation and distribution.	DCP of the District	On going
Revenue Department	1.	Ensure equitable distribution of food items through food and supplies department in all affected areas.	Tehsildar of affected area	Ongoing
	2.	Arrange food packets and community kitchen, if required	SDM of the area	Ongoing
MCDs/NDMC	1.	Ensure equitable distribution of food items in all affected areas.	Councilors of the area	Ongoing



Transport Department	1.	Provide Transportation for food material to godowns and affected areas	Secretary (Transport)	Within a hour
Civil Defence	1. kit	Assist in preparation of food packets/ s and for bulk distribution of food items	Wardens	Immediately

9. Shelter & Sanitation:

Hazards	Primary Agency	Supporting Agencies	Others
For all	Revenue Department	Education Department	NGOs
the		DUSIB	Civil Society
Hazards		PWD	Organisations
		District Red Cross Society	Civil Defence
		Municipal	NCC
		Corporations/ Council	NSS
		DHS	NYKS
		DJB	
		Electricity	
		Delhi Police	
		Transport Department	

Departments		Tasks	Responsible Person	Time Frame
	1.	Setup relief camps and temporary shelters ensuring minimum standards of relief.	Tehsildar of affected area	Within 6 hrs for relief camps and 2 days for temporary shelter
	2.	Ensure overall arrangement and management of camp	Camp In charge	Ongoing
Revenue	3.	Register and allocate passes and maintain entry and exit records	Camp In charge	Within 6 hrs
Department	4.	Procure commodities such as clothing, bedding and other requirements	SDM of the area	As required
	5.	Prepare/ update list of inmates kin	Camp In charge	Within a day
	6.	Also prepare and update list of women, children, injured, sick, orphans and widows.	Camp In charge	Within a day
	7.	Ensure availability of volunteer staff by maintaining their duty charts	Camp In charge	Ongoing
		Arrange for appropriate storage facility	Camp In charge	Within a day
	ne	Manage kitchens, cooks and other eded items	Camp In charge	Ongoing
		. Ensure equitable distribution of food and ner material in the camp	Camp In charge	Ongoing



	11. Depopulate people from relief camps/	SDM of the area	Ongoing
	temporary shelters ensuring their houses are in		ongoing
	liveable conditions		
	12. Conduct detailed assessment of needs	Camp In charge	Within a day
	and address those needs as per the eligibility	7	
	13. Ensure segregation of waste	Camp In charge	Ongoing
	biodegradable and non-biodegradable and	i &	8 8
	medical waste		
	14. Ensure proper lighting in the area such	Camp In charge	Within a day
	as toilets, kitchens, passages etc for safety and	Cump in charge	vv mini a day
	security		
	15. Arrange the necessary support (human	Camp In charge	Ongoing
	resource and material) as and when required	Cump in charge	Ongoing
	16. Ensure that bedding and clothing are	Camp In charge	Ongoing
	aired and washed regularly	B-	0 8 8
	17. Ensure universal design by putting	Camp In charge	Within 2 days
	ramps, sign boards, signage etc for people with		
	disabilities		
	18. Monitor and assess the beneficiary	Camp In charge	Ongoing
	satisfaction for distributed relief items and		
	other facilities		
Food and	1. Provide fuels for cooking, generators and	Asst.	As required
Supplies	other required activities.	Commissioner of	
Department of	1 Amongo appropriato transportation	the District	As required
Transport	1. Arrange appropriate transportation	Secretary (Transport)	As required
Red Cross	facilities for various purposes 1. Provide blankets, tarpaulin sheets for	(Transport) Secy. Red Cross	As required
Red Cross	tents and floor, shrouds for wrapping dead	Beey. Red Closs	715 required
	2. Provide mosquito nets and repellents,	Secy. Red Cross	As required
	match box, candles and utensils (glasses,	,	1
	plates etc.)		
DJB	Repair and maintain pipelines and ensure	Concerned EE	Immediately
	non-contamination		
	2. Provide safe drinking water and tanks	Concerned Dy.	Immediately
	and arrange for drums, jerry cans for storage	Director (SDM)	
MODATE	of water	0 15	******
MCD/NDMC	1. Provide dumpster, garbage bins at the	Concerned Dy.	Within a day
	camp site and ensure hygiene and sanitation by appropriate solid waste management system	Commissioner of the District	
			W''d' CH
	2. Provide trench latrines and toilets in	Concerned Dy.	Within 6 Hours
	as per the minimum standards for relief	Commissioner	0
	3. Ensure segregation of waste	Concerned Dy. Commissioner	Ongoing
	biodegradable and non-biodegradable and medical waste	Commissioner	
		0 15	0 :
	4. Ensure hygiene and sanitation by	Concerned Dy.	Ongoing
	appropriate liquid waste management system	Commissioner	
	5. Carry out timely spraying/ fogging	Concerned Dy.	As required
	against malaria and other epidemics	Commissioner	
	6. Maintain functioning of lighting	Concerned Dy.	Ongoing
	facilities in camp area	Commissioner	



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	7. Carry out dewatering in case of water	Concerned Dy.	As required
	logging in the camp and shelter area	Commissioner	
DUSIB	1. Provide Mobile latrines and toilets in	Concerned SE	As required
	as per the minimum standards for relief		
	2. Establish temporary shelter structures as	Concerned SE	As required
	required by Incident Commander		
DHS, Social	Set up mobile clinics, medical posts and	CDMO of the	Immediately
Welfare	arrange timely medical camps. Make use of	District	immediately
Department	mobile medical units	21502100	
		CDMO of the	A = ======= d
	2. Carry out immunization for probable	CDMO of the	As required
	diseases	District	A : 1
	3. Supply special supplements like vitamin,	CDMO of the	As required
	glucose etc as per the requirement of the camp	District	
	4. Provide psychological first aid and	CDMO & District	Within 2 Hours
	psychosocial care in the camp area	Social Welfare	
		Officer of the	
		District	
	5. Spread awareness for hygiene practices,	Director, DHS	Ongoing
	do's and don'ts	21100001, 2112	ongoing
		CDMO of the	Within 12
	6. Provide water purifying tablets and		
DIVID	instructions to use them.	District	Hours
PWD	1. Construct temporary structures like	Concerned SE	As required
	roads, parking spaces, spaces for dining,	G 1.0F	. 1
	2. Ensure universal design to address the	Concerned SE	As required
	needs of persons with disabilities.		· 11 1
Electricity	1. Ensure electric supply to the camp and	Concerned SDO	Immediately
Companies	shelter area		
	2. Ensure emergency backup for electric	Concerned SDO	Immediately
	supply through generators, inverters etc.		
Delhi Police	1. Ensure law and order in the camp and	Concerned SHO	Immediately
	also make necessary measures for safety and		
	protection of women and children		
	2. Facilitate family reunification services	Concerned SHO	Immediately
	la di	23	
Civil Defence	through public information booth 1. Provide volunteers/ human resources	Warden	Immediately
Civil Defence	· ·	vv aruen	miniculately
Education	required for various activities of camp 1. Provide education to children in the	DEO	As required
		DEO	As required
Department Transport	camps 1. Provide vehicles for various activities	Cocretery	Agnor
Department	and procure private vehicles, if needed.	Secretary, Transport	As per requirement
Depai tilielit	and procure private vehicles, if fleeded.	Transport	requirement

10. Equipment Support, Debris & Road Clearance:

Hazards	Primary Agency	Supporting Agencies	
All hazards	Concerned Municipal	PWD	
	Body	DJB	
		DMRC	
		DDA	
		Delhi Police	
		I & FC Department	

Departments	Tasks	Responsible Person	Time Frame
PWD	Determine the levels of damage of public infrastructure in the affected area (for rapid damage assessment)	Concerned SE	Within 2 hours
	2. Construct temporary shelters, toilets, medical post, helipad and other infrastructures as needed and new temporary roads if required.	Concerned SE	Immediately and as required
	Repair or restore damaged segments of public infrastructure	Concerned SE	Immediately and as required
Municipal Corporations	Ensure clearance of debris and roads	Concerned SE	Immediately
/ Council	2. Demolish or stabilize damaged structures (public and private) to facilitate evacuation and search and rescue in presence of Police, Fire, Revenue and Disaster Management, and Health department.	Concerned SE	Immediately
Delhi Police	Cordon off and maintain law and order at demolition site.	SHO of the area	Immediately
DIR	Provide security to belongings recovered from demolished site.	SHO of the area	During and after demolition
DJB	1. Repair damaged water pipeline, sewerage system, drainage system, water works and water tanks etc.	Concerned Dy. Director (SDM)	Ongoing
I & FC	Repair Roads, canals, levees and other related structures.	Concerned SE	Ongoing

11. Electricity:

Hazards	Primary Agency	Supporting Agencies
All hazards	BSES/TPDDL	PWD
		MCD
		Delhi Transco Ltd.
		Delhi Police



Departments	Tasks	Responsible Person	Time Frame
Electricity Companies	1. Collect and analyse information on power system damage and outrages (field assessments) in coordination with JE (Electrical Wing), PWD [Damage could be in form of damage to thermal power plants, substations, transformers and service drops]	Concerned SDO	Immediately
	2. Restore power supply of critical infrastructure (District control room, hospitals, water supply stations etc.) on priority basis in coordination with JE (Electrical Wing), PWD	Concerned SDO	Immediately
	3. Regulate power supply prioritising facilities over other sources of consumption; and resume the supply when operations have come back to the stage of normalcy	SDO	Ongoing
	4. Provide electrical connections and system at short notice in affected areas for purpose of pumping flood water, search & rescue and illumination of the Incident Base, ICP, temporary health posts and relief shelters	SDO	Immediately
Delhi Police	Cordon off the damaged electric installations for safety of public	SHO of the area	Immediately

12. Transport:

Primary Agency	Supporting Agencies	Others
Department of	DTC	Pvt. Bus
Transport	DMRC	Association
	Indian Railways	Taxi Association
	Delhi Police	Food & Supplies
	MCDs/NDMC	
	PWD	
	Department of	Department of DTC Transport DMRC Indian Railways Delhi Police MCDs/NDMC

Departments		Tasks	Responsible	Time
			Person	Frame
Department of	1.	Acquire and provide vehicles required	Secy. Transport	Within 1
Transport		for all transportation activities from		hour
		government as well as private agencies		
DTC, DMRC	1.	Provide multi-modal transportation for	Dy. CGM (DTC) of	Immediately
		acuation, personnel, equipment, and	the region/Manager	
		aterials and supplies as per instructions of	(Operations),	
	Inc	cident Commander	DMRC	
	2.	Track vehicle engaged in emergency	Dy. CGM (DTC) of	Ongoing
	sei	vices.	the region	



120 200			
	Ensure maintenance and proper functioning of buses, other heavy vehicles and equipments in coordination with Works Manager	Dy. CGM (DTC) of the region	Ongoing
Delhi Police	Ensure safety while transportation of relief goods and whenever required	DCP of the district	Ongoing
	Ensure clearing and restoration of the traffic	DCP (Traffic)	Immediately
Indian Railways	Provide transportation and storage facilities	General Manager (Railway Operations)	As per requirement
PWD/MCD/ NDMC	1. Reconstruct and repair transport network as per priority of rescue and relief in consultation with DC (Revenue)	Concerned SE	As per requirement
Food & Supplies	1. Provide fuel and information on filling stations.	Concerned Asst. Commissioner	Within 1 Hour

13. Water Supply:

Hazards	Primary Agency	Supporting Agencies
For all Hazards	DJB	I & FC Department
		MCDs/NDMC
		DUSIB

Departments	Tasks	Responsible	Time
		Person	Frame
DJB	Assess the damage brought by disaster to water supply system and installations in the affected area	Dy. Director (SDM)	Immediately
	2. Provide water tanks and drinking water at the incident sites for search, rescue & relief	Dy. Director (SDM)	Immediately
	Repair the damaged water supply system in association with Local Bodies and PWD	Dy. Director (SDM)	Immediately
	4. Arrange alternate storage of potable water at temporary shelters	Dy. Director (SDM)	Immediately
I & FC	1. Ensure availability of water for crops by	Concerned SE	As per
Department	repairing damaged canals		requirement
DUSIB	1. Provide temporary water facility for general usage at the relief camps	Concerned SE	Immediately



14. Dead Body Management:

Hazards	Primary Agency	Supporting Agencies	Others
For all Hazards	Delhi Police	Revenue Department DHS District Red Cross Society Civil Defence Municipal Corporations/ Council DIP	NGOs Ward Representatives Resident Welfare Associations (RWA)

Departments		Tasks	Responsible Person	Time Frame
Delhi Police		Identify dead body with the help of Councillors and members of Resident Welfare Associations	SHO of the area	Ongoing
	2.	Maintain record of dead bodies and missing persons through photograph, description, ID, etc	SHO of the area	Within 3 days
	3.	Ensure collection of finger prints, dental examination and other identification marks for forensic identification.	DCP of the district	Within 24 hrs.
	4.	Protect dead bodies	SHO of the area	Ongoing
	5.	Protect belongings of dead bodies	SHO of the area	Ongoing
	6.	Maintain record of temporary disposal of unidentified dead bodies	SHO of the area	Ongoing
DHS	1.	Ensure post mortem of dead bodies	CDMO of the district	Ongoing
District Red Cross Society		Ensure that DNA sample of unidentified dead bodies are taken	CDMO of the district	Ongoing
		Arrange Temporary Mortuary	CDMO of the district	As required
		Arrange shroud, coffin and polythene bags	Secy. Red Cross	As required
Revenue Department	1.	Identify land for temporary burial in coordination with Local Bodies	Tehsildar of affected area	As required
	2.	Ensure temporary disposal of unidentified dead bodies in coordination with Local Bodies, Police and representatives of local media	Tehsildar of affected area	As required
	3.	Maintain record of dead bodies	Tehsildar of affected area	Ongoing

DIP	1. Publish information on dead bodies	Director, DIP	Daily
	in various media platforms for their		
	identification		

6.3 Summary of Important Roles of Primary and Secondary Agencies

Agency	Municipal Bodies/DDA			
Role	Search and Rescue operations; Providing Temporary Shelters; Public Information, Relief Distribution; Construction materials; Restoration of infrastructure			
Agency	Delhi Police			
Role	The saving of life in conjunction with other emergency services; Co-ordination of the emergency services and other organizations; Traffic and crowd control; The investigation of the incident in conjunction with other investigative bodies where applicable; The collation and dissemination of causality information; Identification of victims; The restoration of normality at the earliest opportunity; Maintenance of Law & Order.			
Agency	Delhi Fire Service			
Role	Search and Rescue operations; Evacuation; Public Information			
Agency	PWD			
Role	Construction materials; Restoration of infrastructure; Providing temporary shelters			
Agency	Civil Defence/Home Guards			
Role	Cordoning of area; Search and Rescue operations; Evacuation; First Ai operations			
Agency	Health Department			
Role	Medical aid (Treatment of injuries and surgical operations); Health and sanitation; Disposal of Dead (as per customs)			
Agency	Irrigation & Flood Control			
Role	Construction materials; Restoration of infrastructure; Provisioning of Rescue equipments and rescuers			
Agency	MTNL			
Role	Communication; Reception/ Information Centres; Restoration of infrastructure			
Agency	Delhi Jal Board			
Role	Drinking Water arrangements; Restoration of infrastructure			
Agency	Delhi Transport Corporation			
Role	Provision of vehicles; Transportation of materials, manpower etc.			
Agency	BSES/TPDDL			
Role	Restoration of infrastructure; Provision of power			
Agency	CATS			
Role	Emergency ambulance services round the clock through trained paramedics; Maintaining round the clock control room, wireless connectivity with CATS control room numbers			

Agency	St. Johns		
Role	Providing first aid training; Ambulance services; Relief Distribution		
Agency	Red Cross		
Role	Providing Temporary Shelters; Medical aid (Treatment of injuries and surgical operations); Health and sanitation; Relief Distribution		
Agency	NGOs, RWAs, NYKS		
Role	First Response; Basic Relief and Rescue; Help maintain peaceful coordination between administration and General Public		
Agency	Army/Air Force and NCC		
Role	Search and Rescue operations; Evacuation; Traffic Management and Security of properties; Temporary Shelters; Disposal of Dead; Relief Distribution; Relief Supplies		
Agency	Revenue Department		
Role	Alert & Warning; Incident Management; Relief		
Agency	Food & Supplies		
Role	Food and ration supply		

Table: Summary of Roles of Different Agencies

6.4 Donation and Relief Material Management

Purpose

Donation management is necessary to control the flow of goods and services into disaster areas. This active function will help in coordinating with the volunteer organizations, international donor agencies and other stakeholders to expedite the delivery of volunteer goods, services and funds.

Transparency:

It is essential to make the process of identification of receipts and distribution of relief as transparent and public as possible. The criteria adopted for relief distribution should be clearly told to the recipients of relief supply, otherwise confusion may develop.

Primary Agency: Revenue Department/DDMA

Secondary Agencies: International, National and Local NGOs, Community representatives

Operating Procedures for Donation Management

- 1. EOC will activate the donation management Cell and toll free numbers. These toll free numbers will help people/donors to know what donation they would like to make.
- 2. Team leader activates the secondary agencies and quick response teams and will direct them to reach at donation management cell for finalizing the plan of action
- 3. Identify the minimum standards on guidelines on specific types of items, emergency tool kits, developing a donation needs lists for volunteer agencies, equipment damage assessment, onsite operations check lists, planning check lists, deactivation checklists,

- list of public and private agencies etc for donation management purpose which will help in reducing collecting unnecessary goods and services.
- 4. Team leader will identify collection and sorting points and depute necessary number of field teams for collecting funds, services and goods
- 5. Quick Response Teams in direction to their field team leader collect information about the agencies willing to assist. Response team will also prepare inventory indicating the type of services and assistance they may provide and send regular reports to the disaster management cell.
- 6. Separate points would be identified to collect the goods from local communities and other donors. Field team also sorts the goods details and will send regular reports to the donation management cell.
- 7. Team leader- Headquarter will compile the inventory and revise the plan of action. He may conduct meetings with the volunteer organizations to discuss their roles in providing goods and services to the affected site.

6.5 Media Watch:

The role of media is very important in case of Disaster management. These people should not be allowed to misquote the situation by exaggerating the figure of loss of life and property. It should be the duty of district administration to issue a press briefing on daily bases mentioning facts and figures. In the absence of such briefing the media persons will give the figure on its own or from unauthorized means which may create the confusion throughout the outside world.

Emergency Support Functionaries and their roles & responsibilities at the time of disaster in Delhi.

ESF	Function	Coordinator	Officers & Contact No	Roles & Responsibility
ESF1	Communication	Executive Director, MTNL	MTNL NIC, Delhi Police, Revenue	 ➢ Operation & Restoration of Communications Networks. ➢ Maintenance & Internet Services. ➢ Local Wireless Communications.
ESF2	Evacuation	Secy. Home GNCT Delhi	Army, Delhi Police, Civil Defence, Delhi fire Service, NCC	 Saving of life of affected persons. Co-ordination with emergency services like Fire, CATS other organizations. Traffic and crowd control. Collation and dissemination of causality information; Identification of victims. Restoration of normalcy at the earliest opportunity; Maintenance of Law & Order. Cordoning of area. Search and Rescue Operations. Evacuation. First Aid Operations.
ESF3	Search and Rescue	Secy. Home GNCT Delhi	Delhi fire Services, Police, Civil Defence, Army, NDRF	 Rush to the site of disaster. Assess type of fire and deploy personnel; equipment and fire fighting operation. Search and Rescue injured/traped/buried persons and case. Mobilize Resources for immediate search & Rescue Ophelp of other emergency services. Co-ordination with other organizations. Traffic and crowd control. Cordoning of area. Search and Rescue operations. First Aid operations. Investigation of the incident. Collation and dissemination of causality information. Identification of victims. Restoration of normality at the earliest opportunity. Maintenance of Law & Order.
ESF4	Medical Health/Trauma	Secy. Health GNCT Delhi	Major Hospitals, CATS, St. John Ambulance, Civil Defence, MCD	 Medical aid (Treatment of injuries and surgical operations) Develop surge capacity of Hospitals. Health and sanitation. Triage and Disposal of Dead (as per customs). Emergency ambulance services round the clock the paramedics. Operation of round the clock control room. Providing first aid, Ambulance services. Relief Distribution.

ESF5	Equipment Support	Secy. Urban Development GNCT Delhi	MCDs, PWD, NDMC, Cantonment. Board, DDA, DMRC, DJB, NDRF	 Restoration of infrastructure. Providing temporary Shelters. Removal of Debris. Deployment of heavy machinery/Equipment for dealing collapses & Infrastructure damage.
ESF6	Help lines, Warning Dissemination & coordination Media coverage	Pr. Secretary (Revenue/Disaster Management) GNCT Delhi	All Emergency Support Functionaries (ESFs), Media Agencies	 Alert & Warning Activate Districts' Control Rooms. Issue warning based on information received from departments. Notify through SMS to Nodal officers of ESF departments. Incident Management. Relief, Rescue and shelter. Setting up of relief camps and temporary shelters en standards of relief. Dissemination of Information & Media.
ESF7	Drinking Water	CEO, Jal Board GNCT Delhi	DJB	 Drinking Water arrangements. Restoration of water infrastructure.
ESF8	Electricity	Secy. Power GNCT Delhi	Transco, Power Companies (TPDDL/BSES)	 Restoration of Electrical infrastructure. Distribution of Power.
ESF9	Relief (Food and Shelter)	Pr. Secretary (Revenue/Disaster Management) GNCT Delhi	Food & Supplies Department, DSCSC, Civil Defence, DUSIB, NGOs	 Food and ration supply. Safety of stored food grains in godowns. Keep a check on hoarding & black marketing.
ESF10	Debris and Road Clearance	Director of Local Bodies GNCT Delhi	PWD, MCDs, NDMC, Cantonment Board, DDA, MES, CPWD, Traffic Police	 Providing Temporary Shelters. Public Information, Relief Distribution. Construction materials. Restoration of infrastructure.
ESF11	Law and Order	Commissioner, Delhi Police / Secy. Home GNCT Delhi	Traffic Police, Civil Defence, Home Guards	 Provide safety & security at the affected site. Co-ordination of the emergency services and other organi Traffic and crowd control. The investigation of the incident in conjunction with ot bodies where applicable. Collation and dissemination of causality information. Setup missing persons squad post. Identification of victims. The restoration of normality at the earliest opportunity.

Maintenance of Law & Order.

ESF12	Transport	Secy. Transport GNCT Delhi	DTC, DMRC, Traffic Police	 Provision of vehicles. Transportation of materials. Manpower etc.

Chapter I

EARTHQUAKE ACTION PLAN

1.1 Introduction:

The Earthquake Vulnerability Atlas of India reveals that Union Territory of Delhi lies in seismic zone IV which has fairly high risk where the general occurrence of earthquake is of5-6 magnitude, a few of magnitude 6-7 and occasionally of 7-8 magnitude. In the past, five earthquakes of Richter Magnitude 5.5 to 6.7 are known to have occurred in the UT of Delhi or close to it since 1720 AD. Two major lineaments namely Delhi-Haridwar ridge and Delhi-Moradabad faults pass through the territory, both having potential of generating earthquakes of magnitude upto MSK VIII will be quite probable in the Delhi territory. Normal depth of 30 km may be assumed for these earthquakes. Taking lessons from past experiences and with a view to minimize the adverse impacts of earthquakes in the future, the Government of Delhi has prepared the State Disaster Management Plan with this section of the plan incorporating the relevant action implementation.

The Action Plan will consist of the following five activities:

- a) Declaration of earthquake disaster
- b) Institutional mechanism of the State Government to respond to earthquake disaster
- c) Trigger mechanism on receiving the report of occurrence of an earthquake
- d) Response mechanism of the concerned line departments along with the roles and responsibilities of each one of them and
- e) Immediate relief to be provided to the affected population

<u>Declaration:</u> The Delhi Government has to declare any area where earthquake has occurred as disaster affected area on the recommendations of the Divisional Commissioner or the District Magistrate. The purpose of declaration of disaster is to organize effective response and mitigating the earthquake effects. Such a declaration provides wide powers and responsibilities to the Divisional Commissioner and the District Magistrates in order to handle the incident effectively.

1.2 Institutional Setup Mechanism:

The Delhi Government has undertaken long term capacity building initiatives to deal with earthquake disaster through the set up in correspondence from Delhi Disaster Management Authority. The Revenue department is primarily responsible for emergency response and relief in the State, while the Delhi Disaster Management Authority (DDMA) is designated as the nodal agency for formulation of policies, long term planning, coordination and monitoring body for mitigation, reduction and preparedness for disasters in the State. The institutional mechanism established in Delhi for management of disasters is given in Chapter

1.3 Trigger Mechanism:

There is almost no warning available before the earthquake. Therefore planning should cater for a quick response at all levels to reduce the effects of the earthquake to the minimum.

- The occurrence of an earthquake is to be reported by the Indian Meteorological Department (IMD) to the Commissioner of Relief by the fastest means. The Delhi Disaster Management Authority (DDMA) and State Executive Group (SEC) under the chairmanship of Lt. Governor and Chief Secretary respectively, should be activated immediately on the occurrence of any major earthquake.
- Besides these, the SEOC also receives reports on the earthquake from district and sub division levels. On receipt of the information, the SEOC verifies the authenticity of the reports and will inform the real situation to concerned authorities.
- The State government may, by notification published in the official gazette and in any one or more news papers having widest circulation in the area, declare such area to be disaster affected area.

1.4 Task & Responsibility Matrix for Emergency Response Phase (First 72 Hours of the Incident)

Time Frame	SI.No.	Task/Role	Responsibility
0+15			
Minutes			
1	Commis and nod (233921 Office (2	the occurrence of earthquake to Divisional sioner, State level help lines (100,101,102, 1266) al officers of all line departments, Chief Secretary 00) and Chief Minister's Office (23392020), LG 23975022), and NEOC-I & II at MHA and 23092923, 9868891801)	Team Leader, State EOC

0+30			
Minutes			
2	Establish communication link by activating alternate	Team Leaders, State &	
	communication equipment i.e. satellite phone/HAM radio,	District EOCs	
	etc. in EOCs.		
3	Deploy Mobile Emergency communication Units to affected	District EOCs	
	areas for establishing communication link.		
4	Verify the authenticity of the incident from agencies like IMD,	Team Leader, State EOC	
	and also from District Police and Fire Brigade control rooms.		
5	In case of L-2 level event, overall management of SEOC shall	Divisional	
	be taken over by Divisional Commissioner.	Commissioner	
6	Instruct nodal officers of line departments to depute duty	Divisional	
	officers to report in SEOC.	Commissioner	
7	Hold first meeting with duty officers.	Divisional	
		Commissioner	
8	Collect First Information Reports from District EOCs and help	Sp. CEO (DM)	
	lines of line departments.		
9	Call for First Information Reports from the districts and ESF	Sp. CEO (DM)	
	help lines. Dispatch ESF teams (Police, Fire, Ambulance, etc.)		
	to the affected areas.		
10	Assess the situation on the basis of First Information Reports	Divisional	
	and request for the services of NDRF and Armed forces if	Commissioner	
	required.		
11	Instruct both regular and emergency staff of EOC and Revenue	Divisional	
	Department to report for duty.	Commissioner	
12	Activate Incident Response System	Divisional	
		Commissioner & DMs	
13	Provide security in affected areas and maintain law and order	DCP, Delhi Police	
	situation.		
14	Mobilize Medical First Response Teams to affected areas	Secretary, Health	
15	Mobilize SAR Teams and search & rescue equipment and	Secretary Home,	
	machinery to affected areas	Director, Fire Dept, DCP	
		Police,	
		Civil Defence, Army	

Time Frame	SI.No.	Task/Role	Responsibility
0+1 Hour			
16	Instruct	nodal officials for Disaster Management of	Divisional Commissioner
	differen	t departments (PWD, MCD, DHS, etc.) to submit	
	prelimin	ary need and loss assessment report of the	
	affected	areas.	
17	Contact	Air Force to make arrangements for aerial survey of	Divisional Commissioner
	the affe	cted areas.	
18	Instruct	Delhi Police, Civil Defence, District officials of	Divisional Commissioner
	Revenue	e Department to evacuate victims to safer sites.	
19	Contact	Chief Secretary and LG, Chief Minister and brief	Divisional Commissioner
	them of	situation. Decide time and venue for holding State	
	Executiv	re Committee (SEC)	
	and DDN	MA meeting at the earliest.	
20	Inform	all the members to attend the meeting in	Divisional Commissioner
	designat	ted venue to assess situation and review emergency	
	measure	es.	
21	Instruct	concerned authorities or Agencies to shut down	Divisional Commissioner
	critical c	perations	

22	Contact National Remote Sensing Centre through GSDL for aerial / satellite imageries of the affected areas.	Divisional Commissioner
23	Alert all major hospitals to make necessary arrangement for treatment of injured.	Secretary, Health
0+2 Hour		
24	Inform GAD through Chief Secretary Office to ensure all State Government employees report for emergency duties within half an hour.	Divisional Commissioner
25	SEC to assess situation, delegate responsibilities for organizing rescue and relief operations	Chief Secretary
26	Call for hourly situation reports from district EOCs and compile the same and inform Divisional Commissioner.	Sp. CEO (DM)
27	Assess the conditions of road, rail and air communication link and take follow up actions for their recovery.	Sp. CEO (DM)
28	DIP and Revenue Department to establish press/media management / information cell for public information, guidance and rumour control.	DivisionalCommissioner, Director, Information & Publicity
29	Request may be made for assistance from Central Government if required	Divisional Commissioner
30	Contact private / public sector agencies to assist in emergency rescue and relief operations	Divisional Commissioner
31	Set up separate desks for each operation task force and NGO coordination desk in the EOC for coordinating emergency operations	Divisional Commissioner
32	Establish health posts at incident sites	Director, DHS
33	Establish Incident Command Posts at incident sites	Divisional Commissioner & DMs

Time Frame	SI.No. Task/Role R			Responsibility	
0+3 Hour					
34	Maintaiı EOCs	Maintain constant touch with the National / District Div.Comm EOCs			
35	_	for press / media release for rumour control and formation and guidance	Director and Publicity	Information	
36		n patient information centres at major hospitals o line on victim information		ipdt of Major Director, DHS	

Time Frame	SI.No.	Task/Role	Responsibility
0+6 Hour			
37	Establisl	relief coordination centre at the airport, railway	Divisional
	station,	etc. for arrival of Search and Rescue and Medical	Commissioner, Railway
	Teams c	oming for humanitarian aid	and Airport Authority
38	Establish	n central relief coordination centre	Divisional
			Commissioner
39	Instruct	to cordon affected areas and setting up of check	DCP, Delhi Police
	posts to	control entry and exit	
40	Open ac	cess routes and manage traffic for mobilization	DCP (Traffic)
	of equip	ment, machinery and volunteers to the affected	
	areas		

41	Conduct aerial survey and also mobilize quick	Divisional
	assessment teams to affected areas	Commissioner
		/ Secretaries of ESF
		Departments, Air force
42	Establish information centres at the arrival and departure	Airport and Railway
	points especially at the airports, railway stations and	transport authorities
	interstate bus terminus	

Time Frame	SI.No.	Task/Role	Responsibility
0+12 Hour			
43	Mobilize	e relief materials i.e. tents, food materials, water,	Divisional
	essentia	I medicines, blankets, etc. to the affected areas	Commissioner
44	Arrange	to shift evacuated persons to temporary shelters and	Divisional
	ensure p	provision of food, water facilities, blankets and storage	Commissioner
	of relief	materials.	
45	Arrange	road, rail and air transport at State / District	Secretary, Transport
	headqua	arters for dispatch of relief materials to the affected	
	areas		
47	Instruct	district magistrate to establish relief coordination	Divisional
	centre a	and godowns near affected area and provide food	Commissioner
	security	cover.	/ Secretary, Food and
			Supplies
48	Ask for	quick need assessment report from DMs for planning	Divisional
	of relie	f operation and mobilization of resources to the	Commissioner
	affected	areas	

Time Frame	SI.No.	Task/Role	Responsibility
0+12 Hour			
49	Hold rev	riew meetings with DMs in every 12	Divisional Commissioner
	hours		
50	Prepare	and circulate the situation report	ADMs of Districts
51	Prepare	press notes twice a day	Divisional Commissioner
52	Restore	essential services i.e. power, water supply,	Divisional
	telecom	munication facilities	Commissioner/Secretaries
			of Departments

Time Frame	SI.No.	Task/Role	Responsibility
0+48 Hour			
53	affected a	fety and security of personnel deputed in areas for emergency response operation. For identification, photograph, post mortem and ance of records for disposal of dead bodies	Commissioner, Delhi Police
54	Earmark sites	storage point for medical supplies at affected	Secretary, Health

55	Arrange information centre at shelter sites for maintaining records of victims and to provide guidance to relatives, NGOs, etc.	DMs
56	Arrange for complaints regarding missing persons (Missing person help line) and initiate search in shelters, hospitals and police records	Secretary (Home), Divisional Commissioner and Delhi Police
57	Arrange for SDMs empowerment for waiving off post mortem of dead bodies. Arrange for additional manpower if necessary for disposal of dead bodies.	CP/Divisional Commissioner, Municipal Corporations
58	Arrange for transportation of dead bodies to their native places if so required	Secretary, Transport and Health

Time Frame	SI.No.	Task/Role	Responsibility
0+72 Hour			
59	Arrange f	or disposal of unidentified and unclaimed dead	Secretary (Home) and
	bodies		Municipal Corporations
60	Arrange f	or transportation of injured from field hospitals	Secretary (Health) &
	to base h	ospitals	Secretary (Transport)
61	Activate s	short and interim relief measures	Divisional
			Commissioner/Line
			Departments
62	Arrange f	or distribution of cash relief to the victims	Divisional
			Commissioner

Chapter II

Flood Action Plan

Floods are among the most common and destructive natural hazards causing extensive damage to infrastructure, public and private services, environment and economy. Though NCT of Delhi does not have a record of devastating flood of mass causalities, the flood risk still holds its place. Keeping this in the realm the immediate action plan has been incorporated to aid the management operation at its best efficient level.

The Flood Action Plan consists of the following activities:

- Declaration of Flood disaster
- Flood Forecasting and Warning
- Trigger mechanism
- Response mechanism of the concerned line departments along with the roles and responsibilities

- Relief
- **2.1 Declaration**: The immediate response is to demarcate the areas affected by the severity of flood by declaring the situation a disaster at macro or micro level. The Delhi Govt. through Delhi Disaster Management Authority's network declares the graveness of the calamity as per the occurrence. The Relief Commissioner immediately propels all the District Collectors to act on the plan in relevance to their districts.
- **2.2 Flood Forecasting and Warning:** Flood forecasting is the process whereby the impending risks to the livelihoods may be imparted at the earliest. It includes the meteorological interpretation to the occurrences in the atmosphere and thus warning the people of any grave occurrence. Since the forecasting is very important, it has to be done by the experts in this field. This is at present being done by the Meteorological Department of India and Central Water Commission.

The main components of a national flood forecasting and warning system are as follows:

- Collection of real-time data and prediction of flood severity and time of onset of
- particular levels of flooding
- Preparation of warning messages, describing what is happening, predictions of what will happen and expected impact. Messages can also include what action should be taken.
- The communication and dissemination of such messages.
- Interpretation of the predictions and other flood information to determine flood impacts on communities
- Response to the warnings by the agencies involved and communities.
- Review of the warning system and improvement in the system after flood event.
- If predictions fail, the reasons of prediction failure should be communicated to communities in order to establish trust.

For a flood warning system to work effectively, all these components must be present and they must be integrated with each other rather than operating in isolation.

Central Flood Forecasting Division of Central Water Commission, R.K. Puram, New Delhi monitors the flood discharges in River Yamuna right from the upper catchment and issues flood forecasting bulletins for various stage of floods. The forecasts based on the discharge from the Hathni Kund Barrage (3 km. u/s of Tajewala) are relevant to Delhi as the travel time required for the flood water from Hathni Kund Barrage to Delhi varies between 36 to 72 hours depending upon the prevailing flow conditions in the river. First, second and third warning shall be issued from central flood control room situated at the office of D.C. (East) as per the discharge volume at Hathni Kund Barrage, as laid down in flood control order of Delhi.

Procedure for disseminating warnings to remote areas:

- ❖ Local radio, which should be supplied with clear and accurate information
- ❖ Local means of raising alarms, for example, sirens, loud hailers, loudspeakers etc.
- 'Sky Shout' from emergency service helicopters.
- Doordarshan and the local cable channels (TV channels & radio Channels including FM radio)
- Bulletins in the Press
- Satellite Based disaster Warning Systems
- Fax
- Telephone
- Media warnings (print and electronic)
- General warning indicators, for example sirens
- Warnings delivered to areas by community leaders or emergency services
- ❖ A community-based warning system to pass any information about an approaching flood to every family

2.3 Trigger Mechanism: Plan Activation

The flood response system will be activated on the occurrence of a heavy rain. The Divisional Commissioner through (Central Flood Control Room) will activate all the Departments for emergency response. He will issue instructions to include the following details:

- → Specify exact resources required
- → The type of assistance to be provided
- → The time limit within which assistance is needed
- → The state, district or other contact persons/agencies for the provision of the assistance
- → Other Task Forces with which coordination should take place

The EOC (HQ) and other control rooms at the district level as well as sub-district control rooms should be activated with full strength. Once the situation is totally controlled and normalcy is restored, the Divisional Commissioner declares End of Emergency Response and issues instructions to demobilize the staff deployed in emergency duties.

2.4 Duties of Various Departments:

SI.No.	RESPONSE ACTION	CONCERNED DEPARTMENT
1	 Report the occurrence of flood to Divisional Commissioner, concerned DCs, Heads of line departments, Chief Secretary and Chief Minister's office and NEOC, MHA & NDMA Establish communication links by alternate communication equipments like HAM radio etc. in district EOC and flood watch locations. 	In-Charge, Central Flood Control Room

	• Verifying authenticity of flood from agencies like CWC, and also from District EOCs	
	• Remain in constant touch with IMD and CWC for early	
	warning information	
2	Hold first meeting with Duty Officers	Divisional
	Dispatch of Search & Rescue teams, medical aid teams to the	Commissioner
	affected areas.	
	Make arrangements for the aerial survey of affected areas	
	Instruct local administration to evacuate victims to safer sites	
3	Hold meeting of SEC of DDMA within 12 hours of flood, if	Chief Secretary
	situation demands and assess the initial situation reports.	,
4	The sector committees affected districts shall conduct regular	DCs of concerned
	coordination meetings during the flood to monitor & evaluate	districts
	the situation and plan for response and relief activities.	
5	Assess the situation from initial survey reports and call for Army	Divisional
	and NDRF, if situation demands.	Commissioner
6	Although adequate Wireless sets are available in irrigation and	Divisional Commissioner
	flood control deptt., yet in case of emergency Civil Defence	& DG (Home Guards)
	Volunteers / Home Guards will be responsible for setting up	
	wireless stations at the Flood Control Room, L.M .Bund Office of	
	the Dist. Magistrate (East) and various sectors as per	
	requirements of the Divisional Commissioner Delhi. All these	
	wireless stations will be manned by the Civil Defence	
7	Volunteers. Home guards/CDVs will be deployed for patrolling duties on	Concerned DC
/	bunds and regulators when required to guard against any	
	sabotage and for initiating rescue operations of marooned	(Revenue) and DG (Home Guards)
	villages. Civil Defence volunteers will be deployed for camp	(Home Guarus)
	management, distribution of rations etc as per the	
	requirements of the Divisional Commissioner	
8	On receipt of requisition from Divisional Commissioner, Delhi,	Secretary (Health)
	Secretary (Health), Govt. of Delhi would make arrangements for	, , ,
	setting up first aid posts/ mobile dispensaries at relief camps	
	and arrange visits of medical teams to the flood affected area.	
	In case of need, Secretary	
	(Health) may seek the assistance from the chief Medical Officer,	
	NDMC/MCD.	
9	Provision of temporary latrines, urinals and street lighting at	Concerned Supdt.
	camp site. Providing safe drinking water to the victims would be	Engineer DJB,
	arranged by Delhi Jal Board and other line departments in flood	MCDs, NDMC,
	affected areas and relief camps.	DUSIB & PWD
10	A medical team of veterinary staff will be deployed in the flood	Director (Animal
44	affected areas and the cattle camps.	Husbandry)
11	Assess the condition of road and rail network for quick	Secretary (Transport)
	mobilization of Emergency teams and resources to affected	and Dy. Commissioner
	areas and take follow up steps. Adequate no. of trucks and	(Traffic)
	other category vehicles as may be needed would be arranged	
	when notified by the Divisional Commissioner for providing transport services to shelter sites	
12	Establish Relief Camps in designated areas	Revenue
12	Providing temporary shelters to evacuated persons	Department
	Providing temporary shelters to evacuated persons Providing food materials to the victims	(Concerned DCs
	- 1 Townshing 1000 materials to the victims	and SDMs)
13	Arrangements to be made for quick identification and	Secretary
	maintenance of the records of disposal of dead bodies in the	(Home), Secretary
	· ·	

	affected areas	(Health), Commissioner of Police
14	 Arrangements to be made to record the complaints of all persons reported missing Follow up action in terms of verification of the report also needs to be made 	Secretary (Home), Divisional Commissioner
15	 District Magistrates and sub-divisional magistrates to be empowered to exempt the requirement of identification and post-mortem in case of mass casualties Separate Cell to be established district level to coordinate with the NGOs and outside donor/aid agencies 	Concerned DCs and SDMs of Revenue Deptt.
16	Directorate of Information & Publicity to coordinate with the media to play a positive role in disseminating appropriate information to public and the government in order to facilitate the speedy recovery. Issue daily press releases	Director (DIP) and Divisional Commissioner
17	Assess the requirements of deployment of rescue boats on daily basis and also strategically position them.	Secretary (I & FC)
18	Ensure that local health workers and veterinary officers survey the affected area on regular basis for disease surveillance and prevention. Carry out Immunisation and prevention of disease due to worms in domestic animals in water logged areas	Director (DHS), Concerned Municipal Health Officers, Director (AH)
19	Establish mobile veterinary health care posts and ensure supply of adequate animal food in affected areas.	Director (AH)
20	Health Post/Van with essential medicines and health kits and distribution of chlorine, halogen and ORS packets at camps	Concerned CDMO & Municipal Health Officers
21	Sanitary Survey and water disinfection, Water supply restoration and purification. Demarcation of bore wells/tube wells unsafe for drinking water purposes.	Concerned Supdt. Engineer (DJB)
22	Ensure maintenance of registers at the relief centres for damaged houses, stock of relief materials, visitors, suggestions, victims, etc.	Concerned SDM
23	Ensure daily reporting of situation of flood and relief centres to State EOC and Central Flood Control Room.	In-Charge of affected district's EOC
24	Mass feeding shall be only for initial period; if possible dry ration shall be given for home cooking. Food distribution shall be discontinued as soon as possible. NGOs and CBOs shall be involved in supplementing effort of Govt.	Divisional Commissioner, Secretary (F&S)
25	Arrangement of Tents, Clothing, Bedding, Stoves, Fuel, Lighting, Water, sanitary facilities and hygiene (temporary latrine & bathing, utensils, soaps, toothpastes, etc.), health care, electricity, solid waste disposal at relief camps. At least 1 mobile toilet/20 persons at relief camps.	DC (Revenue), DC (MCD), SE (DUSIB)
26	Arrange for education at alternate locations for children at relief camps and affected areas.	Director (Education)

Functions of Central Flood Control Room, Sector committees and officer in charge of relief camp have been elaborated in flood control order of Delhi.

- The Divisional Commissioner to issue instructions to the district magistrates to provide the 'Need Assessment Report', 'Damage and Loss Assessment Report'.
- The relief need assessment report should be provided by each District Magistrate.
- Arrangements for distribution of gratuitous relief and cash doles to be made by Revenue Department.

Chapter III

STANDARD OPERATING PROCEDURES (SOPs) FOR BUILDING COLLAPSE & FIRE

3.1 Standard Operating Procedure for Building Collapse

Immediate actions by major ESFs during building collapse are provided in the following Table.

ESF#	Function	Responsible Person	Support Agency	Immediate actions to be taken by ESFs		
ESF 1	Law & Order	DCP (Delhi Police) of the affected District	Delhi Civil Defence and Home Guards, Volunteers	 Cordon off the affected area to facilitate the Search and Rescue Operations. Mob management. Traffic management for facilitating the free movement of vehicles to the affected area. (Especially Emergency Vehicles). Maintenance of law and order on the site. Important warning dissemination. 		

				• The Volunteers will also
				assist the Delhi Police in maintenance of law and order at the site.
ESF 2	Search & Rescue	Divisional Fire Officer of the affected area	Police, Civil Defence, NCC, NDRF, local representative,	 Evacuate the persons from the debris. The Civil Defence Volunteers will assist the Delhi Fire Service Personnel in Search and Rescue Operations.
ESF 3	Medical Response/Trauma	CDMO of the District and concerned Medical Superintendent	NDMC, MCDs, CATS, Civil Defence, St. John Ambulance Brigade, Hospitals, NGO representatives	 Set up a emergency first aid & triage centre on the site Transport the casualties to the hospitals. Hospital management as per the SOP of hospital. Medical Support at temporary shelters CDVs assist the Medical team in providing first aid and transportation of casualties
ESF 4	Equipment Support & Debris Clearance	Zonal Dy. Commissioner of MCDs	PWD, DJB, DDA, NDMC, DMRC, Private builders	 Provide immediate equipments support for debris Clearances Manpower for debris Clearance. Coordinate with supporting agencies for required Machineries.
ESF 5	Electricity	Concerned area operational manager of BSES / TPDDL	-	 Disconnect the power supply from the local station. Restore supply after complete operation/ necessary instruction. Will establish temporary power supply to the incident site.
ESF 6	Relief & Rehabilitation, Help Lines, Information Dissemination	Concerned Dy. Commissioner (Revenue) of the district	NGO Representatives, Community representatives, Food & Supplies Department	 The incident command post will be set up at the incident site. Accommodation arrangements will be made for the various ESF functions. If required temporary shelter arrangements will be made. Damage assessment will be conducted along with the officials & local representative.

	•	Coordination of food relief
		activities as per need.
	•	Overall coordination with
		all the ESF and update
		report to state level
		officers.
	•	Media management

All ESFs have to assist the Incident Commander i.e. DM/Deputy Commissioner (Revenue) at District level as per their assigned duties described in the detailed SOP's and to be followed during emergency within the District/State. A detailed disaster management SOPs of all ESFs and team leaders has been given earlier in District Disaster Management Plan.

The ESF Plan document outlines the objective, scope, organization setup and Standard Operating Procedures (SOPs) for each ESF that is to be followed by the respective ESF agencies when the Incident commander activates the response plan. Standard Operation Procedures (SOPs) provide a basic concept of the operations and responsibilities of Disaster Management Team, Nodal and Secondary agencies.

Since, there has been increase in the cases of building collapse in Delhi. Keeping this in mind, DDMA feels the need of specific SOP for building collapse. The success of ESF will be of critical importance and would reflect in the lives saved in the golden hour. Below a table of major ESFs has been given which will be activated and responded at state/district level during structural & building collapsed situation.

3.2 Standard Operating Procedure for Fire

Delhi is vulnerable to one another disaster that is fire especially in summer's. Disaster related to fire can be prevented in first few minutes of incidents after it generally become out of control of common man and coordinated effort of all the ESF is required in that case.

Management of fire and role of ESF's:

When operating at fire emergency site conditions may develop that would necessitate an immediate evacuation of the building

Stopping fire:

This will be primarily done by Fire department and most important for fire management.

Search and rescue:

Primary agency: Delhi Fire Services (Concerned Sub-divisional Fire officer)
Supporting Agencies: Police, Civil Defence, NCC, NDRF, local representative

Role:

Evacuate the persons from the fire incident site.

> The Civil Defence Volunteers will assist the Delhi Fire Service Personnel in Search and Rescue Operations.

Evacuation:

Primary agency: Police Department.

Supporting Agencies: Fire Services, Civil Defence, NCC, Army

Role:

- 1. On the directions of Incident Commander (IC), the ESF Team Leader will perform evacuation. He will instruct the team to initiate evacuation of the areas expected to be exposed to more threat in future.
- 2. The QRT shall move along with adequate material and resources to carry out evacuation. People will be directed to move towards safer areas identified by technical experts.
- 3. The team leader will designate in-charge of relief centers and keep in touch with them for regular head count and care of evacuees.
- 4. Police, Fire, Civil Defence & Home Guard (CD & HG) and other government employees may have to go door to door to ensure that residents have been alerted about the emergency.

Medical Response/Trauma:

Primary agency: Delhi Health Service (Concerned CDMO).

Supporting Agency: NDMC, MCDs, CATS, Civil Defence, St. John Ambulance Brigade,

Hospitals, NGO representatives

Role:

- 1. Set up a emergency first aid & triage centre on the site
- **2.** Transport the casualties to the hospitals.
- **3.** Hospital management as per the SOP of hospital.
- **4.** Medical Support at temporary shelters
- 5. CDVs assist the Medical team in providing first aid and transportation of casualties

Electricity:

Primary Agency: BSES, TPDDL (Concerned Area Operational Manager)

Supporting agency: DELHI TRANSCO LTD.

Role:

- 1. Disconnect the power supply from the local station.
- 2. Restore supply after complete operation/ necessary instruction.
- 3. Will establish temporary power supply to the incident site.
- 4. Assessing the causes of fire if that found to be related to electrical.

Chapter IV

STANDARD OPERATING PROCEDURES (SOPs) FOR INDUSTRIAL (CHEMICAL) DISASTER

4.1 SOPs for Offsite Emergency Response

SI. No.	Task	Responsibility	Activity
1	Disaster declaration and plan activation	District Magistrate	 Declare emergency and activate offsite emergency plan. Activate district ESFs. Establish communication with SEOC and officials of concerned industry
2.	Mobilization and Deployment	District Magistrate & ESF heads of the district	 Arrange immediate deployment of QRTs of Police, Fire, Ambulance, etc. Depute safety experts (including those from Environment Department) to the site and call for NDRF if situation demands. Based on the chemicals detected/used in the industry, initiate health & shelter support. Arrange evacuation of the affected and likely to be affected population and livestock of the area. Arrange for necessary relief support in the Shelters

3.	Issue of warning message & press release	District Magistrate	 Issue warning and preparedness message to the inhabitants of the affected and likely to be affected localities (with details of shelters, escape routes, preventive measures, etc.) Issue warning message to EOCs of adjoining districts. Brief media on status of emergency regularly. Send daily situation report to Div.Comm.
4.	Disposal of dead bodies	DC (MCD), DC (Revenue) and DCP (Police)	 Ensure following procedure is followed before disposal/handing over of dead bodies: Photographs of dead bodies are taken. Identification of dead bodies is done. Post mortem wherever necessary and possible is carried out. Dispose animal carcasses
5	Maintenance of Law & Order, Traffic Management	Secretary (Home), Commissioner (Delhi Police)	 Control and divert traffic in the affected areas. The primary aim of traffic management would be to ensure the transport of the injured to the hospital, easy access for emergency responders and safe evacuation of the people from the danger zone. Cordon off the area and ensure maintenance of law & order at the incident site and shelters as well. Coordinate with District Magistrate. Carry out evacuation and public alert message dissemination with the help of Home Guards, Civil Defence, NGOs, NCC and DTC.
6.	Search & Rescue & Fire & Chemical Control	Director (Delhi Fire Service)	 Assess the situation (chemical spill/leak) and depute HAZCHEM response vehicles to the incident site. In case of fire, start fire fighting and also take care of surrounding storages/tanks to be over heated so that reduce the chances of 'domino effect'. In case of chemical leak, try plugging/stopping of leak with the use of proper PPE. Search and identify the risk and nullify the sources of leak / toxic release. If any unclear or unidentified substance or source is identified or detected, the team should send them immediately to the laboratory for further investigation / analysis. Search & rescue the affected persons from the incident site.

7.	Medical Services	Concerned CDMO	 Provide expertise on health support required based upon chemical identified. Assess the health status of the people in the exposed area. Provide advice to District Magistrate on the geographic extent to which the incident may affect the population and identify hospitals with relevant specialization and inform this to EOC & CATS. Mobilize relevant specialists for the treatment of victims and coordinate medical support activities. Assess the long term consequence of the incident and take necessary curative measures.
8.	Recovery	District Magistrate	 Prepare recovery plan after assessing the long term consequences of the incident with the help of experts including those from NDRF, Fire Service, DHS, Environment Department.

Chapter V

STANDARD OPERATING PROCEDURES (SOPs) FOR NUCLEAR & RADIOLOGICAL EMERGENCY

5.1 SOPs for Nuclear & Radiological Emergency Response

Sl.No. Emergency Responsibility Activity
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2.	Nuclear & radiation emergency Transportation	District Magistrate, ESF Heads of the district, Regional Director (ERC of DAE), Commandant (NDRF)	 District Magistrate shall be incident commander in such emergency. Identify and characterize the source and its origin. Initiate a quick and reliable monitoring methodology to detect the onset of an accident/emergency condition and assess its magnitude. Estimate the dose. Support decision making on protective measures for the population and environment. Mobilise the QRTs of ESFs. Initiate countermeasures for relief and rescue on the basis of variation in radiation dose. Issue public alerts for do's and don'ts. Evacuate/relocate the affected population. Examine contamination in food and drinking water. Evacuate domestic animals. Monitor the steps for decontamination of affected area/people. On discovery of any such accident, the District
2.	of Radioactive Materials	Magistrate, DCP of the District	Magistrate in a district or the Deputy Commissioner of Police, shall inform the following: ERC at R.K. Puram State EOC NDRF
3.	Radiological Dispersal Device Emergency	District Magistrate, ESF Heads of the District, Regional Director (ERC of DAE), Commandant (NDRF)	 Mobilise and operate incident command. Oversee victims triage. Make sure that the site is cordoned and the perimeters are controlled and managed. Ensure notification and activation of special Teams. Ensure traffic and access control. Ensure protection to at risk and vulnerable population. Gender issues must keep in mind. Provide resources support and requests for assistance. Ensure public works coordination. Ensure public information, outreach, and communication activities. Seal off the inner zone of 400m radius from the blast point as 'no entry area' except for emergency measures. Perform life-saving rescue and emergency first aid for seriously injured. Remove injured persons as far away as practical from the incident scene, especially in case of fire. The medical personnel will be informed that radioactive contamination might

exist on the victims and/or their clothing. Identify all those who may have been exposed to a possible release of radioactive material. Identify those involved with the incident or potentially contaminated by the incident at scene, except those requiring emergency medical evacuation. All individuals will be monitored and decontaminated, if necessary, and cleared after further medical treatment and discharged. Prohibit eating, drinking and smoking in the incident area several tens of metres from the explosion site and get inside a closed building. This will reduce exposure to both radiation and radioactive airborne dust. Not to eat food until certified free from contamination. Avoid any smoke/dust. Turn on local radio/TV channels for advice from authorities. Remove contaminated clothes and place these in a sealed plastic bag. Take a shower to wash off dust and dirt. This will reduce total radiation exposure. If radioactive material was released, local news broadcasts will advise people where to report for radiation monitoring and for blood and other tests to determine

whether they were in fact exposed and steps to be taken to protect their health.

<u>List of Vital Installation of New Delhi District</u>

SI.NO	Name of Vital Installation	Police Station	Category
1	India Gate	T.Marg	<u> </u>
2	Parliament House	Pt.Street	I
3	President House	S. Avenue	I
4	P.M House	Ch. Puri	I
5	South Block	Pt. Street	I
6	North Block	Pt.Street	I
7	Supreme Court	T. Marg	I
8	National Museum	S. Avenue	I
9	Teen Murti Bhawan	Ch. Puri	I
10	Army Headquarters	S. Avenue	G-I
11	Naval HQ	S.Avenue	G-I
12	Hyderabad House	T.Marg	G-I
13	Vigyan Bhawan	S. Avenue	G-I
14	RAksha Bhawan	T. Marg	G-I
15	Delhi High Court	T.Marg	G-I
16	Baroda House	T. Marg	G-I
17	UPSC	T.Marg	G-I
18	Rail Bhawan	Pt. Street	G-I
19	Shastri Bhawan	Pt. Street	G-I
20	Krishi Bhawan	Pt.Street	G-I
21	RBI	Pt. Street	G-I
22	Niti Aayog	Pt.Street	G-I
23	Sanchar Bhawan	Pt. Street	G-I
24	Shram Shakti Bhawan	Pt. Street	G-I
25	Transport Bhawan	Pt. Street	G-I
26	Nirma Bhawan	S. Avenue	G-I
27	Sardar Patel Bhawan	Pt. Street	G-I
28	Udyog Bhawan	S. Avenue	G-I
29	Dak Bhawan	Pt. Street	G-I
30	Jaisalmer House	T.Marg	G-I
31	All India Radio	Pt. Stree	G-I
32	Nirvachan Sadan	Pt. Street	G-I
33	Vice President House	S. Avenue	G-I
34	Akbar Bhawan	Ch. Puri	G-I
35	Lok Nayak Bhawan	Tug. Road	G-I

36	DRDO Bhawan	S.Avenue	G-I
37	National Defence College	Tug. Road	G-I
38	NDCC Bldg.	Con. Place	G-I
39	MEA Bldg. Jawahar Bhawan	S. Avenue	G-I
40	Air Headquarter	S. Avenue	G-I

Details of Water Treatment Plants Under Chief Engineer (WW)

SI.No	Name of	Area	Name of Nodal	Contact No	umber	Address
	Installation	(In Acres)	Officer/EE(E&M)	Landline	Mobile	
1	Wazirabad WTP	51.77	Sh. Rajiv Agarwal		9650364422	Wazirabad Water Works, Delhi- 1100084
2	Chandrawal WTP	61.10	Sh. R.D. Yogi		9650290895	Chandrawal Water Works, Delhi- 1100054
3	Okhla WTP	29.83	Sh. Tej Pal Singh		9650680606	Okhla Water Works, Near Hply Family Hospital Delhi.
4	Akshardham WTP	2.02	Sh. Tej Pal Singh		9650680606	Akshardham WTP, NH-24, Delhi-110092
5	Bhagirathi WTP	65.00	Sh. R.D. Yogi		9650290895	Bhagirathi Water Works, Gokulpuri, Delhi- 110053
6	Sonia Vihar WTP	140.00	Sh. S.P Singh		9650291589	Sonia Vihar Water Works, Delhi-110094.
7	Haiderpur WTP	103.00	Sh. S.S Bhardwaj		9650291252	Haiderpur Water Works, Delhi- 110085
(a)	Khayala BPS	12.50	Sh. S.S Bhardwaj		9650291252	Khayala BPS, Raghubir Nagar, New Delhi
(b)	Naraina BPS	1.25	Sh. S.S Bhardwaj		9650291252	Naraina BPS, MES area, N. Delhi.
8	Bawana WTP	40.00	Sh. S.S Bhardwaj		9650291252	Bawana WTP, Kamaruddin Nagar, Delhi.
9	Nangloi	48.43	Sh. K.K Piplani		9971490048	Nangloi WTP, KAmaruddin Nagar, Delhi-

					110041	
10	Dwarka WTP	24.3	Sh. K.K Piplani	99714900448	Dwarka	WTP,
	(Existing)				Najafgarh,	Delhi-
					1100043	
(a)	Dwarka WTP	26.87	Sh. K.K Piplani	9971490048	Dwarka	WTP,
	(Proposed)				Najafgarh,	Delhi-
					1100043	

As per data available in the Labour Department, GNCTD, there are 18 Major Accident Hazard Units in Delhi. Onsite disaster management plans have been prepared for these units. Details of MAHUs are as follows;

<u>SI.No</u>	Name & Address of MAH unit	Districts	Hazardous materials being mfd., handled, store and Imported
1	M/s Bhagirathi Water Treatment Plant, Gokulpuri	North-East	Chlorine
2	M/s 140 MOD Water Treatment Plant, Sonia Vihar	North-East	Chlorine
3	M/s Haiderpur Water Works, Haiderpur	North-West	Chlorine
4	Delhi Water Works Chandrawal No-I, Civil Lines	Central	Chlorine
5	Delhi Water Works Chandrawal No-II, Behind Cyber Pass, Civil Lines	Central	Chlorine
6	Wazirabad Water Works, Timarpur	Central	Chlorine
7	Badarpur Thermal Power Station (NTPC), Badarpur	South-East	Chlorine Ammonia (gas) Ammonia (Liquid)
8	M/s Indane LPG, Bottling Plant, Behind Sarita Vihar, Madanpur Khadar	South-East	LPG
9	M/s Okhla Water Works, Okhla	South-East	Chlorine
10	M/s Bharat Petroleum Corp. Ltd., IGI Airport Terminal-2, near Shabbad Mode	New Delhi	ATF HSD
11	M/s Indian Oil Corp Ltd. P.O. Bijwasan	South-West	MS, HSD, SKO, ATF, MTO
12	M/s Hindustan Petroleum Corporation Ltd., Village Bijwasan,	South-West	MS, HSD, SKO
13	M/s Bharat Petroleum Corp Ltd., Village Bijwasan	South-West	MS, SBP, Hexane, HSD, LDO, SKO, MTO, ATF
14	Gas Turbine Power Station, Ring Road, I.P. Estate	Central	Chlorine, HSD
15	M/s 40 MGD Water Treatment Plant, Kamruddin Nagar, Nangloi	West	Chlorine
16	M/s Hindustan Petroleum Corporation Ltd., Shakur	West	MS, HSD, ATF, LDO, Lubricants, MTO,

	Basti		Hexane, Solvent
17	M/s Indian Oil Corp Ltd., Sakur	West	ATF, LDO, MTO,
	Basti		ULMS, HSD
18	Indian Bottling Plant, Ghevra	West	LPG
	Mode, Rohtak Road		

Abbreviation:- ATF- Aviation Turbine Fuel, HSD- High Speed Diesel, LDO- Light Diesel Oil, LPG- Liquefied Petroleum Gas, MS- Motor Spirit, MTO- Mineral Tupentine Oil, SBP- Special Boiling Point Solvent, SKO- Superior Kerosene Oil, ULMS- Un-Leaded Motor Spirit

Sensitive Power Transmission Sub Station Units

SI.No	Name of Installation	
1	SLDC Minto Road	
2	Bawana	400 KV GRIDS
3	Bamnauli	400 KV GRIDS
4	Tikrikalan	400 KV GRIDS
5	Harsh Vihar	400 KV GRIDS