

STATE DISASTER MANAGEMENT PLAN PUNJAB



**DEPARTMENT OF REVENUE, REHABILITATION AND
DISASTER MANAGEMENT
GOVERNMENT OF PUNJAB**

FOREWARD



Different parts of Punjab are vulnerable to the natural calamities like Flood, Earthquake, Drought and Embankment Erosion. In fact there are multiple High Risk Multi Hazard Zones.

Apart from these natural hazards there are chances of man-made disasters like fires, industrial accidents, terrorist attacks etc. Punjab has twenty two districts covering 79 Tehsils, 143 blocks, 12,278 villages, 143 towns and 14 cities of Punjab. The total area of the state is 50,362 square kilometers and the population is 2,77,04,236 (Census, 2011).

This State DM Plan, Punjab, has been prepared in the context of natural and man-made disasters. This Plan should be useful to tackle the multi-hazard vulnerabilities and should be based on the factors like ever-growing population, the vast disparities of income, rapid urbanization, increasing industrialization, development within high risk zones, environmental degradation, climate change, state and national security, economy and sustainable development.

The objective of the State Disaster Management Plan, Punjab is to facilitate execution of activities for prevention and preparedness, search and rescue operations, coordination, and community awareness and involvement. In preparing the Plan, the existing system has been studied; the prevailing documents and various stakeholders were consulted.

The framework of the plan is based on the paradigm shift in Disaster Management from a relief centric approach to a regime that anticipates the importance of preparedness, prevention and mitigation. On the other hand, it outlines the functions of the principal agencies and clearly demarcates roles for; before, during and after a disaster. Such clarity will act as a framework for each line-departments and district authority to prepare their own plans, promoting efficiency and teamwork.

In the process, it is my fervent hope that the plan achieves its main objective – to ensure the safety and well being of the citizens of Punjab. By mainstreaming disaster risk reduction into developmental work and ensuring that the community remains the most important stakeholder, i hope this plan will be helpful in promoting a culture of prevention and preparedness at all levels.

A.R. Talwar
Financial Commissioner,
Revenue, Punjab

ACKNOWLEDGEMENT

The Punjab State Disaster Management Plan has been formulated for the Government of Punjab, State Disaster Management Authority. It seeks to provide a comprehensive approach to disaster risk Management in the State. I take this opportunity to thank Dr. Adapa Karthik, IAS, Jt. Secretary-cum-Director Disaster Management, Govt. of Punjab, for giving me the responsibility to prepare the State Disaster Management Plan-2010-11. Throughout the process his guidance, co-operation and suggestions helped me a lot. I also extend my thanks to, Mr. G.S. Sidhu, IAS, Secretary Revenue, Government of Punjab.

Rinkal Mahajan
Project Officer
UNDP-DRR Project

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EXECUTIVE SUMMARY

Although common man is not so familiar with the term disaster management; they are much aware of certain phenomenon like Earthquake, Landslide, and Cyclone and now even Tsunami. Since time immemorial India is highly prone to natural calamities. Today, from Kanyakumari to Himalayas, India doesn't have any region exempted from one or another kind of disaster.

According to recent study, 65 per cent of Indian landmass is highly prone to earthquakes; whereas, 12 per cent is submerged under water annually (Ministry of Home Affairs. The unanswered question, today, is how to tackle such disasters.

Punjab is situated in the northwest India. The Indian state borders the Pakistani province of Punjab to the west, Jammu and Kashmir to the north, Himachal Pradesh to the northeast, Chandigarh to the east, Haryana to the south and southeast and Rajasthan to the southwest. The total area of the state is 50,362 square kilometres. The population is 2,77,04,236 (Census, 2011).

The State Disaster Management Plan for Punjab is a combination of modern participatory approach. This document contains Nine Chapters and seven annexure and additional information.

Certain most important concepts and approaches like significance of a State Disaster Management Plan of Punjab as well as detailed profile of the district are coming in the first chapters. The vulnerability and hazard situation and capacity available to face a disaster are elaborately described in the second chapter.

Punjab is vulnerable to 21 types of hazards out of 33 identified by the High Powered Committee (HPC) of Government of India into 5

sub-groups. Apart to identified hazard by HPC, state has high impact of Groundwater and Surface water Pollution, depletion of groundwater level and cancer epidemic which needs to be addressed as hazard

A major part of geographical area of the state is prone to floods although substantial part has been protected through flood control measures.

The Water table is rising in South-western districts of the state due to limited or non-extraction of groundwater because of blackish/saline quality, which makes it unfit for domestic, irrigation and other purposes which causes water logging.

Punjab has experienced drought due to inadequate rain in Monsoon. The State was experienced drought in 1978, 1979, 1985, 1987, 2002 and 2004, both in rural and urban areas. In 1987, a major drought was experienced in the State but in 2002, the intensity of the drought has made the situation much more acute and has broken the back of the farming community. The State Government declared all the 17 districts in the State as drought affected.

A United Nations Development Programme (UNDP) report states that about 12% of Punjab state suffers from the threat of desertification. The Punjab is facing very serious problem of soil erosion by water. It is serious menace in the Shivaliks and Kandi region, along the river courses, streams and choes and in the south western arid and hot region. In this seismic zoning map, most of the area of Punjab State lies in Zone III and IV. However, northern boundary of Punjab State with Himachal Pradesh is in close proximity to Zone V. According to the Building Material &

Technology Promotion Council, 1997, 48.6% area of the state is vulnerable to Intensity VIII and 45.6% area to Intensity VII.

A house to house survey was conducted by the Health Department. The prevalence of cancer in Punjab as per survey is 30.54 per lakh population whereas the prevalence in India is 125 per lakh, for example in Muktsar district between 2001 and 2009, 1,074 people died of cancer

In June 2010, studies carried out amongst mentally retarded children in the Malwa region of Punjab, revealed 87% of children below 12 years and 82% beyond that age having uranium levels high enough to cause diseases.

Road Accidents are increasing day-by-day in the Punjab. In 2008 3206 persons were killed in road accident whereas 3668 persons were killed in 2009 in Punjab.

Three rail accidents witnessed in Punjab which are Khanna rail accident in which 212 persons were killed, Sarai Banjara rail disaster in which 46 persons were killed and Ladhawal rail disaster in which 39 people lost their lives.

Occasionally Punjab witnesses hailstorms which cause huge damages to the standing crops, Gales, Lightening, Squall, Thunderstorm, Heat Wave, Cold Wave, Dustorm etc. Punjab is also prone to industrial disasters. In 2009 37 people lost their lives in industrial disasters whereas 14 were lost in 2010. There are 60 Maximum Accident Hazard Units are found in Punjab. Punjab also witnessed structure and crop fires.

Punjab has 553 KM long International border with Pakistan with 4 districts of Amritsar, Ferozepur (Fazilka is separated and become

another district of Punjab), Tarn Taran (this district was created in April 2006) and Gurdaspur abutting the International border.

Punjab has witnessed Operation Blue star riots in which 83 army personnel were killed and 249 injured while insurgent casualties were 493 killed and 86 injured, Operation Black Thunder in which 42 persons were killed.

Punjab's grievous drug problem was revealed recently in a report by Guru Nanak University in Punjab's largest city, Amritsar, which declared that some 73.5 per cent of the state's youth between 16 and 35 years were confirmed drug addicts. Punjab Pollution Board has identified 13431 water polluting industries in the state under the provision of Water and Air Acts. In June 2010, studies carried out amongst mentally retarded children in the Malwa region of Punjab, revealed 87% of children below 12 years and 82% beyond that age having uranium levels high enough to cause diseases.

Mitigation and Preparedness Plan: The State Plan for preparedness and mitigation attempts to protect the lives and properties of the people of Punjab from potentially devastating hazards. Structural Mitigation and Non-Structural Mitigation measures are suggested in the preparedness and mitigation plan. Structural mitigation includes retrofitting, afforestation, multi-purpose dams, watershed management, and improvement in drainage efficiency, desiltation of stream beds, check on encroachment, and check on disposal, improving the Capacities of Bridges/Aqueducts, intra and inter-State Coordination, water harvesting measures, etc. Non-Structural Mitigation includes Sensitization/Awareness Campaigns, Training and Capacity Building, Flood Plain zoning, Flood Proofing, Flood Fighting, Early Warning and Dissemination System, etc.

Response Plan: It includes institutional mechanism, State Emergency Operations Centre (SEOC), Incident Command System, response activities, warning systems, Role of State Govt. in L2 disaster, State Disaster Quick Response Mechanism, etc.

Recovery Plan: It includes Recovery from Disasters, Recovery as a Developmental Process, Recovery Process, Interface with Response Activities, Recovery and Prevention. In the end, Implementation of recommendation of 13th Finance Commission and Annual Work Plan are also explained.

Review and Updation of Plan, Coordination, Implementation and Dissemination of the Plan is also discussed in the end.

The efforts to prepare a document like this -The State Disaster Management Plan for Punjab- received inspiration from such a scenario. The objective of this document is to introduce the unique and tested method of disaster management in district Patiala. Replacing the well-known traditional methods of disaster management, one has Patiala. Replacing the well-known traditional methods of disaster management, one has to embrace decentralized efforts and people's participation. Also there are 12 Emergency Support Functions with one nodal agency and a couple of supporting agencies to look after disaster management, in the new set up.

This Plan has been prepared as per the guidance provided by the National Disaster Management Authority and mandates the roles and functions to be played by the State Disaster Management Authority, State Executive Committee and State government Line Departments. Disaster management, by its very nature, requires a multi-disciplinary approach hence; a strong coordination mechanism forms the core of successful Disaster Management.

This Plan outlines the functions of the principal Agencies like SDMA, SEC, State Relief Commissioner, and at district level the DDMA and role of Responsible Officers (DC/DM) and onsite response. The Punjab State Disaster Management Authority (PSDMA) and SEC will be supported by the line departments. However the functions listed out for the line departments are mandatory to comply with. As such, each line department and district authority's requisite to prepare their own disaster management plan in alignment with State plan.

This Plan may be reviewed annually by the SEC to ensure all activities and information is updated. Regular training of relevant department officials should be carried out to ensure compliance and quick response during disaster situations.

The Plan has been structured for easy understanding and clear demarcation of roles and responsibilities for scenarios before, during and after disasters. Past experience has shown that each disaster situation throws up a new set of challenges which the government has to deal with. It is therefore impractical to go to each spectrum in anticipating every possible situation. The Plan adopts a comprehensive approach to prepare the State Machinery to tackle any Disaster like situation i.e. Earthquake, Drought, Floods/Flash floods, Urban and Rural Fire, etc.

The State Disaster Management Plan is a combination of modern participatory approach. This document has been designed in two volumes in which the first volume contains Nine Chapters where as the second volume is dedicated for annexure and additional information.

It is hoped that the Plan serves the purpose for which it is designed, to ensure safety and well being of the citizens of Punjab.

September 2011

Chapter I

INTRODUCTION

1.1 STATE PROFILE

1.1.1 Physical Location

Punjab is situated in the northwest India. The Indian state borders the Pakistani province of Punjab to the west, Jammu and Kashmir to the north, Himachal Pradesh to the northeast, Chandigarh to the east, Haryana to the south and southeast and Rajasthan to the southwest. The total area of the state is 50,362 square kilometers. The population is 2,77,04,236 (Census, 2011). Punjab's capital is Chandigarh, which is administered separately as a Union Territory since it is also the capital of neighboring Haryana. Other major cities of Punjab include Mohali, Ludhiana, Amritsar, Patiala and Jalandhar.

1.1.2 Geological and Geographical Data of Punjab

The total geographical area of the state is 50,362 sq. kms

Demographic Profile

As per Census 2011, Punjab has a total population of 2,77,04,236 out of which 1,46,34,819 are males and 1,30,69,417 are females. It constitutes 2.29% of total population of India. Population density of Punjab is 550 persons per sq.km. Other key demographic data is as given in Table 1.

Regions

The area of Punjab can be divided into three regions which are the following:

Malwa is a region of Punjab and parts of Haryana between the Sutlej and Yamuna rivers. People of Malwa are known for being great fighters, and warriors. The Malwa area makes up majority of the Punjab region consisting 11 districts. Cities such as Ludhiana, Patiala, Bhatinda and Mohali located in the Malwa region

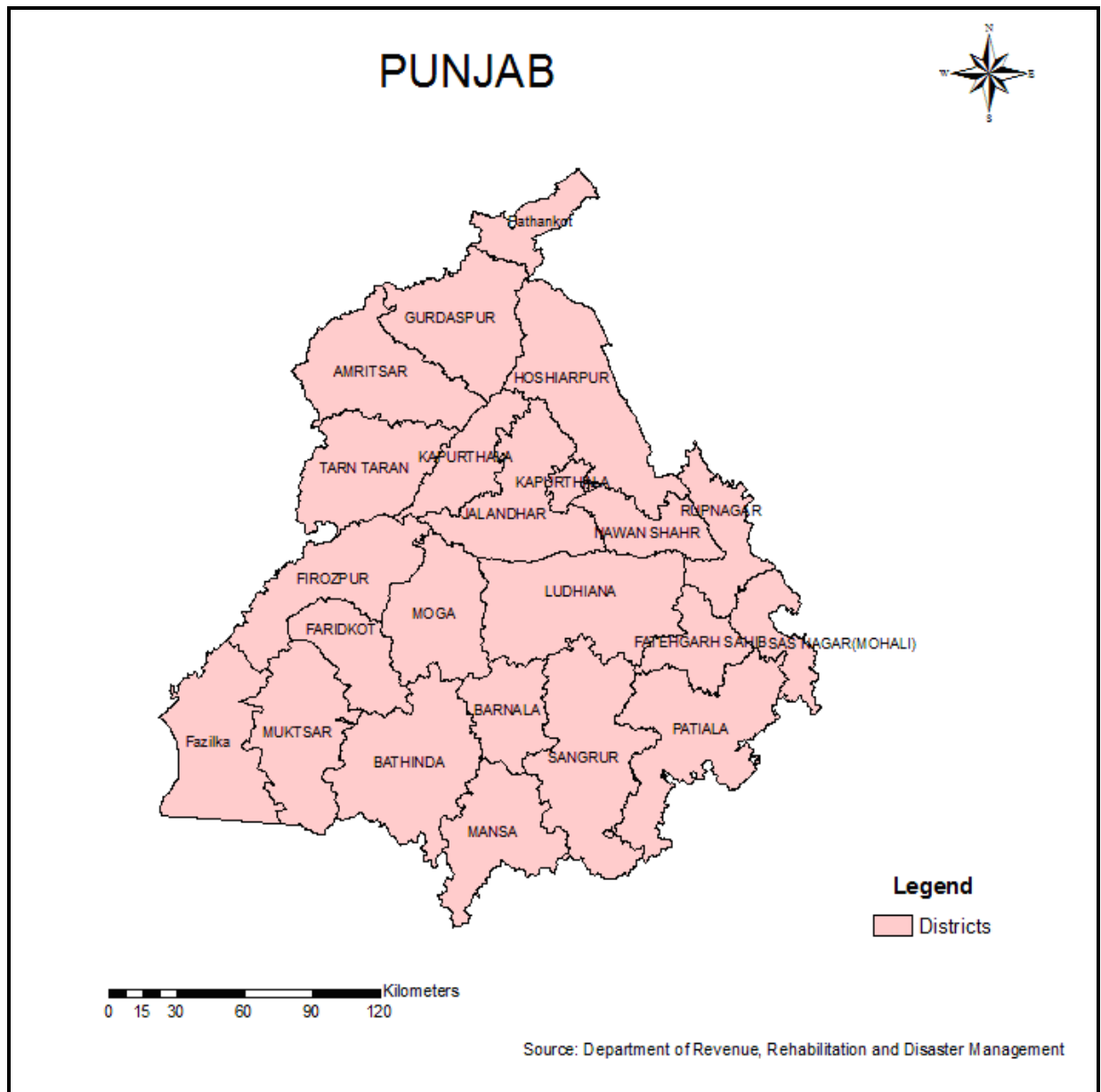
Majha is a historical region of the Indian Punjab comprising the modern

districts of Amritsar, Gurdaspur and Tarn Taran. It lies between two of the five great rivers of the Punjab: the Ravi and the Sutlej.

Doaba is the region of Indian Punjab surrounded by the rivers Beas and Sutlej. The name "Doaba" literally translates to "land of two rivers" ("Do" two, "Ab" river; Punjabi). It is one of the most fertile regions of the world, and was the centre of the Green Revolution in India. To this day, it remains one of the largest per capita producers of wheat in the world. The biggest cities in Doaba are Jalandhar, Hoshiarpur, Adampur, Nawansher and Phagwara.

Table 1: Demographic Data of Punjab State

PUNJAB POPULATION DATA AT A GLANCE: 2011											
DISTRICT CODE	INDIA/STATE/ DISTRICTS	TOTAL POPULATION			DECADAL GROWTH RATE	DENSITY (per sq.km)	SEX RATIO (per 1000 males)	SEX RATIO (0-6 AGE)	LITERACY RATE (%)		
		PERSONS	MALES	FEMALES					TOTAL	MALE	FEMALE
1	2	3	4	5	6	7	8	9	10	11	12
	INDIA	1,21,01,93,422	62,37,24,248	58,64,69,174	17.64	382	940	914	74.0	82.1	65.5
	PUNJAB	2,77,04,236	1,46,34,819	1,30,69,417	13.73	550	893	846	76.7	81.5	71.3
1	Gurdaspur	22,99,026	12,12,995	10,86,031	9.30	649	895	824	81.1	85.9	75.7
2	Kapurthala	8,17,668	4,27,659	3,90,009	8.37	501	912	872	80.2	84.6	75.4
3	Jalandhar	21,81,753	11,40,536	10,41,217	11.16	831	913	874	82.4	86.1	78.3
4	Hoshiarpur	15,82,793	8,06,921	7,75,872	6.85	466	962	859	85.4	89.9	80.8
5	S.B.S. Nagar	6,14,362	3,14,415	2,99,947	4.58	479	954	879	80.3	86.2	74.3
6	Fatehgarh Sahib	5,99,814	3,20,603	2,79,211	11.39	508	871	843	80.3	84.5	75.5
7	Ludhiana	34,87,882	18,66,203	16,21,679	15.00	975	869	865	82.5	86.3	78.2
8	Moga	9,92,289	5,24,289	4,68,000	10.90	444	893	863	71.6	75.3	67.4
9	Firozpur	20,26,831	10,70,812	9,56,019	16.08	380	893	846	69.8	76.7	62.2
10	Muktsar	9,02,702	4,76,300	4,26,402	16.10	348	895	830	66.8	72.9	60.0
11	Faridkot	6,18,008	3,27,121	2,90,887	12.18	424	889	851	70.6	75.9	64.8
12	Bathinda	13,88,859	7,44,875	6,43,984	17.37	414	865	854	69.6	75.3	62.9
13	Mansa	7,68,808	4,08,921	3,59,887	11.62	350	880	831	62.8	68.4	56.4
14	Patiala	18,92,282	10,02,112	8,90,170	19.40	596	888	835	76.3	81.4	70.5
15	Amritsar	24,90,891	13,22,088	11,68,803	15.48	932	884	824	77.2	81.2	72.8
16	Tarn-Taran	11,20,070	5,90,239	5,29,831	19.28	464	898	819	69.4	75.4	62.9
17	Rupnagar	6,83,349	3,57,265	3,26,084	8.67	488	913	866	83.3	88.9	77.2
18	S.A.S. Nagar	9,86,147	5,24,989	4,61,158	32.02	830	878	842	84.9	89.2	80.0
19	Sangrur	16,54,408	8,78,628	7,75,780	12.30	449	883	835	68.9	74.2	62.9
20	Barnala	5,96,294	3,17,848	2,78,446	13.16	419	876	847	68.9	73.1	64.1



Physiography

Physiography refers to the study of physical features of the area and their relationship with one another including the factors and processes responsible for the evolution of landforms. The state of Punjab forms a part of Indo-Gangetic alluvial plain and is composed of sediments of Shiwalik hills and Himalayas brought down and laid by the rivers of Indus system. The exact depth of the alluvium has not been ascertained, though it varies from a few metres to over 2000 metres.

The state can be divided into the following major physiographic units:

- a. Siwalik hills
- b. Piedmont plain
- c. Alluvial plain

- d. Sand dunes
- e. Flood plain
- f. Palaeochannels

The Siwalik hills in the north-east are steeply sloping. Number of choes originate in the Shiwalik zone and drain the excess storm water. The Shiwalik hills occupy nearly 2.6 per cent area of the state and cover sizeable area of Gurdaspur, Hoshiarpur, S.B.S. Nagar, Rupnagar and S.A.S Nagar districts of the state. The hills have dense to open scrub forest.

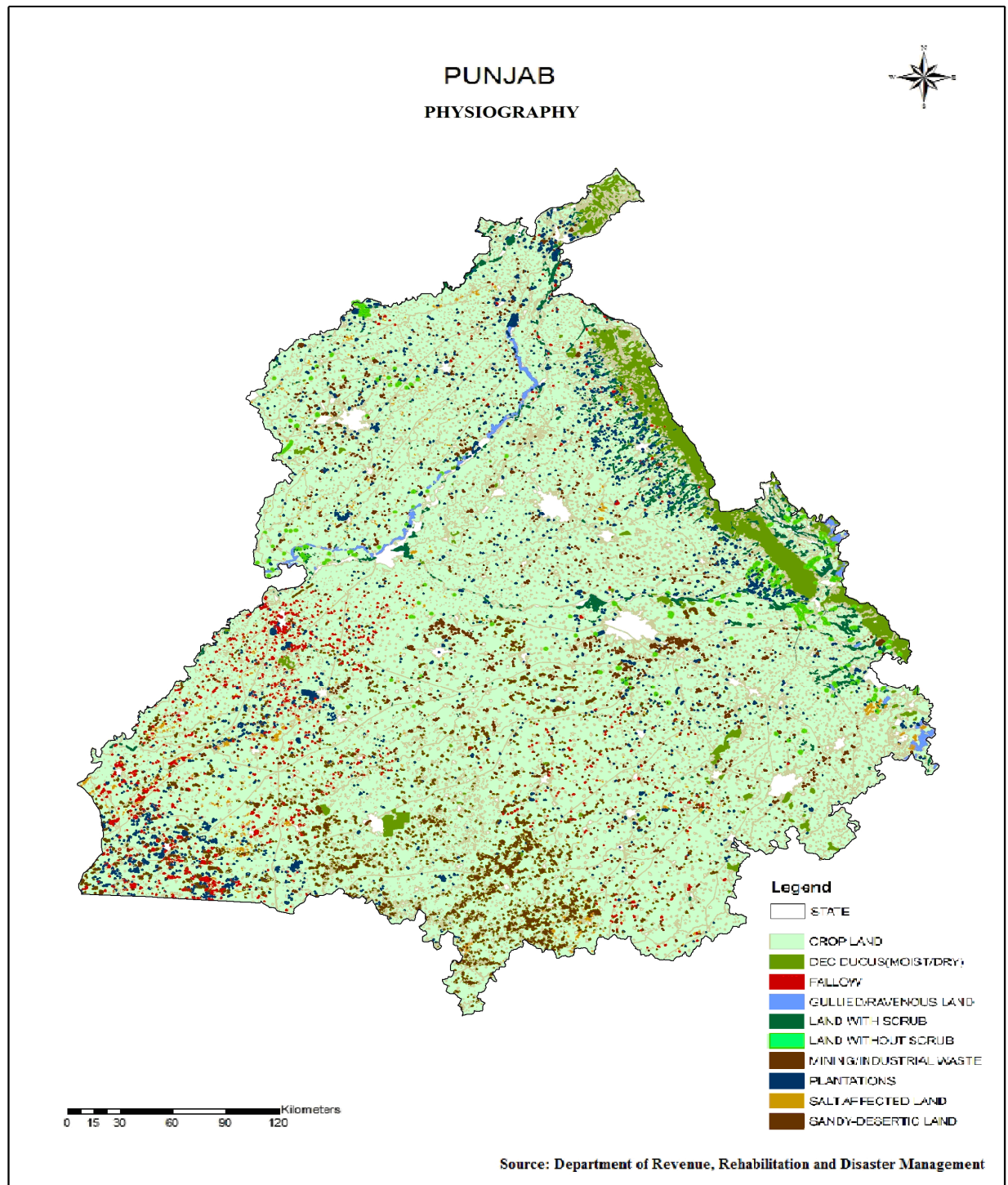
The piedmont area forms a transitional zone between the Shiwalik hills and alluvial terraces. It is about 10 to 15 km wide and comprises of Gurdaspur, Hoshiarpur, S.B.S. Nagar, Rupnagar and S.A.S Nagar districts. The elevation of this zone varies from 300 to 375 m above MSL. The piedmont area is gently sloping to undulating and is dissected by number of seasonal rivulets (choes) which transport storm water with sediments from their catchment. The coarsest of these sediments are deposited in the form of alluvial fans at the foot hills and finer fractions are deposited along the choes within the piedmont area.

The sand dunes are low ridges along the present and old courses of rivers and choes. They are formed as a result of reworking of sand bar deposits of rivers. The deposits are sandy in texture and dominated by quartz and feldspar minerals. The sand dunes covered nearly 9.0 per cent area of the state during 1987, however, as a result of levelling and clearing by the farmers in the recent past, the area of sand dunes has been reduced to barely 0.56 per cent during 2004. The areas in and around the sand dunes are moderately sloping whereas interdunal areas are nearly level to gently sloping.

The alluvial plain/terraces are the old flood plains of the rivers, the remnants of which lie above the level of the present river beds. They are separated from flood plains at their bases by broken chains of sand dunes and cliffs. The deposits of terraces vary with respect to texture, depth of carbonate leaching and translocation of other mobile soil constituents. Some parts of these terraces are affected by water logging and/or salinity and alkalinity. The unit occupies nearly 76.9 percent of the total geographical area of the state. Three major alluvial plains/ terraces are recognised in the state. They are popularly known as Uppar-Bari Doab covering most parts of Tarn Taran, Amritsar and Gurdaspur districts. Bist Doab covering area between Beas and Satluj rivers and Malwa plain, area south of river Satluj.

The flood plains of Ravi, Beas, Satluj and Ghaggar rivers and many seasonal rivulets cover nearly 10.0 per cent area of the state. The flood plain soils are young and stratified without appreciable alteration of sediments. The continuous erosion cum deposition keeps the soils young as time becomes a limiting factor for the consolidation of sediments into pedogenic horizons.

The palaeochannels are believed to be the remanants of the old active channels. The origin of these channels may be due to the frequent changes in the courses of Ravi, Beas, Satluj and Ghaggar rivers and their tributaries, which became defunct and silted up. These areas occupy a low-lying topographic position on the landscape.



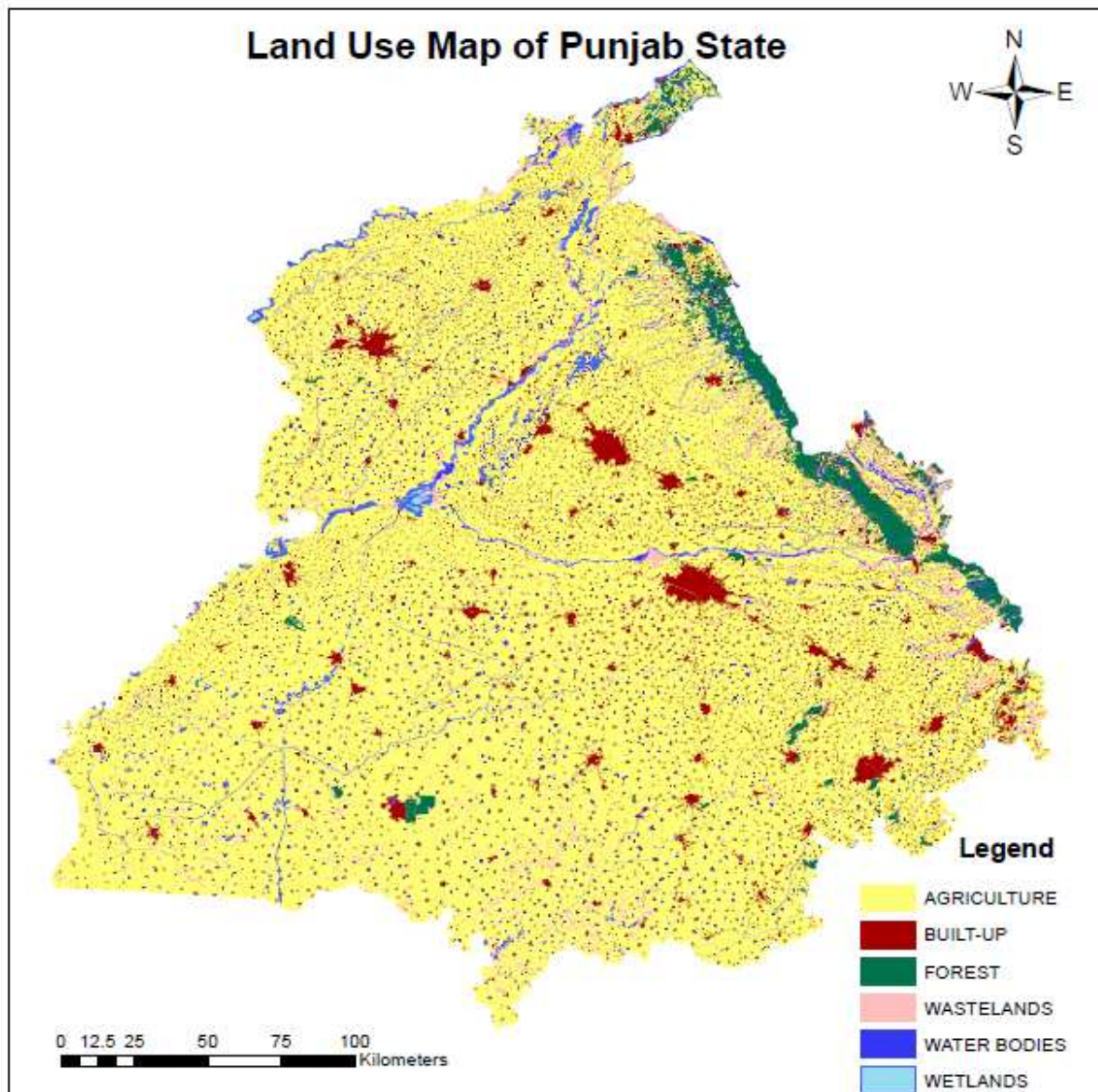
1.1.3 Land Use & Land Cover in Different Socio-Cultural Zones

Land use/land cover information is essential input for rational land use planning and environmental conservation. The land use statistics in three major socio-cultural zones of Punjab is presented in the following Table:-

Table 2: Area (ha) under different land use/land cover categories in different socio-cultural zones of Punjab

Land use/land cover categories		Upper Bari and Bist Doab Plain	Satluj and Ghaggar (Malwa) Plain	South-West Zone	Punjab State
Built-up Land	Urban	39414.87 (2.25)	53911.78 (3.00)	14611.01 (0.98)	107937.66 (2.14)
	Industrial	1554.91 (0.09)	3491.51 (0.20)	955.52 (0.06)	6001.94 (0.12)
	Rural	64268.51 (3.66)	79718.19 (4.46)	41737.35 (2.80)	185724.05 (3.69)
	Sub total (i)	105238.29 (6.00)	137121.48 (7.67)	57303.88 (93.84)	299663.65 (5.95)
Agricultural Land	Crop land	1450528.97(82.64)	1526355.47 (85.33)	1358992.13 (91.07)	4335876.57 (86.09)
	Fallow	655.39 (0.04)	708.73 (0.04)	7537.90 (0.51)	8902.02 (0.18)
	Orchards	2351.01 (0.13)	207.97 (0.01)	3794.88 (0.25)	6353.86 (0.13)
	Plantations	9913.58 (0.56)	3604.70 (0.20)	5290.09 (0.35)	18808.37 (0.37)
	Sub total (ii)	1463448.95 (83.38)	1530876.87 (85.59)	1375615.00 (92.18)	4369940.82 (86.77)
Forests	Dense	89946.34 (5.12)	42805.33 (2.39)	3694.22 (0.25)	136445.89 (2.71)
	Open	5608.93 (0.32)	2553.29 (0.14)	3667.75 (0.25)	11829.97 (0.23)
	Scrub	2136.11 (0.12)	2849.26 (0.16)	932.46 (0.06)	5917.83 (0.12)
	Sub total (iii)	97691.38 (5.57)	48207.88 (2.70)	8294.43 (0.56)	154193.69 (3.06)
Wastelands	Salt affected	1342.12 (0.08)	1732.59 (0.10)	4093.81 (0.27)	7168.52 (0.14)
	Gullied/Ravinous	3800.15 (0.22)	4808.80 (0.27)	--	8608.95 (0.17)
	Land with/ without scrub	21024.50 (1.20)	21437.19 (1.20)	1499.55 (0.10)	43961.24 (0.87)

	Sand dunes/ Sandy area	172.21 (0.01)	4507.95 (0.25)	23020.03 (1.54)	27700.19 (0.55)
	Mining/ Industrial	2811.05 (0.160	5360.98 (0.30)	2126.02 (0.14)	10298.05 (0.20)
	Sub total (iv)	29150.03 (1.66)	37847.51 (2.12)	30739.41 (2.06)	97736.95 (1.94)
Water Bodies	River/ Drains	38764.55 (2.21)	23254.25 (1.30)	6224.01 (0.42)	68242.81 (1.36)
	Canals	3672.82 (0.21)	7714.47 (0.43)	6924.60 (0.46)	18311.89 (0.36)
	Ponds	1441.43 (0.08)	2649.95 (0.15)	2153.29 (0.14)	6244.67 (0.12)
	Reservoirs	2061.30 (0.12)	594.15 (0.03)	89.63 (0.01)	2745.08 (0.05)
	Sub total (v)	45940.10 (2.62)	34212.82 (1.91)	15391.53 (1.03)	95544.45 (1.90)
Wetlands	Marshy/Swampy	8401.95 (0.48)	317.03 (0.02)	1111.50 90.07)	9830.48 (0.20)
	Waterlogged	5329.27 (0.30)	116.46 (0.01)	3844.24 (0.26)	9289.97 (0.18)
	Sub total (vi)	13731.22 (0.78)	433.49 (0.02)	4955.74 (0.33)	19120.45 (0.38)
Grand Total (Sub total i+ii+iii+iv+v+vi)		1755200.00	1788700.00	1492300.00	5036200.00



1.1.4 Climate and Rainfall

The climate of Punjab is mainly influenced by the Himalayas in the north and the Thar Desert in the south and south-west. The periodic circulation of the moist air masses from the south-east and north-western sectors decides the occurrence of two wet periods each followed by a dry period. The presence of Himalayas in the north greatly modifies the temperature. As the distance from the Himalayas increases the temperature also increases, whereas rainfall decreases. In general, summers are hot and winters are cool.

The state experiences three distinct seasons, the hot season from April to June, the rainy season from July to September and the winter season extending from October

to March. The highest temperature (between 44.2° and 44.7° C) in the state is recorded in the month of June and the lowest (between 0° and 2.2°C) in December. The mean annual rainfall is 705 mm, which varies from 1200 mm at Pathankot to less than 300 mm at Abohar, representing wettest and driest stations, respectively. The major part of the rainfall occurs between the months of July and September, and is essential for growing Kharif crops and subsequent sowing of rabi crops. Hence the climate of the state is dominantly, semi-arid and monsoonic type. The soil moisture regimes are udic, ustic and aridic and the soil temperature regime is mainly hyperthermic.

Temperature: Day temperatures are more or less uniform over the plains except during winter and monsoon season. In general the night temperature is lower in higher altitudes except during the post monsoon when they are more or less uniform. June is the hottest month with mean maximum temperature of 41° C in plains and with 2 to 5° lower temperatures at elevated places. Highest temperature recorded in the plains is 45°. January is the coldest month with mean minimum temperature for the state on a whole is 5.5°C, varying from 4° to 5°C in the west to 6° to 7° C in the east. Both maximum and minimum temperature rise from January till June.

Rainfall: State receives about 648.8 mm of average annual rainfall. 75% of which is received during monsoon months from July to Sept. July and August are rainiest months. Rainfall in the state varies from 26 cm in extreme southwest parts to 72 cm in extreme southern parts and varies from 42 cm in southern parts to 13.5 cm over northern parts. Districts north of Gurdaspur constitute the area of maximum rainfall and districts southwest of Ferozepur receive minimum amount of rainfall. These districts represent lowest and highest rainfall in the state.

1.1.5 River System & Dams:

Rivers of Punjab

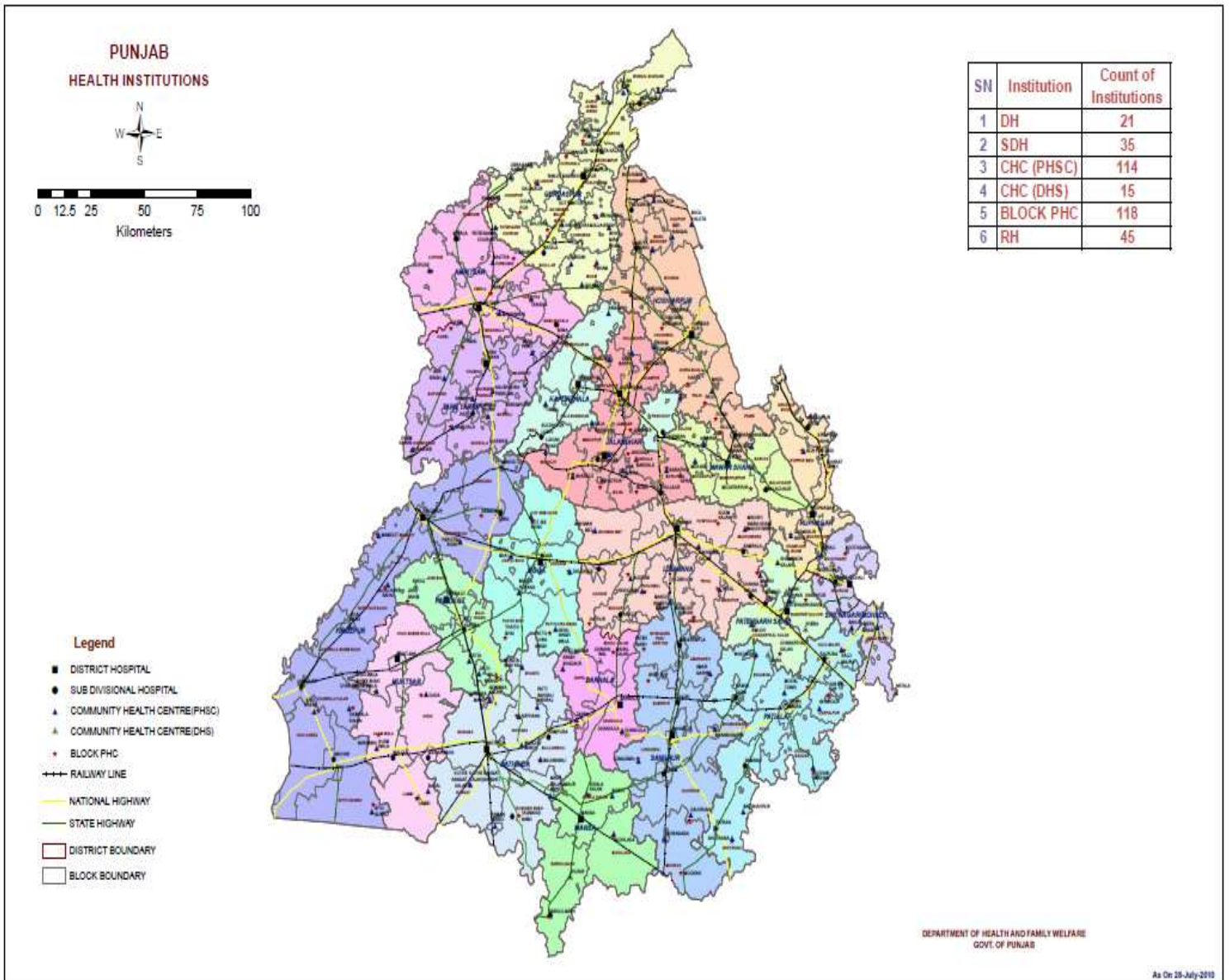
There are three perennial rivers namely rivers Ravi, Beas & Sutlej and one non-perennial river namely River Ghaggar in the State. Besides several Choes, Nadies & Khads also traverse the Sub mountainous & alluvial plains before outfalling into Parent River. Multipurpose storage reservoirs stand constructed on River Sutlej at Bhakra, River Beas at Pong and Ranjit Sagar Dam on river Ravi. Due to construction of Dams on the three rivers, the menace of flash floods has been considerably reduced but flash floods are still experienced in river Ghaggar due to non-construction of dam on this river. The Drainage Administration is entrusted with the work of maintenance and repair of 1800 Km. long Flood Protection Embankments (Dhusis), 3800 No. River Training Works & 7238.13 Km long Drainage system.



Health:

Punjab has 507 Ayurvedic dispensaries, 5 ten bedded, Ayurvedic Hospitals, 17 Ayurvedic Swasth Kendras situated in the mainly far flung rural areas. There is govt. central Ayurvedic pharmacy, Patiala which manufactures and supplies the medicines to the State dispensaries and hospitals. At present, there are 107 Government Homeopathic Dispensaries in the State of Punjab. In each dispensary one Homeopathic Medical officers, one Dispenser and one Class-IV employee is working. In addition to this 98 Dispensaries are functioning in CHCs under National Rural Health Mission Scheme, in these dispensaries only Homoeopathic Medical Officer has been posted.

Health Institutions



Education:

Nearly 360,000 students join the state's primary schools every year. The average radius covered by schools is 0.8 km in urban areas. The state has six universities, 233 graduate colleges and 20,776 schools (2006). The Punjab University is more than 100 years old and is well regarded, globally. In case of any disaster the educational institute can function as centers for temporary accommodations and can also be used for distribution of relief material. These institutes can impart training to manpower involved in the activities of disaster management. Also instructions provided to students studying in various schools can reach a large number of homes.

Roads and Bridges:

Road Network

The state is well connected to its four neighbouring states and the rest of India through 11 National Highways (NH). The state highways account for about 2.2 per cent of the total national highway network in India.

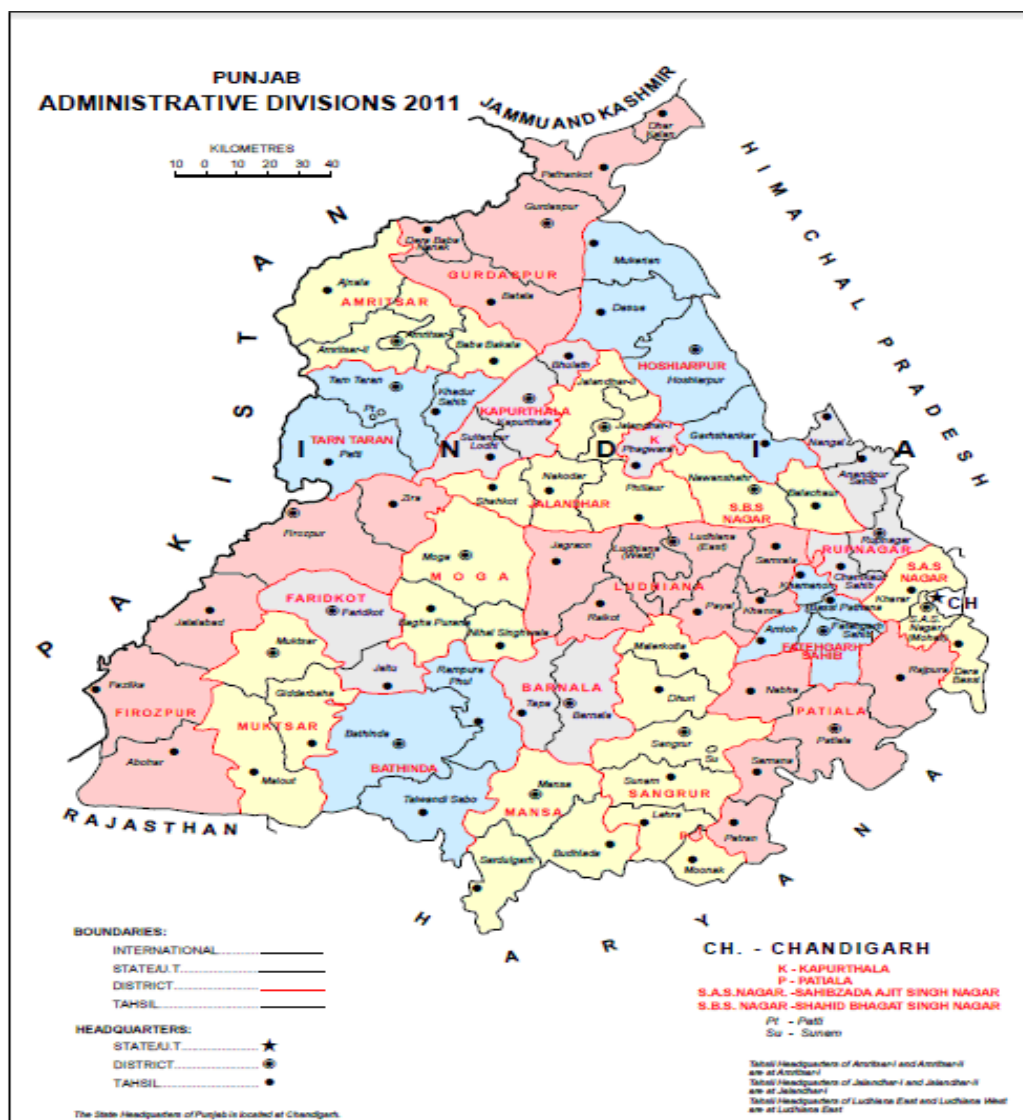
1.1.6 Administrative Set-Up

Punjab has twenty two districts each under the administrative control of a District Collector. The districts are subdivided into 79 Tehsils, which are under the administrative control of a Tehsildar. Each Tehsil consists of blocks which are total 143 in number. The blocks consist of revenue villages and the total number of revenue villages in the state is 12,278. Apart from these there are 22 Zila Parishads, 136 Municipal Committees and 22 Improvement Trusts looking after 143 towns and 14 cities of Punjab. Fig 2.2 and Table 2.1 gives the administrative subdivisions of Punjab.

Table 3: Geographical area, number of villages and blocks in different districts of Punjab

District	Area (sq kms)	No. of Tehsils	No. of Sub-Tehsils
Amritsar	2676.3740	4	5
Barnala	1412.9901	2	2
Bathinda	3374.1890	3	4
Faridkot	1475.9645	2	2
Fatehgarh Sahib	1142.4416	4	1
Ludhiana	3707.0851	7	7
Mansa	2168.5908	3	3
Moga	2230.9172	4	1
Muktsar	2634.2405	3	4
SBS Nagar	1259.5952	2	1
Patiala	3318.4168	5	3

Rupnagar	1376.5143	4	2
Sangrur	3603.2098	6	7
SAS Nagar	1093.8194	3	1
Tarn Taran	2418.3104	3	5
Firozpur	5258.9944	3	3
Fazilka	9184.3	3	3
Gurdaspur	3564.9752	3	8
Hoshiarpur	3368.6790	4	5
Jalandhar	2629.9561	5	7
Kapurthala	1628.7370	4	1
Pathankot	4641	2	2



1.2 State Disaster Management Plan

1.2.1 Paradigm Shift in Disaster Management

From a response and relief-centric approach to a proactive and comprehensive mindset towards DM covering all aspects from prevention, mitigation, preparedness to rehabilitation, reconstruction and recovery

It also provides:

- The creation of a policy, legal and institutional framework, backed by effective Statutory and financial support
- The mainstreaming of multi-sectoral DM concerns into the developmental process and mitigation measures through projects.
- A continuous and integrated process of planning, organising, coordinating and implementing policies and plans in a holistic, community based participatory, inclusive and sustainable development

1.2.2 National Vision

The national vision is to build a safer and disaster resilient India by developing a holistic, proactive, multi-disaster and technology driven strategy for DM. This will be achieved through a culture of prevention, mitigation and preparedness to reduce the impact of disasters on people. The entire process will centre stage the community and will be provided momentum and sustenance through the collective efforts of all government agencies supported by Non-Governmental Organisations (NGOs).

1.2.3 The role of state Disaster Management Authority (SDMA)/ State Executive Committee (SEC) and the State Departments

According to Section 23 of the DM Act 2005, this states that there shall be a DM plan for every state. It outlines the broad coverage of the plan as well as the requirements of consultation in the preparation of the state plans. It also provides for annual review and updating of the state plan, and enjoins upon the state governments to make provisions for financing the activities to be carried out under the state plans. It provides for the departments of the state governments to draw up their own plans in accordance with the state plan.

1.2.4 Purpose of Plan

To respond promptly in a coordinated manner in a disaster like situation, it is mandatory to mitigate the potential impact of disasters in order to save lives of

people and property in Punjab.

1.2.5 Key Objectives

The aim of the state plan is to ensure that the following components of Disaster Management (DM) are addressed to facilitate planning, preparedness, operational, coordination and community participation. Flowing from the national vision and the aforementioned approach, the objectives & guiding principles for the plan formulation are:

- Promoting a culture of prevention and preparedness by ensuring that DM receives the highest priority at all levels.
- Ensuring that community is the most important stakeholder in the DM process.
- Encouraging mitigation measures based on state-of-the-art technology and environmental sustainability.
- Mainstreaming DM concerns into the developmental planning process.
- Developing contemporary forecasting and early warning systems backed by responsive and fail-safe communications and Information Technology (IT) support.
- Promoting a productive partnership with the media to create awareness and contributing towards capacity development.
- Ensuring efficient response and relief with a caring approach towards the needs of the vulnerable sections of the society.
- Undertaking reconstruction as an opportunity to build disaster resilient structures and habitat.
- Undertaking recovery to bring back the community to a better and safer level than the pre- disaster stage

1.2.6 State Disaster Management Plan: An Approach

Till recently, the approach to Disaster Management has been reactive and relief centric. A paradigm shift has now taken place at the national level from the relief centric syndrome to holistic and integrated approach with emphasis on prevention, mitigation and preparedness. These efforts are aimed to conserve developmental gains as also minimize losses to lives, livelihood and property. A typical Disaster Management continuum as shown below, comprising of six elements i.e., Prevention, Mitigation and Preparedness in pre-disaster phase, and Response, Rehabilitation and Reconstruction in post-disaster phase, defines the complete

approach to Disaster Management.

For efficient execution of the State Disaster Management Plan, the Plan has been organized as per these four stages of the Disaster Cycle.

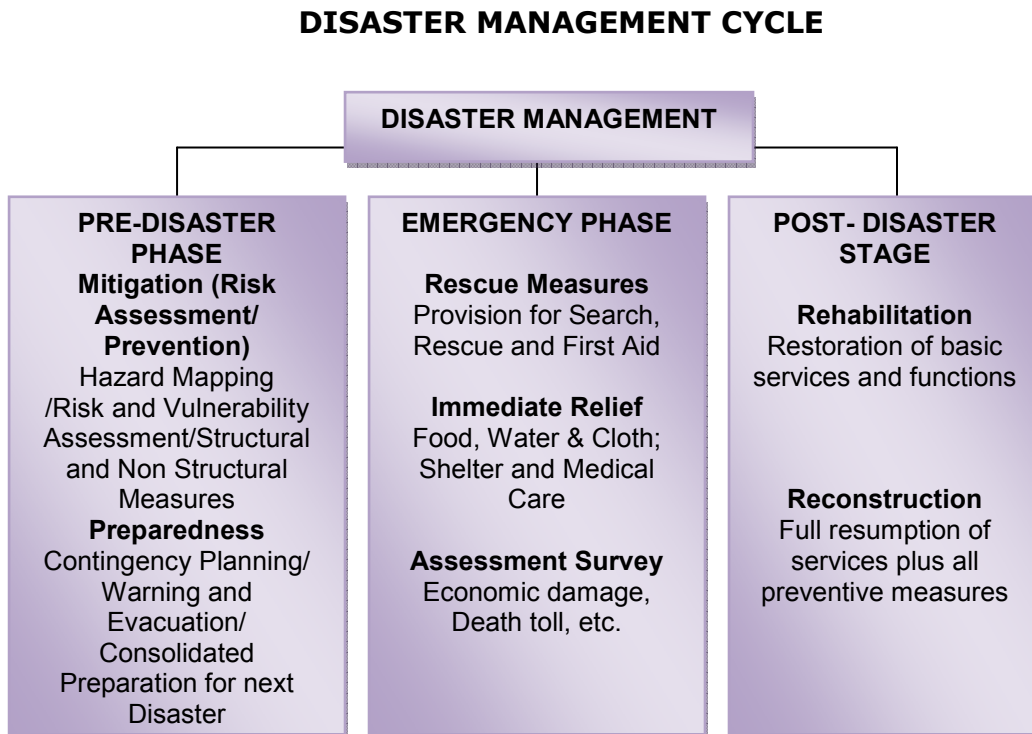


Fig. No.1 Disaster Management Cycle

CHAPTER-II

HAZARD, RISK AND VULNERABILITY ASSESSMENT

INTRODUCTION

The State of Punjab suffers mainly from two natural hazards, namely, flood and earthquakes, of which floods have quite a high frequency of occurrence, whereas earthquakes of $M \geq 5.0$ have a moderate frequency within and close to the boundary of the State. Theoretically risk is said to be the product of hazard and vulnerability of that region. In Disaster Management, risk is measured in terms of expected loss of human lives, loss of capital, property like agricultural land, roads, structures, livestock etc. Hazard is potentially a damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydro meteorological and biological) or induced by human processes (environmental degradation and technological hazards). Hazards can be single, sequential or combined in their origin and effects. Each hazard is characterized by its location, intensity, frequency and probability.

Vulnerability is the internal weakness of a system from external threats and in disaster perspective it is the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. It is the degree of loss (from 0 to 100 per cent) resulting from a potentially damaging phenomenon. It is the degree to which a person, system or unit is likely to experience harm due to exposure to perturbations or stresses.

Risk is the probability of harmful consequences, or expected losses (deaths, injuries, property, livelihoods, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

A hazard becomes a disaster only when it affects human settlements and causes loss of life and damage to property. In order to reduce the impact of such events

through mitigation efforts, it is necessary to understand how such hazards become disasters. The extent of vulnerability of the area, people and property to a hazard or the probability of its occurrence defines the extent of risk. Vulnerability analysis and risk assessment therefore are essential forerunners for evolving appropriate preventive measures and mitigation strategies.

The process of conducting a risk analysis is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability; and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure,

Punjab is vulnerable to 21 types of hazards out of 33 identified by the High Powered Committee (HPC) of Government of India into 5 sub-groups. Apart to identified hazard by HPC, state has high impact of Groundwater and Surface water Pollution, depletion of groundwater level and cancer epidemic which needs to be addressed as hazard. :

Table 4: DISASTERS IDENTIFIED BY THE HIGH POWERED COMMITTEE OF GOVERNMENT OF INDIA (1999)

I	Water and Climate related disasters	<ul style="list-style-type: none"> ✓ Floods and Drainage Management • Cyclones • Tornadoes and Hurricanes ✓ Hailstorm • Cloud Burst ✓ Heat Wave and Cold Wave • Snow Avalanches ✓ Droughts • Sea Erosion ✓ Thunder and Lighting
II	Geologically related disasters	<ul style="list-style-type: none"> • Landslides and Mudflows ✓ Earthquakes • Dam Failures / Dam Bursts • Mine Fires
III	Chemical, Industrial and Nuclear related disasters	<ul style="list-style-type: none"> ✓ Chemical and Industrial Disasters • Nuclear Disasters
IV	Accident related disasters	<ul style="list-style-type: none"> ✓ Forest Fires ✓ Urban Fires ➤ Mine Flooding ➤ Oil Spill ✓ Major Building Collapse ✓ Serial Bomb Blasts ✓ Festival Disasters and Fires ✓ Electrical Disasters and Fires ✓ Air, Road and Rail Accidents ➤ Boat Capsizing ✓ Village Fire
V	Biologically related disasters	<ul style="list-style-type: none"> ✓ Biological Disaster and Epidemics ✓ Pest Attacks ✓ Cattle Epidemics ✓ Food Poisoning

Source: A Report from HPC, GOI in 1999
✓ **Disaster in Punjab State**

Seasonality of hazards

Table 5: Seasonality of Hazards of Punjab State

Type of Hazards	Jan Feb Mar				Apr May Jun				Jul Aug Sep				Oct Nov Dec			
	H	C	A	I	H	C	A	I	H	C	A	I	H	C	A	I
Flood									←	→						
Earthquake	←															→
Hailstorm									←	→						
Windstorm					←	→			←	→						
Heatstroke					←	→										

No government has unlimited resources allowing them to plan for every hazard event possible, therefore some form of ranking is required when deciding which hazards are most important to plan for. Based on the aggregation in the Risk Matrix, 21 hazards are identified that could affect the State of Punjab. This assessment identifies the risk that each hazard presents to the Punjab State, thereby allowing to plan for mitigation, response, and recovery efficiently within budgetary and other constraints.

Based on the information, it has assigned each hazard with a rating of *high*, *moderate*, *low* or *very low*, though this assessment did not find any hazards with a rating of *very high* in the State of Punjab. The results of this assessment identify that flooding, road accident and cancer hazards as *high risk*.

The Risk Matrix on the following page shows the relative ranking of all hazards analyzed.

HAZARD RISK MATRIX

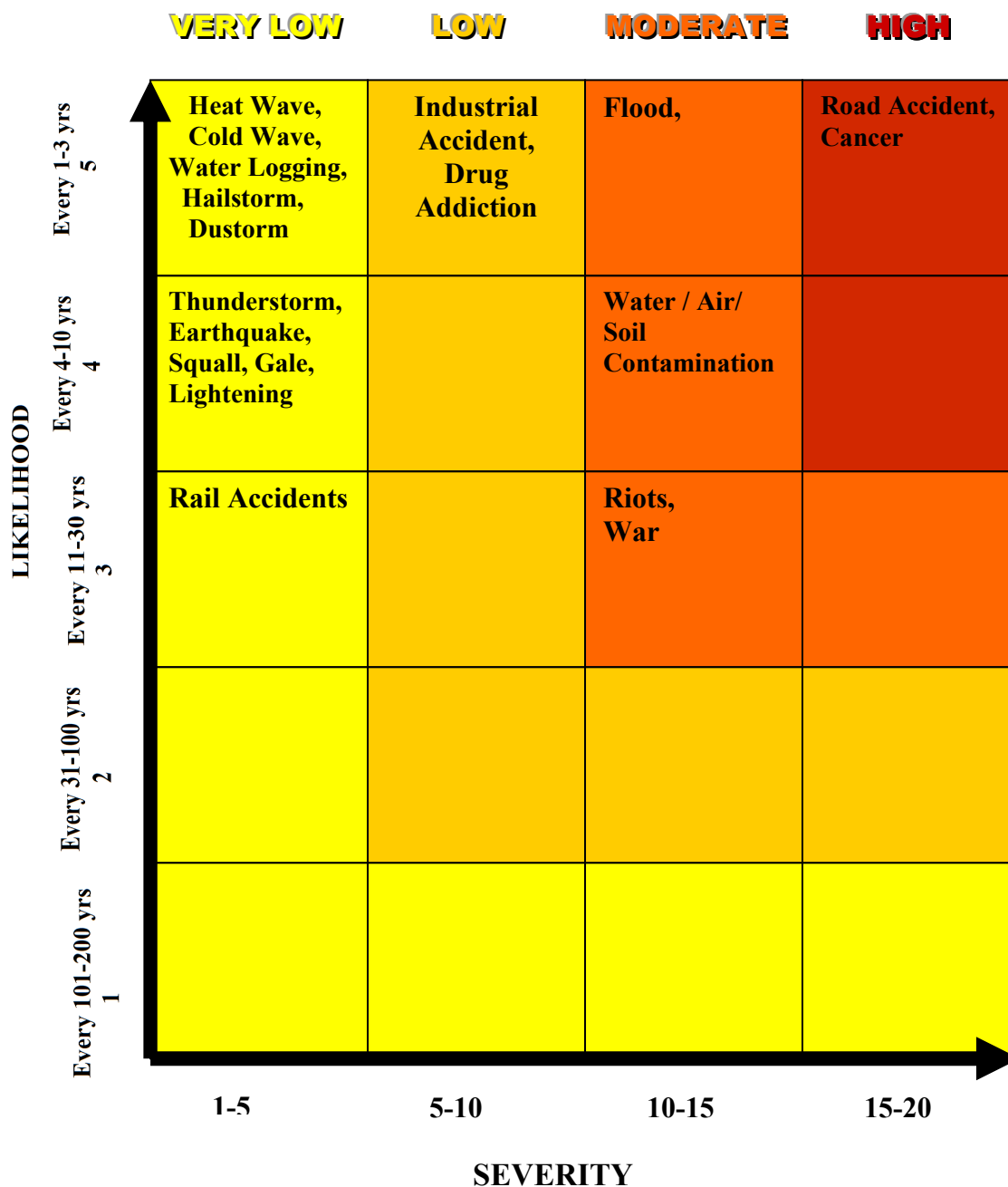


Fig. No.2 Hazard and Risk Matrix

2.1 Hazard, Risk and Vulnerability Assessment

Considering **hazards** alone may lead to a skewed set of priorities for action. It is equally important to consider the **severity** of possible impacts from the hazard as well as the frequency or **likelihood** of a hazard event occurring. The combination of severity and likelihood is termed the **level of risk**.

In determining the severity of a hazard event, a community's vulnerability must be examined. Likelihood reflects the frequency of occurrence for a particular hazard event and can range from rare events occurring every 200 years to more frequent events, which usually have a high number of recorded incidents or anecdotal evidence.

For example, a community located on a floodplain is more vulnerable than a similar community built outside the floodplain and if that community may have areas with a high proportion of elderly or disabled residents, thereby increasing the vulnerability of the community.

A Hazard, Risk and Vulnerability Assessment examine the hazards that may impact a community and the risk that each hazard event poses to the community as a whole and to vulnerable elements of the community.

Factors considered in developing a list of hazards for the Punjab State includes:

- Demographics
- Geography
- Industries and other technologies
- Transportation modes and routes
- Weather and climate

Based on aggregation seen in the Risk Matrix, it has been identified 33 hazards that could affect the State of Punjab. Details regarding the measure of likelihood are seen in Table 1.

Table 6: Measure of Likelihood

Measures of Likelihood	Return Period (yrs)	Score
Frequent or Very Likely Every	Every 1-3 yrs	5
Moderate or Likely Every	Every 4-10 yrs	4
Occasional, Slight Chance Every	Every 11-30 yrs	3
Unlikely, Improbable Every	Every 31-100 yrs	2
Highly Unlikely, Rare Event Every	Every 101-200 yrs	1

Table 7: Details each level of risk rating with a description of how these ratings should be interpreted

RISK RATING INTERPRETATION	
	These risks are <i>low</i> . Implementation of mitigation measures will enhance emergency preparedness, but it is of less urgency than the following hazards.
	These risks are <i>moderate</i> . These hazards have intermediate levels of frequency and severity. Hazards classified as moderate are more urgent than low risk hazards and are often commonplace concerns. Given this, moderate level hazards should be addressed with an appropriate level of urgency.
	These risks are <i>low</i> . Implementation of mitigation measures will enhance emergency preparedness, but it is of less urgency than the following hazards.
	These risks are <i>low</i> . Implementation of mitigation measures will enhance emergency preparedness, but it is of less urgency than the following hazards.

2.2 HAZARDS

This HRVA is designed to provide an assessment of the hazards that may present risks to the State of Punjab. These hazards may require site support through the Emergency Coordination Centre.

2.2.1 Hydrological (i) Flood

A major part of geographical area of the state is prone to floods although substantial part has been protected through flood control measures. Nevertheless, the protected area also faces risk, although in reduced magnitude, because of possibility of flood in case of failure of protection works.

The district wise damage risk tables show high to very high from flood to a large number of houses and medium risks to many houses in the protected area from the consideration of possibility of failure of flood control works in extreme floods. As per records, about 62,000 houses are damaged due to floods annually on an average.

The maximum damage of 627000 houses was reported in floods of 1955. A gist of flood damage scenario in the state as per available record is shown in Table 37.

Apart from the State Govt., Bhakra Beas Management Board is the focal organisation in-charge of management of flood related aspects in the state. Detailed study of flood problem of particular areas, drainage problem and systematic maintenance of embankments are some vital aspects for disaster mitigation in the state.

Many flood control works including embankments have been constructed in the state. Possibility of failure of the works at vulnerable points is a major consideration for flood disaster mitigation. Also house constructions should follow the Guidelines and the settlement planning should be based on Land Use Zoning Guidelines.

Record to Previous Floods

In the state records, no major disaster has been mentioned for the last 25 years, except a war of 1971 with Pakistan and another flood occurred in the 1987s leading to massive loss of property.

Table 8: No. of villages/towns affected, human lives and Cattle lost due to floods during the Rainy Season in Punjab

Year	No. of Villages/	Area affected	Population affected	Human lives	Cattle heads	Damage caused	% of damaged	Value of crops	Hou (Pri
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	town affected	in sq. kms		lost	lost (No.)	to area under crops (hects)	area to total cropped area	damaged (Rs. '000)	No.
1960	2540	4638	1383796	19	311	361383	7.64	98914	4209
1961	1792	2093	888687	13	47	200792	4.18	47983	1308
1962	7203	15057	4301826	95	2035	957950	19.27	246035	2529
1963	284	493	112658	5	7	14347	0.29	4723	1871
1964	2626	8585	1733989	39	525	322787	6.31	150066	2574
1965	16	7	1200	1	-	222	0.01	150	3
1966	1457	2110	770234	19	211	81265	1.57	58756	3012
1967	419	-	-	1	13	41857	0.77	26684	306
1968	540	689	284718	7	2	62347	1.18	49188	3921
1969	205	431	362758	19	157	20336	0.37	16593	1253
1970	176	118	7541	1	5	6987	0.12	3088	1811
1971	1227	617	336959	23	164	244083	4.26	31930	8396
1972	68	139	6878	5	6	3369	0.57	4804	812
1973	1046	1651	370788	27	219	126024	2.09	70668	3060
1974	14	120	5000	-	3	30	-	-	1000
1975	1243	1297	479205	35	432	74759	1.19	104900	3027
1976	3153	3564	1621426	129	1821	223578	3.56	364011	2828
1977	373	114	233884	11	96	9476	0.15	6922	782
1978	1585	1450	368644	17	148	108924	1.70	220495	3697
1979	25	19	5113	-	-	1775	0.43	4438	-
1980	1191	489	85724	44	117	48930	0.72	6559	3194
1981	328	-	55579	6	37	12497	0.18	14435	8575
1982	9	-	451	1	-	46	-	29	16
1983	240	39089	269548	13	27	37138	0.53	69809	1695
1984	439	33	18794	-	1	3257	0.05	5603	1571
1985	5274	8270	1716628	153	2805	269683	3.77	472898	3070
1986	402	516	163503	7	14	51518	0.71	59531	9683
1987	-	-	-	-	-	-	-	-	-

1988	341	741	20300	10	200	74125	10.52	25300	2179
1989	-	-	-	-	-	-	-	-	-
1990	755	471	90465	13	275	47078	9.75	251086	1106
1991	-	-	-	-	-	-	-	-	-
1992	459	34	47038	10	-	33762	0.45	283400	7582
1993	5017	7977	3560122	359	8586	203957	2.68	-	1476
1994	469	-	29451	41	369	33348	0.43	36730	6950
1995	6585	2788	2120990	157	1310	275761	3.59	1126531	1443
1996	-	-	-	19	1	15529	0.30	68872	2873
1997	677	-	-	28	100	97950	1.24	366932	1231
1998	-	126	176	22	14	8816	0.11	27564	654
1999	30	29	-	12	-	2764	-	12959	18
2000	81	127	319	5	88	12620	0.16	77116	9
2001	-	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-	-
2003	43	47	25	3	-	14	0.06	16784	1296
2004	480	610	60157	15	511	46561	0.59	517010	1373
2005	480	610	60157	15	511	46561	0.59	517010	1373
2006	442	211	405933	10	23	21297	0.27	172539	266
2007	1033	1035	405911	7	3	70407	0.67	582995	881
2008	2001	5004	389116	34	104	70488	0.90	645084	1225
2009	545	14967	118796	15	74	17599	12.56	279475	6450
2010	1884	218337	101186	37	107	257657			2308

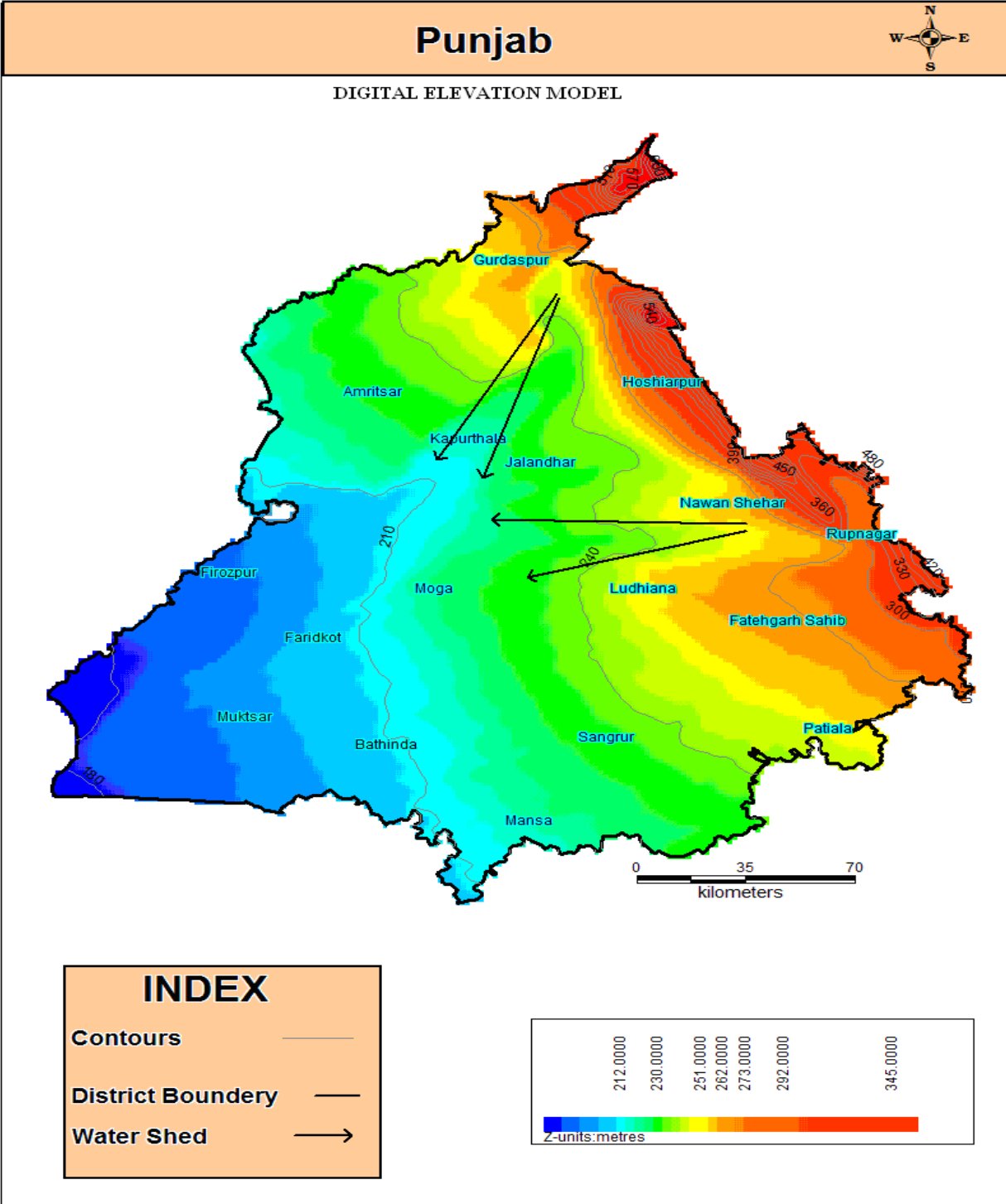
Source: Economic Advisor of Punjab

Amongst all the natural disasters afflicting the State, floods are the most frequent and devastating. Almost 80% of the annual rainfall is concentrated over a short monsoon period of 3 months.

In Punjab, damages due to floods are caused mainly by the river Ravi, Sutlej and Ghaggar, which have a common delta where floodwaters intermingle, and, when in spate simultaneously, wreaks considerable havoc. The problem is further accentuated when flood synchronises with high tide. The silt deposited constantly

by these rivers in the delta area raises the bed levels and the rivers often overflow their banks or break through new channels causing heavy damages.

Following figure shows the Digital Elevation Model of Punjab. It shows that elevation of Punjab State decreases from North-East to South-West.



The various factors which contribute to the high degree of vulnerability and damages in the State during floods are:

- a) Nearly 80% of the rainfall in the State occurs within 3 months, which also coincide with the main cropping season;
- b) Increased encroachment in the flood plains because of comparatively better livelihood opportunities and development are important contributors to the increased vulnerability to flood.
- c) Poor socio-economic condition of the majority living in the flood plains, and the local economy being primarily dependent on the monsoon paddy.
- d) Poor infrastructure and weak mud houses.
- e) Very little or no forest cover in the flood prone areas.

The rivers posing flood problem in the state are Beas, Sutlej, Ravi and to some extent Ghaggar as shown in the Flood Hazard Map. Although flood problem in the three rivers named first have been largely mitigated through construction of reservoirs and embankments, flood risk due to high releases from reservoirs and breach in embankment persists. Considerable damage also occurs by a number of choes (Hill torrents) flooding Hoshiarpur, Jalandhar, Kapurthala and Rup Nagar districts. The main problem during the monsoon (flood period) is drainage congestion and water logging. The water logging problem is predominant in Firozpur, Bathinda and Sangrur districts. Intense rainfall, inadequate drainage system and lack of proper maintenance of flood control and other works (embankments, drainage system, cross drainage works) often accentuate the flood situation in the state.

The vulnerability of the State to floods is given in the map below.

ii) Water Logging:

The Water table is rising in South-western districts of the state due to limited or non-extraction of groundwater because of blackish/saline quality, which makes it unfit for domestic, irrigation and other purposes. This has caused water-logging in some parts of this area. In the Nineteen Fifties, the sub-soil water level in the South Western districts, mainly in the Muktsar, Malout and Abohar tracts, was about 33 meters below ground level. After the construction of twin canals i.e. Rajasthan Canal feeder and Sirhind Canal feeder, in addition to Abohar Branch and Bikaner Canal, the sub-soil water level started rising at the rate of 0.2 metre to 1.0 metre annually. The area has witnesses a rise in water level upto 22 meter in the last 25 years.

The main reason of water logging is non-extraction of underground water, which is blackish/ saline. The topography of the entire area of Muktsar and Malout, which is saucer shape and impedes surface drainage system both natural and artificial, the constant seepage from the twin canals and return flow from canal irrigation, are some of the other contributory factors towards creating water logging problem.

The Water table is rising in south-western Districts of the state due to limited or non-extraction of groundwater because of blackish/saline quality, which makes it unfit for domestic, irrigation and other purposes. This has caused water-logging problem in Kahnuwan Bet Area in district Gurdaspur, Chamkaur Sahib and Sri Anandpur Sahib block in district Ropar.

iii) Drought

State of Punjab includes lack of potable water for residents and crop failure due to lack of water for irrigation. Secondary impacts include damage to the agriculture and tourism sectors of the economy.

Punjab have experienced drought due to inadequate rain in Monsoon. The State was experienced drought in 1978, 1979, 1985, 1987, 2002 and 2004, both in rural and urban areas. In 1987, a major drought was experienced in the State but in 2002, the intensity of the drought has made the situation much more acute and has broken the back of the farming community. The State Government declared all the 17 districts in the State as drought affected.

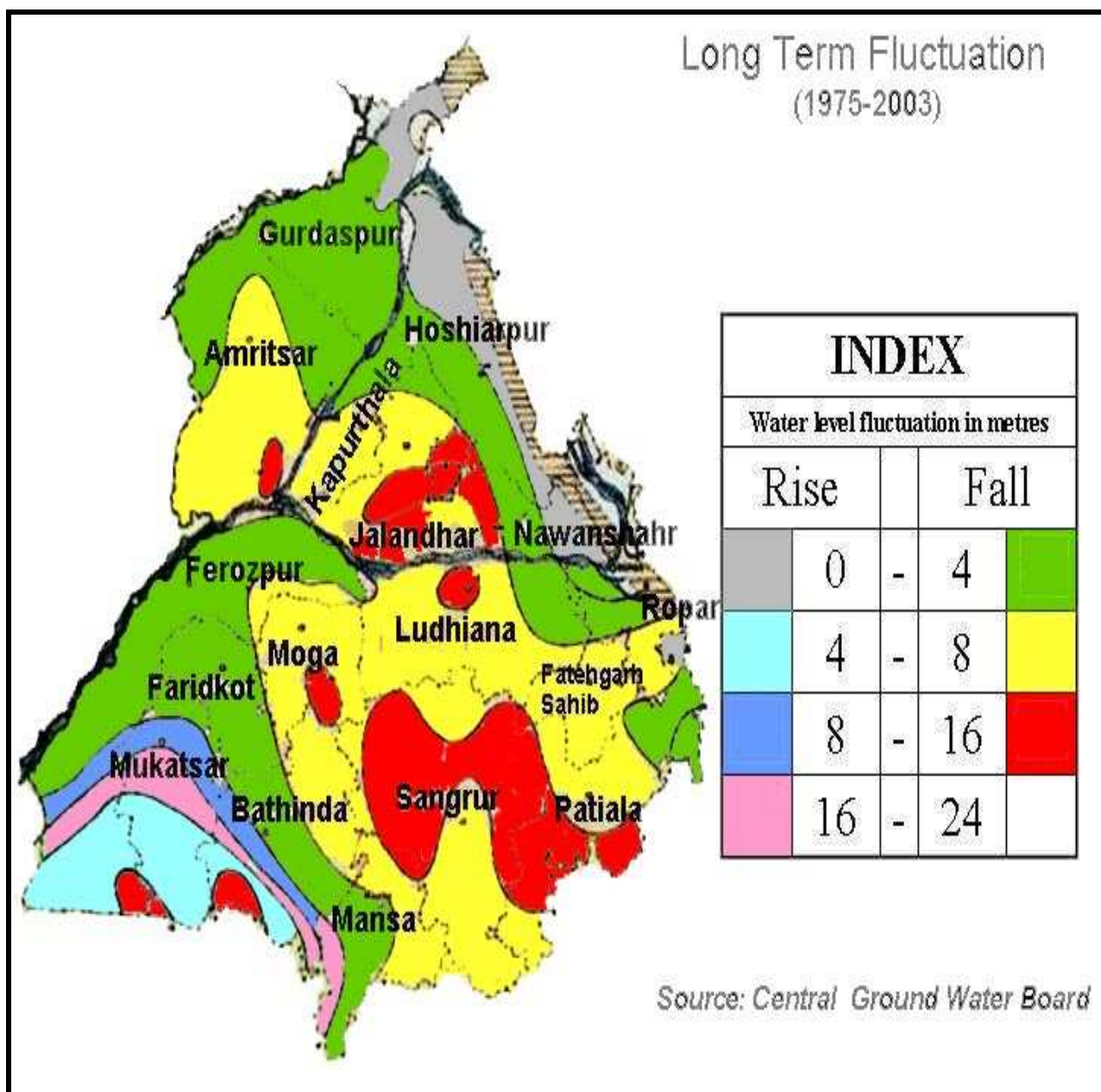
The primary causes of drought include low rainfall or inadequate snow pack the preceding winter. However, other factors may also contribute to drought conditions including land degradation and an increase in water demand. An increase in water demand may be a result of increased population or industry, but can also result from water used for fire fighting.

Technological failure of human-built water supply systems can also lead to drought-like conditions, though this is often of a localized nature.

The Intergovernmental Panel on Climate Change (IPCC, 2001) climate models incorporate scenarios of possible future states of the global climate. The most common scenarios are based on a range of socioeconomic assumptions (e.g. future global population and Gross Domestic Product). The models project global temperature increases ranging from 1.4 °C to 5.8 °C by 2100 (relative to 1990), accompanied by changes in precipitation and other aspects of the climate system. In British Columbia, the average annual temperature may increase by 1 °C to 4 °C, with more dramatic effects in the northern portion of the province than in the southern. Even a seemingly minor increase in average annual temperature can have significant impacts on weather patterns, plant species distribution, and animal migrations, for example. These changes can impact tourism, agriculture, municipal and agricultural water supplies, forestry, and other industries.

iv) Desertification

Desertification is a process whereby the productivity of the land declines because of deforestation, over-cultivation, drought, over-grazing, poor irrigation methods, salinization, soil erosion and changes in rainfall patterns. Desertification is a long-term process in terms of its development and impacts but its consequences are drought, famine and dying animals. A United Nations Development Programme (UNDP) report states that about 12% of Punjab state suffers from the threat of desertification. Today, India and Pakistan both face the threat of desertification in the semi-arid zone of Punjab. Land has been intensively cultivated under the Green Revolution at the expense of grazing and traditional fallow periods. The desertification of Punjab is proceeding (and will increase with climate change) due to the excessive use of fertilizers and improper irrigation techniques without proper long-term soil conservation strategy.



Above map shows the long term water level fluctuations of Punjab State. Drought hazard increases due to the fall of water level.

v) Soil Erosion

Soil erosion is the removal of the topsoil layer or soil particles by physical or human activities. This is a result of the absence of vegetative cover and moisture. Intensive cultivation, deforestation and destruction of the natural vegetation by grazing or other means will increase soil erosion. It is estimated that 3,000 hectares of cultivated land are lost to erosion in Punjab province annually. The Kandi tract in Rupnagar district of Punjab state has undulating topography, inadequate ground water, steep slopes, bare land surfaces and, thus, severe

problems of soil erosion. Soil erosion can result in landslides, flash floods and the silting of water channels and dams downstream.

Status of Soil Erosion:

- The Punjab is facing very serious problem of soil erosion by water. It is serious menace in the Shivaliks and Kandi region, along the river courses, streams and choes and in the south western arid and hot region.
- It is more prevalent in Gurdaspur, Nawashehar, Hoshiarpur and Ropar districts of north-eastern of Punjab where water erosion by various choes and streams is much more and is aggravated by the loose structure and softness of rocks, steep slopes, deforestation overgrazing and various cultural and economic activities of man.
- In sub-mountain region of Punjab, runoff is one of the major modes of escape of rainwater received in the area.
- Studies in the area have indicated that runoff during the monsoon period varies between 24 and 36 percent, whereas annual loss of rainwater varies between 26 and 42 per cent.
- As far as individual storms are concerned, the runoff varies from none to as high as 80 per cent. The peak runoff rates recorded in the area are sufficient to cause flash floods.
- The runoff carries along with it upper fertile soil rich in applied nutrients, thereby decreasing productivity of the soil. The whole Kandi region have been rendered infertile and dissected and are prone to flooding by hundreds of choes that transverse the districts of Hoshiarpur, Gurdaspur, Nawashehar and Ropar from Shiavilks to the flat alluvial plains.
- It covers nearly 11% area of the state. As per Central Water Commission (2003), 9140 sq km area in the state is prone to water erosion.

Effects Of Soil Erosion

- Soil erosion by various factors causes wide range of problem in land management and water bodies.
- About 60 percent of soil that is washed away ends up in rivers, streams and lakes, making waterways more prone to flooding and to contamination from soil's fertilizers and pesticides.
- Soil erosion also reduces the ability of soil to store water and support plant growth, thereby reducing its ability to support biodiversity.
- Erosion promotes critical losses of water, nutrients, soil organic matter and soil biota, harming forests, rangeland and natural ecosystems.
- Erosion increases the amount of dust carried by wind, which not only acts as an abrasive and air pollutant but also carries about 20 human infectious disease organisms, including anthrax and tuberculosis (Lang, Susan S., March 20, 2006).
- The most important effect of soil erosion is the loss of top soil thus converting otherwise productive soils into shallow soils which is one of the major factors of low and unstable crop yields in the rain-fed semi-arid to sub-humid tropics of India.

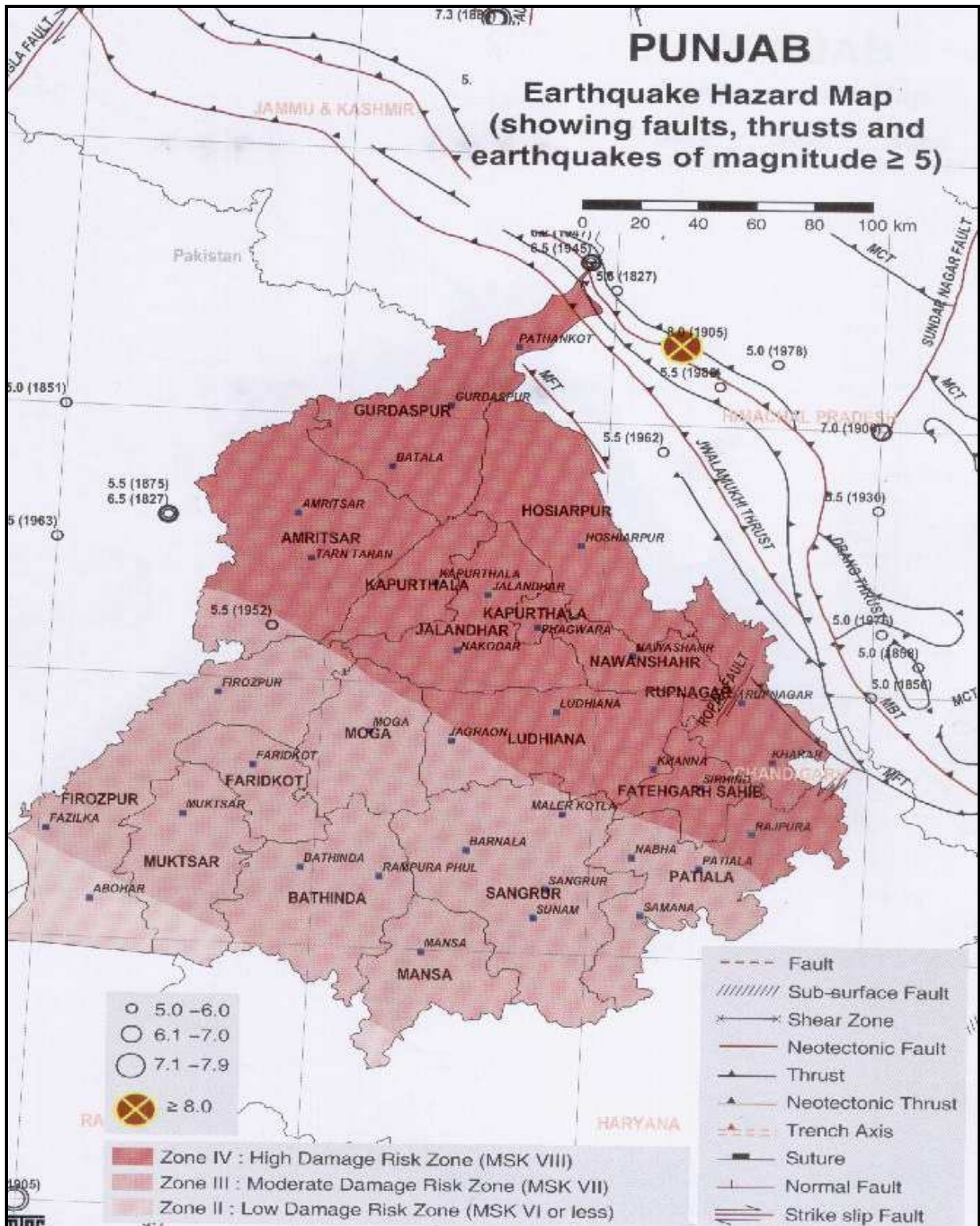
- There are vast areas of degraded common grazing lands, uncultivable waste lands and degraded forests that pose a serious threat to adjoining productive crop land.

2.2.2 GEOLOGICAL

I. Earthquake

Based on tectonic features and records of past earthquakes, a seismic zoning map of India has been prepared by a committee of experts under the auspices of Bureau of Indian Standard (BIS Code: IS: 1893: Part I 2002). In this seismic zoning map, most of the area of Punjab State lies in Zone III and IV. However, northern boundary of Punjab State with Himachal Pradesh is in close proximity to Zone V. The Zone III and IV are broadly associated with a seismic intensity VII and VIII on MMI scale respectively.

It may be mentioned that the seismic intensity VII on the MMI scale corresponds to horizontal ground acceleration range of 18-240 cm / sec² or an average acceleration of 67 cm / sec² in any direction and the seismic intensity VIII on MMI scale corresponds to horizontal ground acceleration range of 51-350 cm / sec² or an average acceleration of 172 cm / sec² in any direction. The ground acceleration and hence seismic intensity of an earthquake at a place depends on the magnitude of an earthquake, distance from the focus, duration of earthquake, characteristics of underlying soil and its damping characteristics. Generally, the damage to the buildings founded on sandy soil will be higher than that in similar type of buildings having their foundation on hard bedrock. Also, the damage will be higher for higher magnitude and long duration earthquakes, less epicentral distance, soft soil conditions and areas with high liquefaction potential.



Source: BMPTC

From the earthquake hazard map given in the above, it is seen that about 50 percent of the area of the state in the north, consisting of Amritsar, Gurdaspur, Hoshiarpur, Jalandhar, Kapurthala, Ludhiana, Patiala and Rup Nagar districts is liable to MSK Intensity VIII and about 45 percent could have Intensity VII. An earthquake of M 5.5 occurred in Kapurthala district in 1952 and much larger earthquakes of M 7.0 to 8.0 have occurred in Himachal Pradesh at about 50 to 60 km from the State boundary, which could cause moderate to heavy damage in the districts of Gurdaspur, Amritsar and Hoshiarpur. Earthquakes of $M \geq 5.0$ that are known to have occurred in and around the State are listed in the following table:-

Punjab is one of the richer states of the country. As such large majority of the housing is constructed under burnt bricks (placed in Category B) and only small percent are kucha with clay mud or unburnt brick walls (placed in Category A), as summarised below:-

% Area of state in intensity VIII	=	48.6
% Area of state in intensity VII	=	45.6
Total housing units (2001 census)	=	5,967,467
% of Category B units	=	89.3
% of Category A units	=	6.4

Now the Category A housing (built with clay walls or stone laid in mud mortar) are so weak that they would collapse completely in an Intensity VIII shock, and will be destroyed with partial collapse even in Intensity VII earthquake. On the other hand Category B (burnt brick) houses built using mud mortar will suffer severe damage with partial collapse under Intensity VIII, but only moderate damage if built in 1:6 cement-sand mortar. Under Intensity VII, Category B housing will suffer cracking, minor to wider, depending on the quality of mortar. Under collapsing condition of the houses, people and cattle can be buried and killed. For a feel of the Intensities it may be mentioned that Intensity VIII was reached in Latur earthquake of 1993 in which about 9000 human lives were lost due to the collapse of stone houses with heavy flat roofs; and Intensity VII occurred in the Jabalpur earthquake of 1997.

History of Earthquakes in Punjab

The state of Punjab hence falls in a region of moderate to high seismic hazard, as per the 2002 Bureau of Indian Standards (BIS) map. Historically, parts of this state have experienced seismic activity in the M4.0-5.0 range. Instrumentally recorded data on earthquakes shows that most of the area of Punjab State lies in a seismically active region which has been affected by moderate to great earthquakes in the past. The prominent amongst them are:

- (i) Kangra earthquake of 4th April 1905 (M: 8.0): At least 28,000 people were killed in the Kangra-Dharamsala region of Himachal Pradesh. Damage and casualties also occurred in adjoining parts of Punjab including in the cities of Amritsar, Lahore, Jalandhar, Ludhiana and Sialkot.

- (ii) Dharamshala earthquake of 26th April 1986: The epicenter was close to Kandi area of Punjab and due to this earthquake six people were reported killed, thirty injured and 85% of the houses were reported damaged in Dharmasala area. This earthquake was also followed by a number of aftershocks.
- (iii) Uttarkashi earthquake of 21st October 1991 (M: 6.8): Between 750 to 2000 people killed in the Gharwal region. It was also felt very strongly in Uttar Pradesh, Chandigarh, Delhi, Haryana and Punjab. Some minor damage was reported in Chandigarh and New Delhi.
- (iv) Chamoli earthquake of 29th March 1999 (M: 6.5): The epicenter was Near Gopeshwar (Chamoli), Uttaranchal. 115 people killed in the Gharwal region. The quake was felt very strongly in Uttar Pradesh, Chandigarh, Delhi and Haryana. In Haryana, one person was killed in the city of Ambala and 2 at Nakodar in the neighbouring state of Punjab. Minor damage to buildings in New Delhi, most significantly in Patparganj. Minor damage also reported from Chandigarh.
- (v) Pakistan earthquake of 8th October 2005 (M: 7.6): A major earthquake struck the India-Pakistan border on the morning of 8 October 2005. It had a magnitude of $M_w=7.6$ and was felt strongly in much of Pakistan, northern India and eastern Afghanistan. The earthquake resulted in more than 80,000 deaths in northern Pakistan and adjoining parts of Jammu & Kashmir, India and is by far one of the deadliest in the sub-continent. At least 10 people also died in other parts of north India (including 2 in Punjab) and 4 in Afghanistan due to this earthquake. Tremors from the earthquake were felt more than a thousand kilometres away in the Indian states of Gujarat, Madhya Pradesh and Uttar Pradesh.
- (vi) Punjab earthquake of 14th March 2010 (M: 4.5): A light earthquake occurred in northern Punjab along the Punjab-Himachal Pradesh border on 14 March 2010 at 12:23 PM local time in India. It had a magnitude of $M_b=4.5$ and was felt over a wide area due to its depth.

Besides the above noteworthy earthquakes, many other significant earthquakes from IMD catalogue occurred in the region bounded by latitude 29.00 – 33.00N and longitude 73.00 – 78.00 E (covering Punjab and nearby areas) till date. Some of them could have been experienced in Punjab region.

The occurrence of earthquakes in the region is attributed mainly to the chief tectonic features in Himalayas such as the Main Boundary Thrust (MBT), the Main Central Thrust (MCT) and Himalayan Frontal Thrust. These are locally termed as the Jwalamukhi Thrust, the Reasi Thrust, the Murree Thrust, the Panjal Thrust, the Zaskar Thrust etc. The other tectonic features of importance in the region are Kallar Kasar thrust, Salt Range thrust, Drang thrust, Ropar Fault and Sunder Nagar Fault. From the available geological

and seismological evidence, it is seen that these faults have been active in the past. According to the theory of plate tectonics, the area lies near the boundary of Indian and Eurasian plates along which there is a wide zone of deformation due to cracking and splintering of the lithosphere and is characterized by single dominant direction of underthrusting. Geophysical data in and around Himalayas have shown that the Indian plate is moving North-North -Eastwards at a rate of about 5 cm. per year and colliding with Eurasian plate due to which stresses are accumulating in the region. The accumulated stress is occasionally released in the form of earthquakes along various segments of Himalayan arc.

Presently, there is no scientific technique available anywhere in the world to predict occurrence of earthquakes with reasonable degree of accuracy with regard to space, time and magnitude. It is, therefore suggested that appropriate steps may be taken to ensure that the dwellings and other structures in the region are designed and constructed as per guidelines laid down by Bureau of Indian Standards (BIS) to minimize the losses caused by earthquakes. The choice of seismic factor to be adopted for designing and engineering the structures depends on horizontal ground acceleration and various other factors including type of structures, the ground conditions and also importance of structures. For important and critical structures, site specific spectral studies have to be carried out before assessing the seismic design parameters.

SIGNIFICANT EARTHQUAKES IN PUNJAB

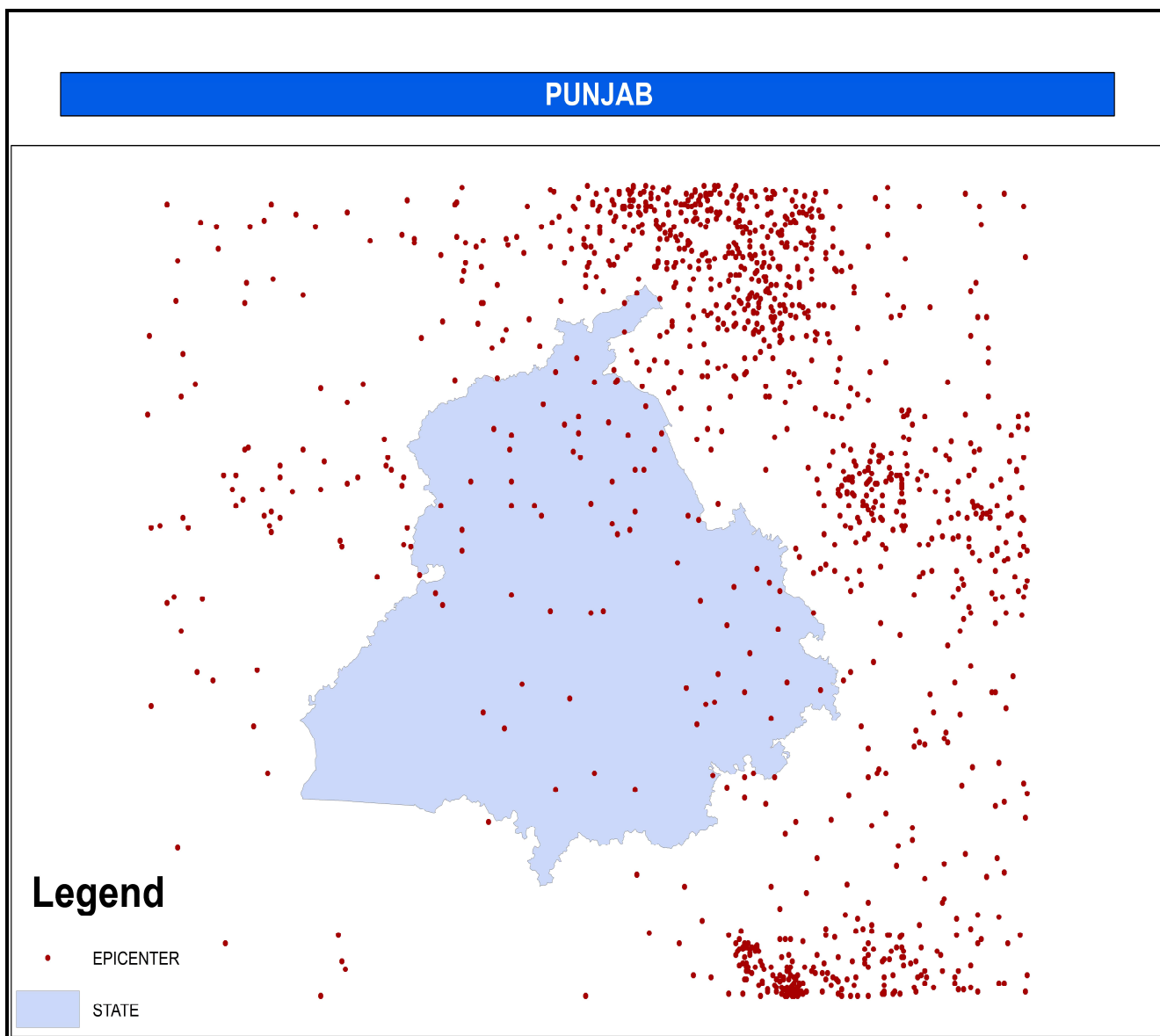
- As far as earthquake history is concerned the last earthquake to hit Punjab was in 1905 Kangra (Himachal Pradesh). Its magnitude is 7.8 and it caused damage in cities like Amritsar, Jalandhar, Tarantaran etc. Many famous buildings suffer damages because of this highly intense earthquake. Tall structures in Amritsar such as minarets of the Sheikh Din mosque, the Clock Tower were badly damaged.
- The 1999 Chamoli earthquake affects Nakodar (SW of Jalandhar). A number of houses in northern Punjab have collapsed. Two deaths were reported. One building collapses in Gurdaspur and six in Amritsar. Fires were also reported from Amritsar.
- April 1905- Kangra (Himachal Pradesh), Mw 7.8 IST/ 00:50 UTC, 32.30 N 76.30 E. The deadliest earthquake to date in the Punjab Himalayas. Close to 30,000 were killed in the Kangra Valley and the adjoining parts of northern Indian and Pakistan. Shocks from the temblor were experienced as far as Puri, on the Mahanadi Delta in Punjab. Damage from the quake extended into many parts of the Punjab.
- 14 October 1970- North of Ferozpur (Indo-Pakistan Border Region), 5.2 Mb (USCGS) 00:36:34.0 UTC, 31.26 N, 74.50 E, 44 kms depth.
- 21 October 1991- Near Piliang (Uttarkashi district), Mw 6.8 (NEIC) 21:23:14 UTC/ 02:53:14 IST, 30.78 N, 78.77 E. Between 750 to 2000 people killed in the Gharwal region. It was also felt very strongly in Uttar Pradesh, Chandigarh, Punjab, Haryana and Punjab. Some minor damages were reported in Chandigarh and New Punjab.

- 17 October 1997- North of Jalandhar, Gurdaspur district (Punjab), 5.1 Ms (EDIC) 17:36:31.0 UTC, 31.6167 N,, 75.7744 E, 38 kms depth
- 29 March 1999- Near Gopeahwar (Chamoli District) Mw 6.5 (HRV) 19:05:11 UTc, 30.492 N, 79.288 E. 115 people killed in the Gharwal region. The quake was felt very strongly in Uttar Pradesh, Chandigarh, Punjab and haryana. In Haryana, one person killed in the city of Ambala and 2 at Nakodar in the neighbouring state of Punjab. Minor damage to buildings in New Punjab, most significantly in Patparganj. Minor damage also reported from Chandigarh.

Table 9: Districts coming under Moderate and Low damage risk zones

Districts coming Under Moderate Risk Zones	Districts coming Under Low damage Risk Zones
Firozpur, Fazilka, Faridkot, Moga, Muktsar, Bathinda, Mansa, Sangrur and Patiala	Amritsar, Tarn Taran, Kapurthala, Gurdaspur, Pathankot, Jalandhar, Hoshiarpur, Ludhiana, Nawanshehar, Rupnagar and Fatehgarh Sahib

Following Map shows the Earthquake Epicentres in Punjab



Source: Department of Revenue, Rehabilitation and Disaster Management

Above map shows the list of Earthquakes from IMD Catalogue occurring between Lat.29.00 to 33.00 Deg. N and Long.73.00 to 78.00 Deg. E (Covering Punjab State) for the period upto January 2010.

II. DISEASES, EPIDEMICS, PANDEMICS

Cancer

Recent times have seen an increase in the incidence of cancer. This is mainly attributed to urbanization, industrialization, lifestyle changes, population growth and increased life span. In India, the life expectancy at birth has steadily risen from 45 years in 1971 to 62 years in 1991, indicating a shift in the demographic profile. It is estimated that life expectancy of the Indian population will increase to 70 years by 2021–25. This has caused a paradigm shift in the disease pattern from communicable diseases to non-communicable diseases like cancer, diabetes and hypertension.

Among men, lung, esophagus, stomach, oral and pharyngeal cancers are more prevalent, while in women; cancers of cervix and breast are most common, followed by those of stomach and esophagus.

Punjab

A survey was conducted by the Health Department in June 2005 in 4 districts of Muktsar, Bathinda, Faridkot and Mansa to know the number of cancer patients in these districts. The results of the survey are:-

Table 10: No. of Cancer Patients

S. No.	District	Population	No. of cancer patients	No. of cancer patients per lakh population
1	Muktsar	827906	453	54.7
2	Bathinda	1200736	711	59.2
3	Faridkot	585500	164	28.0
4	Mansa	731535	420	57.4

Source: Health and Family Welfare

A house to house survey was conducted by the Health Department. The prevalence of cancer in Punjab as per survey is 30.54 per lakh population whereas the prevalence in India is 125 per lakh.

Table 11: HOUSE TO HOUSE SURVEY 2009

S.No.	DISTRICT	POPULATION	NO. OF CASES	PREVALANCE (PER LAC POPULATION)
1	Amritsar	2348145	253	10.77
2	Barnala	570244	379	66.46
3	Bathinda	1255932	942	75.00
4	Faridkot	549118	245	44.62
5	Fatehgarh Sahib	533261	176	33.00
6	Ferozpur	2154017	473	21.96
7	Gurdaspur	1669336	559	33.49
8	Hoshiarpur	1024243	476	46.47
9	Jalandhar	2438054	377	15.46
10	Kapurthala	891073	196	22.00
11	Ludhiana	2930443	771	26.31
12	Muktsar	889452	668	75.10
13	Moga	978977	319	32.59
14	Mansa	686642	342	49.81
15	SBS Nagar	611378	141	23.06
16	Patiala	1810046	426	23.54
17	Ropar	756532	200	26.44
18	SAS Nagar	919555	133	14.46
19	Sangrur	1491131	383	25.69
20	Tarn-Taran	825617	279	33.78
Total		25333396	7738	30.54

Source: Health and Family Welfare

2.2.3 ACCIDENTS

I. Road Accidents

The figures of road accidents indicate rising trend in Punjab. The figures are however not complete since each and every accident case is not reported at the police stations. Thus, the actual number of road accident cases may be still higher.

Except for the observance of the Traffic Week in the first week of January every year in the State, there is very little regular and sustained campaigns to prevent and reduce the road accidents.

Table 12: Road Accidents in Punjab

Year	Accidents	Vehicles Involved	Persons Killed	Persons Injured
1980	1010	1064	472	836
1990	1621	1621	1133	1322
2000	3876	3876	2406	3165
2005	4599	4599	2793	4131
2006	5076	5076	3060	4314
2007	5208	5208	3363	4430
2008	5115	5115	3206	4196
2009	5570	5570	3668	4486

Source: Director General of Police Crime, Punjab

II. Rail Accident

a. Khanna Rail Disaster

The Khanna rail disaster occurred on November 26, 1998 near Khanna on the Khanna-Ludhiana section of India's Northern Railway in Punjab, at 03:15 when the Calcutta-bound Jammu Tawi-Sealdah Express collided with six derailed coaches of the Amritsar-bound "Frontier Mail" which were lying in its path. At least 212 were killed in total the trains were estimated to be carrying 2,500 passengers. The initial derailment was caused by a broken rail.

b. Sarai Banjara Rail Disaster

The Sarai Banjara rail disaster occurred on 2 December 2000, when a derailed freight train crossed onto the opposite track early in the morning in Punjab, India. A passenger train coming the other direction hit the freight train head on at speed, killing 46 people and injuring at least 150.

c. Ladhawal rail disaster

The Ladhawal rail disaster on 15 May 2003, was a flash fire which began at 4am on the Frontier Mail train service in India, and engulfed three carriages before it could be extinguished. 39 people lost their lives and another 15 were hospitalized with severe burns.

The train service from Mumbai to Amritsar, had just passed the station at Ludhiana and was approaching Ladhowal, travelling at over 100km/h. Eyewitness A. D. Singh reported that he had seen the fire begin as a result of a dropped cigarette, whilst Safi Pitoliwali claims he saw electrical wiring in the toilet of the fourth carriage catch alight, but what ever the cause, the speed of the train combined with the open windows during the Indian summer to create an inferno, as air carried the fire back through three carriages in a massive burst of flame. When emergency services did arrive, there was no water available due to a local drought, so the wreckage had to be left to burn itself out.

2.2.4 ATMOSPHERIC

There have been occasional incidents of thunderstorms, lightening, squall, gale and hailstorms resulting in damages of property, crops, livestock and human lives. Most important aspect for tackling this kind of disaster will be to ensure immediate first aid to the affected population and then to shift them to the nearest hospitals. In case of localized fire generally local people come to extend help to immediately control it.

I. Hailstorm

Hailstorms consist of precipitation in the form of balls or irregular lumps of ice formed when updrafts in thunderclouds carry raindrops into extremely cold areas of the atmosphere.

Slight hailstorm is sparse usually small in size and often mixed with rain. Moderate hailstorm is abundant enough to whiten the ground. The heavy hailstorm includes at least a proportion of large stones. Punjab state often gets affected by moderate to heavy hailstorms. In the past such hailstorms have often affected the standing crops, trees, vehicular traffic, telecommunication services etc.

Hailstorms in Punjab

Slight: Sparse, usually small in size and often mixed with rain.

Moderate : Fall abundant enough to whiten the ground.

Heavy: Includes at least a proportion of large stones.

Table 13: Hailstorms in Punjab

S.No	Date/period	City/Area	Intensity	Extent of damage
1.	20 March	Gurdaspur,	Moderate	Standing crops badly damaged.

	1990	Hoshiarpur & Kapurthala		
2.	29-31 Dec. 1990	Ferozepur	Moderate	Crops damaged at Moga
3.	11 Feb. 1991	Bathinda	Moderate	Crop worth several lakhs of rupees damaged.
4.	24 May 1994	Amritsar	Heavy	i)Hailstones weighing 20 gms reported. ii)Extensive damage to mango grovesreported.
5.	24 May 1994	Chandigarh	Moderate	300 Kikkar trees uprooted.
6.	14 Feb. 1995	Jalandhar	Heavy	Vehicular traffic disrupted in Jalandhar city.
7.	15 Feb. 1995	Chandigarh	Moderate	Telecommunication services disrupted.
8.	30 Mar. 1995	Punjab	Moderate	Standing crops damaged.
9.	5 Apr. 1997	Mansa & Moga	Moderate	Wheat crop badly damaged.
10.	28 Apr. 1997	Patiala	Heavy	Huge damage to standing crop reported.
11.	29 Apr. 1997	Patiala	Heavy	-----do-----
12.	9 Apr. 1998	Parts of Punjab State & Chandigarh(U.T)	Heavy	i)Standing crops badly damaged. ii)TV antennas and trees uprooted.
13.	27 Apr. 2000	Chandigarh(UT), Patiala & Sangrur	Moderate	Wheat piled up in Mandis damaged.

Source: - Indian Meterological Department, New Delhi.

II. GALE

CRITERIA

Strong: Wind Speed \geq 75 Kmph.

Table 14: GALE in Punjab

S.No	Date/period	City/Area	Intensity	Casualties	Extent of damage
1.	12 May	Sangrur	Strong	5 persons died	7 injured

Source: - Indian Meterological Department, New Delhi.

III. LIGHTNING

Table 15: Lightning in Punjab

S.No	Date/period	City/Area	Intensity	Casualties	Extent of damage
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1.	15 May 1996 17 Jun 1996	Chandigarh Jalandhar		One person died. One person died at Phagwara.	
2.	1 July 2000				Telecom services disrupted and T.V sets damaged in Mushkabad near Samrala

Source: - Indian Meteorological Department, New Delhi.

IV. SQUALL

CRITERIA

Moderate: Surface Wind Speed (in gusts) upto 80 Kmph

Severe : Surface Wind Speed (in gusts) more than 80 Kmph.

Table 16: SQUALL in Punjab

S.No	Date/period	City/Area	Intensity	Casualties	Extent of damage
1.	20 Mar. 1990	Bathinda & Ferozepur	Severe		Hundreds of villages of Abohar block in Ferozepur and Malout and Lambi block in Bathinda district affected.
2.	19 May 1990	Chandigarh	Severe		Extensive damage to crop (105 Kmph) reported. Large no. of trees/electric and telecommunication poles uprooted.
3.	27 May 2000	Gurdaspur	Severe		2 persons died under an uprooted tree.

Source: - Indian Meteorological Department, New Delhi.

V. THUNDERSTORM

CRITERIA

Moderate: Loud peals of thunder with frequent lightning flashes, moderate to heavy rains and maximum wind speed 29 to 74 Kmph.

Severe: Continuous thunder and lightning, heavy rains and Maximum wind speed ≥ 75 Kmph.

Table 17: Thunderstorm in Punjab

S.No	Date/period	City/Area	Intensity	Causalities	Extent of damage
1.	10 June 1991	Chandigarh	Severe	2 children died	i. Roof tops of large no. of jhuggies either blown off or damaged. ii large no. of birds perished. iii. Large no. of trees uprooted disrupting power supply and telecommunication services.
2.	10 Jan 1996	Chandigarh	Moderate		Telephone and electric services disrupted.
3.	15 March 1998	Punjab(Entire State)	Moderate		Standing crops badly damaged.
4.	5 May 2000	Ludhiana, Moga & many parts of Punjab and Chandigarh(U.T)	Severe	Two women	i)Rabi crop adversely affected.
5.	27 May 2000	Gurdaspur	Severe	Two persons died under an uprooted tree.	
6.	2 June 2000	Bathinda	Moderate		i)Paddy & Cotton crop on 2000 acres of land damaged due to inundation. ii)Several trees uprooted.
7.	6 June 2000	Ferozepur	Severe	Two persons died and five other injured as they buried under a shed at Govindpur.	
8.	25 June 2000	Chandigarh	Moderate		Many trees uprooted in Palsora and adjoining Mohali and in Sec-31 of the city.

Source: - Indian Meteorological Department, New Delhi.

VI. Heat Wave

Climatic changes, decrease in tree cover, depletion of ground water resources and increase in day temperature especially in the months of May and June, have made majority of the districts of the state vulnerable to heat wave.

As per the data available, temperature in this state during the month of May and June goes as high as about 45 degree centigrade.

The heat wave condition in Punjab is becoming increasingly prominent and regular. However, the main risk due to heat wave is heat stroke. The main causal factor was identified as lack of awareness and not following certain do's and don'ts during heat wave conditions. Though extensive awareness campaigns have reduced large number of fatalities, poor socio-economic conditions, lack of enforcement and adoption of working conditions during the summer months and continuing weak facilities to treat heatstroke patients in most PHCs remain the main risks of heat wave.

The State has had past histories of vulnerability to hail storms, thunder and lightning deaths or injury nearly every year.

Cold wave:

When normal minimum temperature is less than 10°C, cold wave is said to be a condition when night temperature is 3-4°C below normal. In such situation a severe cold wave is a condition in which night temperature is 5°C or more below normal. When normal minimum temperature is more than 10°C, cold wave is said to be a condition when night temperature is 5-6°C below normal. In such situation a severe cold wave is a condition in which night temperature is 7°C or more below normal. Punjab has experienced cold waves and severe cold waves many times in the past. Cold wave on 02nd January 1990 is worth mention which took toll of 2 persons from Hoshiarpur.

Table 18: Cold wave in Punjab

Sr.No	Date/Period	Area	Causalities
1	2 Jan/ 1990	Hoshiarpur	2 persons dead

Source: - Indian Meteorological Department, New Delhi.

VII. Cyclones/Wind Storms

So far as wind hazard is concerned, the design wind speed in almost the whole state is 47 m/s (169 km/h) which could only occasionally be reached in what is called 'Andhi'. In such events, weakly built huts of thatch, sheets etc. and those with sloping roofs such as using thatch and tiles and A.C. sheet and corrugated Galvanized Iron (C.G.I.) sheet roofs which are not fully anchored and integrated will suffer damage. The damages occurring in 'Andhis' is again of localised nature and does not result in a 'disaster' to the State. But it will be useful to adopt the wind resistant construction guidelines and implement them for minimising wind damage.

A moderate dust storm is called to a condition in which wind speed is between 39 to 74 kmph and horizontal visibility is up to 500 meters. A heavy dust storm is a condition when wind speed is ≥ 75 kmph and horizontal visibility is up to 50 meters. Punjab was badly hit by dust storms during the months from May to July of year 2010. Chandigarh was severely affected alongwith districts of Roopnagar, Ferozpur, Bathinda, Jalandhar, Muktsar, Patiala and Ludhiana. The dust storms occurred on 5 different dates and took a toll of 8 lives. Significant losses were caused to the houses, telecom services, trees, electric poles etc. apart from this Punjab experienced Gale with wind speed ≥ 75 kmph on 12th May 1999 at Sangrur. In this gale 5 persons died and 7 others got injured.

VIII. DUSTSTORM

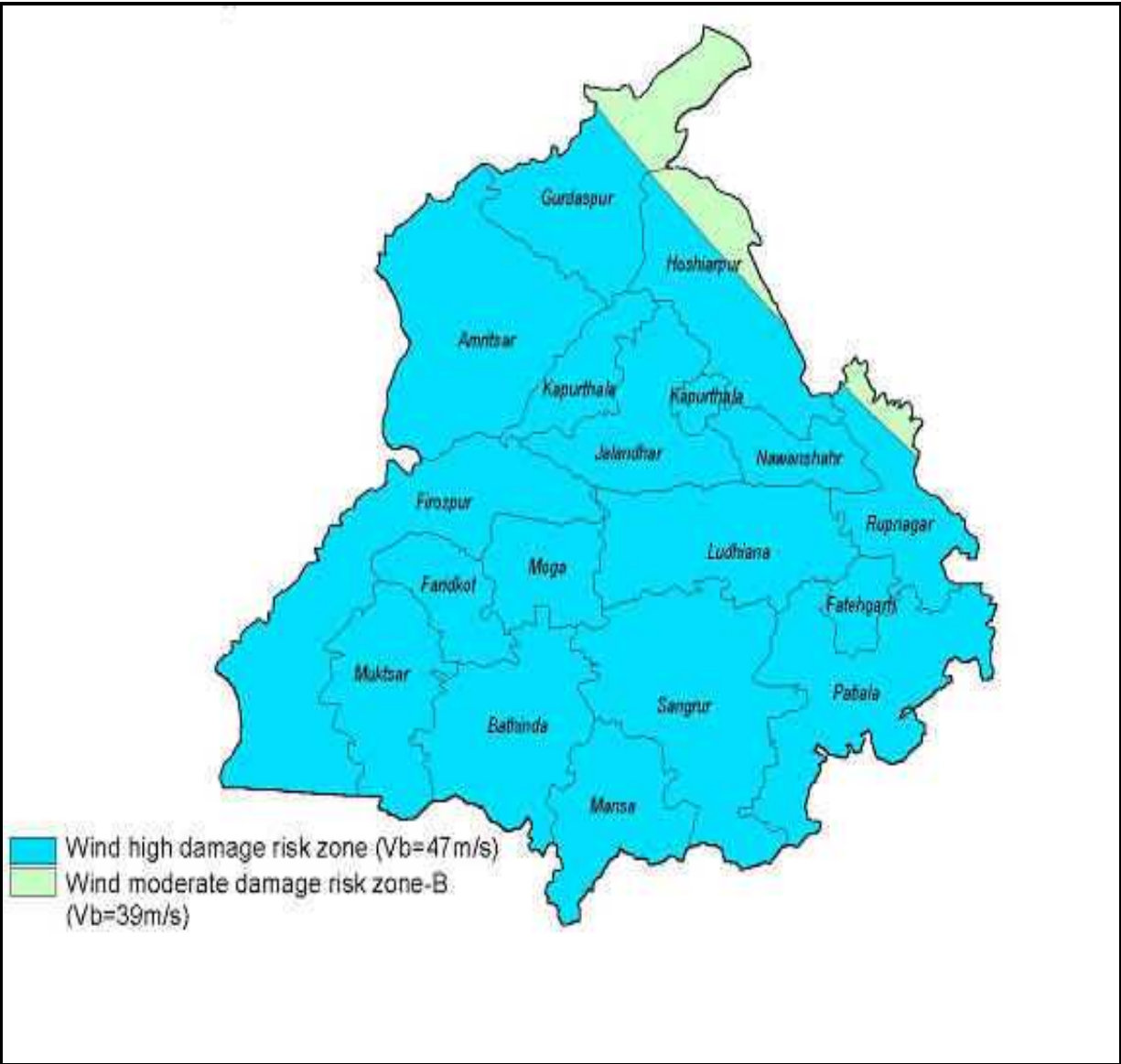
Table 19: Duststorm in Punjab

S.No.	Date/ Period	Area Affected	Intensity	Casualties	Extent of damage
1	27 May, 2000	i)Chandigarh ii)Roop Nagar	Moderate Severe	1 person died 2 persons died.	i)A few trees uprooted. ii)Tin sheets of a few shops blew off. A few houses damaged.
2	2 June, 2000	Ferozepur	Severe		Several trees, electricpoles uprooted and many roof tops blown off.
3	4 June, 2000	i)Bathinda ii)Jalandhar iii)Muktsar iv)Chandigarh	Severe Severe Severe Severe	1 person died. 2 children died. 2 children died.	Hundreds of trees uprooted and power supply broke down
4	16 Jan. , 2000	Patiala			One telecom tower affected.
5	1 July, 2000	Ludhiana			Telecom services disrupted and T.V sets

					damaged in Mushkabad near Samrala.
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Source: - Indian Meterological Department, New Delhi.

PUNJAB Wind Hazard Map



Source: BMPTC

2.2.5 EXPLOSIONS AND LEAKS

I. Chemical/Industrial disasters:

Over the years, there is substantial increase in industrial activities in the State. Many industries in the state store handle and process large volume of hazardous chemicals. This has caused potential threat to the employees, general public and environment in general.

Table 20: Industrial Disasters in Punjab

Year	Fatal (Death)	Non-Fatal (Injuries)
2006	48	139
2007	35	134
2008	39	135
2009	37	245
2010	14	212

Directorate of Factories, Punjab

The industries, which are handling hazardous chemicals, are known as Major Accident Hazard (MAH) units. Many technological accidents have occurred in the state as well as in the country damaging lives and properties. Some areas in the state have been identified having cluster of industries handling hazardous chemicals and pose chemical and industrial disaster. List of districts with type of hazards is given in the Table below.

Table 21: Maximum Accidental Hazard Units in Punjab

SR. No.	Name of Factory and Address	District
1	M/s. Escorts, Bahadurgarh	Patiala
2	M/s. Siel Chemical Complex, Rajpura	Patiala
3	M/s. I.O.C. Ltd. (L.P.G. Bottling Plant) Nabha	Patiala
4	M/s. V.K. Plasticizers, Rajpura	Patiala
5	M/s. Flow Well Plast Chem. (p) Ltd., Rajpura	Patiala
6	M/s. Super Shine Plasticizers, Rajpura	Patiala
7	M/s. Swastik Polymers, Rajpura	Patiala
8	M/s. Ajanta chemicals, Rajpura	Patiala
9	M/s. Shivam Petro Products, Rajpura	Patiala
10	M/s. Shiva Enterprises, Rajpura	Patiala
11	M/s. Bharat Petroleum Corpn. Ltd., Lalru	Mohali

12	M/s. H.P.L. chemicals Ltd., Dera Bassi (New Name High Polymers Labs Ltd)	Mohali
13	M/s. Simar Parafins Ltd., Dera Bassi	Mohali
14	M/s. Rattan Plasticizers, Lalru (New Name M/s. Bromose Organics Ltd. Lalru)	Mohali
15	M/s. Simar Plasticizers, Lahru	Mohali
16	M/s. Nihon Chemical Ltd., Kurali	Mohali
17	M/s. Nahar Industries Ltd., Lalru	Mohali
18	M/s. budhi Raja Polymers Pvt. Ltd., Dera Bassi	Mohali
19	M/s. V.S. Polymers Pvt. Ltd., Dera Bassi	Mohali
20	M/s. National Chemical Industries, Dera Bassi	Mohali
21	M/s. Ashoka Chemical Industries, Dera Bassi	Mohali
22	M/s. N.F.Lts. Naya Nangal	Ropar
23	M/s. Punjab Alkalles & Chemicals Ltd., Naya Nangal	Ropar
24	M/s. Phillips India Ltd.(Formely M/s. Pb. Anand Lamps Ltd.) Mohali	Ropar
25	M/s. J.C.T. electronics Ltd., Mohali	Ropar
26	M/s. Jai Parabolic Springs Ltd., Mohali	Ropar
27	M/s. Guru Gobind Singh Super Thermal Plant, Ghanauli	Ropar
28	M/s. Ajay Electrical Industries Ltd., Mohali	Ropar
29	M/s. N.F. Ltd., Bathinda	Bathinda
30	M/s. B.P.C. Ltd., Bathinda	Bathinda
31	M/s. Hemkunt Gases Pvt, Ltd., Bathinda	Bathinda
32	M/s. H.P.C. Ltd., Phoos Mandi Mansa Road, Bathinda	Bathinda
33	M/s. I.O.C. Ltd., Phoos Mandi Bathinda	Bathinda
34	M/s. Guru Hargobind Thermal Plant, Lehra Muhobat	Bathinda
35	M/s. Bharat Petroleum Corp. Ltd. (LPG Bottling	Bathinda

	Plant) Bathinda	
36	M/s. Indian Acrylics Ltd., Bhawanigarh	Sangrur
37	M/s. I.O.C. Ltd. (Bulk Depot), Sangrur	Sangrur
38	M/s. Shreyans Paper Mills Ltd.,	Sangrur
39	M/s. Hindustan Petroleum Corp. Ltd Jind Road, Sangrur	Sangrur
40	M/s. Bharat Petroleum Corp. Ltd Jind Road, Sangrur	Sangrur
41	M/s. I.B.P. Terminal (Bulk Depot) Sangrur	Sangrur
42	M/s. Abhishek Industries (Paper & Chem. Div.) (Varinder Agro Chemicals), Barnala	Sangrur
43	M/s. H.P.C. Ltd., Hoshiarpur (LPG Bottling Plant)	Hoshiarpur
44	M/s. A.B.C. (Paper Div), Sailakhurd	Hoshiarpur
45	M/s. Mukerian Paper Ltd., Mukerian	Hoshiarpur
46	M/s. H.P.C. Ltd. (Bulk Depot), Hoshiarpur	Hoshiarpur
47	M/s. Mahavir Spinning Mills Ltd., Gassed Mercerised Yarn Unit, Phagwara Road, Hoshiarpur	Hoshiarpur
48	M/s. I.O.C. Ltd., (L.P.G.), Jalandhar	Jalandhar
49	M/s. I.O.C. Ltd., (Pipeline Div.), Jalandhar	Jalandhar
50	M/s. B.P.C. Ltd., (Bulk Depot), Jalandhar	Jalandhar
51	M/s. Rail Coach Factory, Kapurthala	Kapurthala
52	M/s. J.C.T. Mills Ltd., Phagwara	Kapurthala
53	M/s. Shreyans Industries Ltd., Banah	Nawanshehar
54	M/s. D.C.M. Engg. Products, Asron	Nawanshehar
55	M/s. Setia Paper Mills, Mukatsar	Mukatsar
56	M/s. I.O.C. Ltd., Pathankot	Gurdaspur
57	M/s. I.O.C. Ltd., Amritsar	Amritsar
58	M/s. Batra Brothers. Ludhiana	Ludhiana
59	M/s. Aar Kay Petro(P) Ltd., Ludhiana	Ludhiana

60	M/s. Upper India Sttel Mfg. and Engg. Co. (P) Ltd., Ludhiana	Ludhiana
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Around 2 lakhs small scale industries and 562 large and medium scale industries are functioning in the state with total production of over Rs. 570 billion. 2628 industries have been identified as hazardous waste generating industries by Punjab Pollution Control Board (as on 28-02-2007). The total hazardous waste generated from these industries is 124674.70 tons per annum (TPA) out of which 96992.12 TPA is recyclable, 15108.75 TPA is incinerable and 12573.83 TPA is storable. All the major industries which generate incinerable hazardous waste have installed captive incinerators in their premises.

2.2.6 FIRE

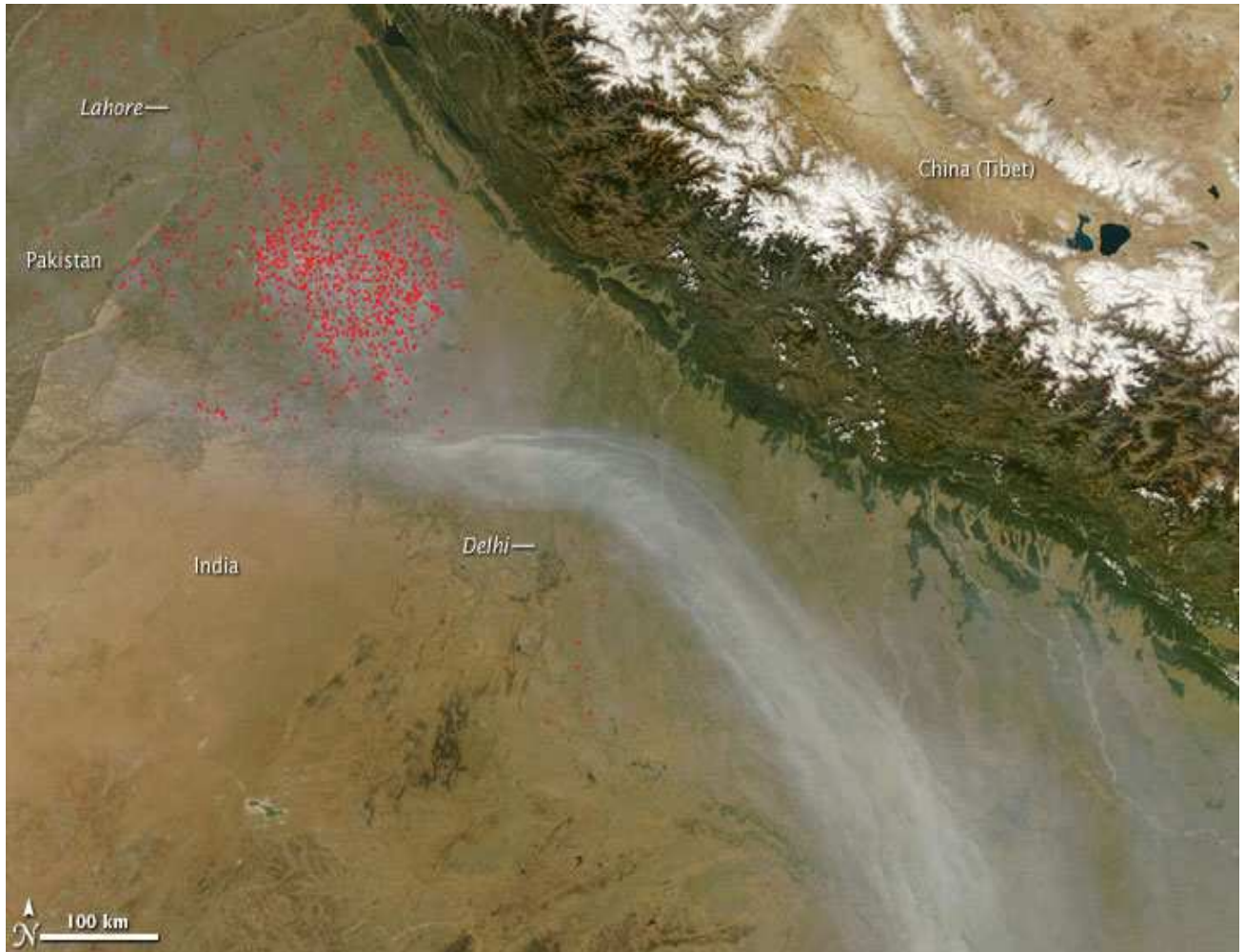
I. Structure Fire

A structure fire occurs in residential, commercial, or industrial buildings or structures. Fires can be ignited by a number of causes, such as faulty electrical wiring, cooking and heating equipment, and cigarettes. In some cases, fires may also be ignited intentionally. Structure fires are a reality within any Electoral Area in the State of Punjab and have the capacity to spread quickly to adjoining structures.

II. Crop Fire

Punjab occupies less than two percent of the area of the country, and yet it produces about two-thirds of the food grains in India. Wheat and rice are the two most commonly grown food crops. Farmers use fire to clear fields and get them ready for new plantings. Crop residues become a soil-fertilizing ash, and burning destroys some crop pests. Although the fires are not necessarily immediately hazardous, such widespread burning can have a strong impact on weather, climate, human health, and natural resources.

A plume of haze flows southeastward, along the path of the Ganges River, which is hidden from view. Although some of the haze is probably smoke from the fires, urban pollution is a major problem in this part of India. Several large cities are found here, including Delhi, India, where soot from diesel cars is a major (and still increasing) source of air pollution. Other images of the haze can be found in a related Natural Hazards event, Haze along the Himalaya.



At the base of the Himalaya Mountains in north-western India, the annual agricultural fire season was underway in the states of Punjab (closest to Pakistan) and Haryana (to the southeast) in early November 2008. In this Moderate Resolution Imaging Spectroradiometer (MODIS) image from the Aqua satellite on November 3, actively burning fires are marked with red dots.

2.2.7 OTHER HAZARDS

I. TERRORIST ACTIVITIES

a. WAR

Punjab has 553 KM long International border with Pakistan with 4 districts of Amritsar, Ferozepur (Fazilka is separated and become another district of Punjab), Tarn Taran (this district was created in April 2006) and Gurdaspur abutting the International border. The following 19 blocks (Attari block included in 2010-11) with area of 6369.82 sq.km are being covered under Border Area in Punjab:-

Table 22: Border Area in Punjab

Gurdaspur:	Kalanaur, Dera Baba Nanak, Narot Jaimal Singh, Bamial, Dina Nagar, Dorangla, Gurdaspur.
Amritsar :	Ajnala, Chogawan and Attari
Tarn Taran:	Gandiwind, Bhikhiwind and Valtoha
Ferozepur:	Ferozepur, Guru Harsahai, Jalalabad, Fazilka,, Khuian Sarvar & Mamdot

Problem

i) The Border districts have suffered a lot and lagged behind due to their proximity to the border, 3 wars with Pakistan and long spell of cross border terrorism.
ii) Farmers living in Border areas face acute hardships as they can not cultivate tall crops. The problems are compounded by inadequate accessing facilities to the farmers after the erection of fencing alongwith International border.
iii) Rivers Ravi and Sutlej and number of choes and distributaries are passing through the border Districts of Gurdaspur and Ferozepur respectively causing damage to the crops particularly during the rainy season.
iv) Border areas lack basic amenities of Education, Health, Sanitation, Transportation, Roads etc. The lack of environment for development of Industries and Marketing infrastructure has further accentuated the problems of the local population.

b. BLASTS AND SHOOT OUTS

Punjab State is prone to terrorist activities form the Pakistan and China which results loss of lives and property. Following table shows the terrorist activities:

Table 23: Terrorist Violence in Patiala District

S.No.	Date of Incident	Place	Killed	Injured	Type	Facts
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1	17/04/91	Patiala	8	4	Shoot Out	Seven security officers and a civilian were killed and four injured while going towards a liquor vend in Samana, where the terrorists had opened fire.
2	18/04/91	Wadali Ala Singh	5	2	Shoot Out	Terrorists shot dead five persons and injured two in a shoot out in village Wadali Ala Singh.
3	23/10/91	Shatrana	5	Nil	Bomb Blast	Five innocent persons were killed in this ghastly blast.
4	17/01/92	Chakala Bazaar	7	19	Bomb Blast	When people were shopping in this bazaar, a powerful bomb exploded killing seven and injuring 19 others.
5	15/04/92	Palheri	4	Nil	Shoot Out	The terrorists killed four persons including two officers of Irrigation Department and a contractor while they were performing their duties on Narwana Branch of canal near village Palheri.
6	27/05/92	Patiala	2	Nil	Shoot Out	Sh. M.L. Manchanda, Assistant Director of All India Radio was among the two persons killed by the militants.
7	31/05/92	Mandoli	4	1	Shoot Out	Four security officials belonging to Haryana State were killed and a civilian injured in this shoot out.
8	09/03/92	Kartarpur Momian	4	Nil	Shoot Out	The terrorists shot dead four persons at village Kartarpur Momian.
9	09/08/92	Bakhat garh	14	Nil	Shoot Out	The terrorists shot dead fourteen persons, all

						relatives of police officials at village Bakhatgarh.
10	11/07/92	Bujrak	5	2	Shoot Out	Terrorists shot dead five persons belonging to a minority community and injured two in a shoot out.
11	31/01/93	Rajpura	1	Nil	Shoot Out	Terrorists shot dead Bhola Nath, a Press Reporter of Jagbani (Hind Samachar Group) near Pancharange Chowk, Rajpura Town.
12	14/12/97	Patiala	2	Nil	Shoot Out	Two senior police officers

II. RIOTS

a. Operation Blue star

June 1984 was an Indian military operation, ordered by Indira Gandhi, then Prime Minister of India, under the pretext of removing Sikh separatists from the Golden Temple in Amritsar. The Sikhs, led by Sant Jarnail Singh Bhindranwale, were accused of amassing weapons in the Sikh temple.

On 3 June, a 36-hour curfew was imposed on the state of Punjab with all methods of communication and public travel suspended. Electricity supplies were also interrupted, creating a total blackout and cutting off the state from the rest of India and the world. Complete censorship was enforced on the news media.

After a 24 hour firefight, the army finally wrested control of the temple complex. According to Indian Government sources, 83 army personnel were killed and 249 injured while insurgent casualties were 493 killed and 86 injured. Unofficial figures go well into the thousands. Along with insurgents, many innocent worshipers were caught in the crossfire. The estimates of innocent people killed in the operation range from a few hundred of people.

Effect of Operation Blue star

On 31 October 1984, the Prime Minister of India, Indira Gandhi was gunned down by her two Sikh bodyguards. In the wake of Indira Gandhi's assassination, rioting mobs allegedly led by Congress leaders, who are still facing the court cases, rampaged through the streets of Delhi and other parts of India over the next few days, killing several thousand Sikhs.

b. Operation Black Thunder

Operation Black Thunder is the name given to two operations that took place in India in the late 1980s to flush out remaining Sikh extremists from the Golden Temple using 'Black Cat' commandos of the National Security Guards. Like Operation Blue Star, these attacks were on Khalistani militants who were using the Golden Temple in Amritsar, Punjab as a base.

Operation Black Thunder I

The first Operation Black Thunder took place on 30 April 1986. About 300 National Security Guards commandos stormed the Golden Temple along with 700 Border Security Force troops and captured about 300 separatists. Only 1 person was killed and 2 were injured. The operation, which lasted eight hours, was approved by then Chief minister of Punjab Surjit Singh Barnala of Shiromani Akali Dal.

Operation Black Thunder II (sometimes just referred to as Operation Black Thunder) began on 9 May 1988 in Amritsar and ended with the surrender of the militants on 18 May. The operation was commanded by Kanwar Pal Singh Gill who was the DGP of Punjab Police. Snipers were used in this operation. Compared to Operation Blue Star, little damage was inflicted on the Golden Temple. In what was reported as a successful operation, around 200 militants surrendered, 41 were killed. Gill stated that he did not want to repeat the mistakes made by the Indian army during Operation Blue Star. This operation was described as a severe setback to the Khalistan movement. In contrast to prior operations, minimum force was used under full public scrutiny. It is remembered for the free access the news media was provided unlike during Operation Blue Star. The day after the militants surrendered nine reporters were allowed into the Temple complex. Kirtan was resumed at the Golden Temple on 23 May 1988 after a two week break during this operation.

c. Sikh leader's murder sparks riots in Punjab Tuesday, 26 May 2009

At least 16 people were wounded on Sunday when six armed men attacked two preachers visiting from India with a gun and knives during a ceremony in a Vienna gurudwara.

Guru Sant Rama Nand, 57, died in the night after an emergency operation, police said. The second, Guru Sant Niranjana Dass, 68, is in a stable condition. Both had suffered bullet wounds.

Four of the attackers were severely wounded, two of them life-threatening, when they were overpowered by worshippers. The other two were only lightly wounded and are in police detention.

The Guru who died was said to be from the Dera Sach Khand, a religious sect which draws large support from the Dalit community and is considered separate from mainstream Sikhism.

III. Drug Addiction

Punjab teeters on edge of crisis as 70% fall into drug addiction

"Punjab is teetering on the edge of an extraordinary human crisis, with an inordinately large number of youngsters hooked on to marijuana, opium and heroin, in addition to imbibing a range of prescriptive tablets," says Raj Pal Meena, head of the state's Anti-Narcotics Task Force (ANTF). Punjab's grievous drug problem was revealed recently in a report by Guru Nanak University in Punjab's largest city, Amritsar, which declared that some 73.5 per cent of the state's youth between 16 and 35 years were confirmed drug addicts. The study said young people in villages were more prone to drug abuse, and attributed this to high unemployment, social tensions and easily available narcotics.

Drug	addiction	touching	alarming	level:	Survey
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According to a Punjab Government survey, 66 per cent of the school-going students in the state consume gutkha or tobacco; every third male and every tenth female student has taken drugs on one pretext or the other and seven out of 10 college-going students abuse one or the other drug. These disturbing details were submitted by Harjit Singh, Secretary, Department of Social Security and Women & Child Development, Chandigarh, in reply to a petition filed by some to drug rehabilitation centres before the Punjab and Haryana High Court. The report was prepared after a study in eight districts— Jalandhar, Kapurthala, Hoshiarpur, Amritsar, Ferozepore, Ludhiana, Muktsar and Gurdaspur.

Secretary of the department, Mr R.L. Kalsia, told that in Majha area, narcotics was being used rampantly, while in Doaba belt, the most common form of addiction were tranquillisers. He added that the addicts used a variety of drugs which included raw opium, smack, heroin, synthetic drugs like morphine, pethidine, codeine and psychotropic substances like diazepam.

The secretary claimed that the Chief Minister, Captain Amarinder Singh, had taken the findings of the survey “seriously” and had instructed the departments concerned to create awareness against rampant drug abuse. An amount of Rs 1 crore had been sanctioned for the purpose.

IV. Water Pollution in Punjab

In Punjab, following are the causes of water pollution:

- Rapid increase in population
- Urbanization,
- Industrialization
- Agricultural practices

The above stated sources have heavily polluted the fresh water resources of Punjab, both in physico-chemical and biological terms. The industrial, domestic and agricultural wastes accumulate in the aquatic ecosystems and then enter the primary, secondary and tertiary webs of the food chain. As wastes move along the food chain, these get magnified.

Industrial Waste water Pollution: Organic and toxic wastes from industries cause water pollution. Punjab Pollution Board has identified 13431 water polluting industries in the state under the provision of Water and Air Acts.

Major Water Polluting Industries in Punjab

Further, Punjab Pollution Control Board has classified water polluting industries under Red (highly polluting) and Green Category (moderately, mild or non-polluting). There are 8182 industries under Red Category and 5249 industries Green Category (Statistical Abstract of Punjab, 2007).

Municipal /Waste Water Pollution: Untreated domestic and industrial effluent when discharged into the environment, find there way into the streams, nallahs and choes. These Nullahs further fall into rivers. Punjab Pollution Control Board carried out a study of various drains/ nullahas during the year of 2006, which falls in to the river Ghaggar. The pollution load of municipal wastewater varies from drain to drain depending upon the nature of municipal discharge.

The water quality studies carried out by PPCB (2006), for some streams, nallahs and choes are as follows:

- **Sukhna Choe:** The value of BOD and COD of the water flowing in Sukhna Choe indicate that there concentration was found as 8 and 40 mg/l, respectively. The concentration of chloride, sulphate sodium and potassium was observed as 96, 40, 70 and 21 mg/l, respectively. The value of calcium and magnesium were estimated as 50 and 50 mg/l, respectively; where as the concentration of zinc and lead was found to be as 0.2 and 0.04 mg/l, respectively. The reasons for high

values of all parameters may probably be due to sewage brought by the choe of various residential settlements along or nearby Sukhna choe.

- **Dhankansu Nallah:** The effluent flowing in the Dhankansu nallah was found contained BOD and COD as 135 and 228 mg/l, respectively. The reason for high values of substrate (organic matter) in the effluent may be probably due to discharge of domestic effluent. The mortality rate of fish was observed as 100% in 100% effluent after 96 hrs, which indicated that very low level of DO due to discharge of untreated sewage in to the Dhankansu nallah.
- **Patiala Nadi :** The wastewater samples collected from Patiala Nadi just before its confluence with river Ghaggar indicate the value of BOD, COD, sodium, sulphate, chloride and TSS as 160, 320, 188, 44, 140 and 28 mg/l, respectively. The value was zinc was found to be mg/l. The reasons for high values of various parameters may be due to the fact that Patiala Nadi mainly carries sewage of Patiala city.
- **Drain at Sardulagarh Town:** First drain of Sardulgarh town which carrying sewage/ sullage of sardulgarh indicate the values of BOD, COD, TSS, TDS, chloride, sulphate, sodium, potassium, TKN, calcium, magnesium, phosphate, zinc, lead and copper were observed to be as 90, 188, 142, 1299, 118, 120, 136, 49, 37, 290, 110, 14, 0.09, ND and 0.06 mg/l, respectively. These results indicates that the sewage of Nagar Panchayat, Sardulgarh requires treatment before it discharge in to river Ghaggar. Waste water also contains pathogens to pose serious risk to human health.

Table 24: Heavy Metals and their Pathological Effects on Man

METALS	PATHOLOGICAL EFFECTS
Mercury	Abdominal pain, headache, diarrhea, hemolysis, chest pain.
Lead	Anemia, vomiting, loss of appetite, convulsions, damage of brain, liver & kidney.
Arsenic	Disturbed peripheral circulation, metal disturbance, liver cirrhosis, hyper kurtosis, lung cancer, ulcers in gastrointestinal tract, kidney damage.
Cadmium	Diarrhea, growth retardation, bone deformation, kidney damage, testicular atrophy, anemia, injury of central nervous system and liver, hypertension.
Copper	Hyper tension, uremia, coma, sporadic fever
Barium	Excessive salivation, vomiting, diarrhea, paralysis, colic pain
Zinc	Vomiting, renal damage, cramps

Selenium	Damage of liver, kidney and spleen, fever, nervousness, vomiting, low blood pressure, blindness, and even death
Chromium (Hexavalent)	Nephritis gastro intestinal ulceration, diseases in central nervous system, cancer, Cobalt Diarrhea, low blood pressure, lung irrigation, bone deformities, paralysis

Source: An Atlas: Surface water, Industrial and Municipal Pollution in Punjab (2008),

Impact of Water Pollution

- Water pollution affects ground water and surface water resources. This harms human health and natural environment in various ways:
- Release of hot water from industries into water bodies increases temperature resulting in decrease of dissolved oxygen content. This adversely effects aquatic life.
- Turbidity due to suspended solids makes the water unfit for drinking and industrial use. High turbidity shortens filter runs at water purification plants and silt up impoundment. This can reduce the photosynthetic activity thus affecting oxygenation in the water bodies.
- High conductivity results in the scaling of pipes and containers and increases pumping costs.
- High phosphates in water bodies result in eutrophication and hence cause degeneration of water bodies.
- Increased nitrates in drinking water can lead to methemoglobinaemia (Blue baby) and cause cellular anoxia.
- High concentration of ammonia is harmful to most fish species. Such pollutants also impart an unpleasant odour and impair taste of water.
- Sodium and magnesium sulphate have a laxative effect and can cause "Crown Corrosion" of sewers.
- Organochlorines, pesticides and insecticides are highly persistent and pass through food chains resulting in bioaccumulation. This not only harms aquatic life but is also harmful for humans and cattle as they affect body tissues (especially kidney) or can be carcinogenic.
- Heavy metals have mutagenic and carcinogenic effects. Salts of arsenic, lead, etc. also make water poisonous.
- Excessive faecal coliform in water can cause several diseases, a few of which are enumerated below:

Table 25: Diseases due to Water Pollution

Disease	Type of Organism	Symptoms and Comments
Cholera	Bacteria	Severe vomiting, diarrhoea and dehydration, often fatal if untreated.
Typhoid	Bacteria	Severe vomiting, diarrhoea inflammation intestine, enlarged spleen-often fatal if

		untreated
Bacterial dysentery	Bacteria	Diarrhoea
Para-typhoid	Bacteria	Severe vomiting, diarrhoea
Infectious hepatitis	Virus	Yellow jaundiced skin, enlarged liver, vomiting and abdominal pain-often permanent liver damage
Amoebic dysentery	Protozoa	Diarrhoea, possibility prolonged

Source: Tiwana *et al.*, 2005

WATER QUALITY OF RIVER SATLUJ

Many important towns like Nangal, Ropar, Ludhiana, Jalandhar and Ferozepur are situated along this river. PPCB is monitoring the quality of the river for physico-chemical parameters at 15 locations under the scheme. Parameters (BOD, COD, DO and faecal coliform) indicate that the water quality is poor downstream Ludhiana upto Harike.

At Nangal (upstream area) is good with sufficient dissolved oxygen. The water quality can be designated as "B" category. As the river flows downwards, its quality degrades due to addition of pollutants and the quality category becomes 'C' (it can be used for drinking only after conventional treatment and disinfection). It is also not fit for bathing. The quality further degrades to 'D' category, as Budha Nallah from Ludhiana disposes industrial wastewaters and domestic sewage into the river.

Table 26: Status of Water Quality of River Satluj (2006-07)

Sampling Points	BOD (mg/l)	COD (mg/l)	DO (mg/l)	Coliform MPN/100 ml	Water Class as D.B.U. classification
Satluj at 100 Mts. U/S of Headwork Nangal	0.1	2.0	8.0	73	B
Satluj at D/S NFL	0.2	2.7	7.9	100	B
Satluj at 100Mts. D/S Nangal	0.3	3.1	7.8	365	B
Satluj at D/S Kiratpur Sahib	0.5	3.9	7.7	2615	C
Satluj at U/S	0.6	4.2	7.6	1777	C

Headworks Ropar					
Satluj at 1 Km D/S Rishab Papers	0.6	3.5	7.6	2652	C
Satluj at U/S Budha Nala Upper	2.9	7.5	6.6	35860	D
Satluj at 100 Mts D/S Budha Nala confluence/ Ludhiana	21	6.5	4.5	153750	D
Satluj at Boat Bridge, Dharamkot Nakadar Road, Jalandhar	12.5	3.7	4.8	95250	D
Satluj at D/S East Bein	9.7	4.2	5.1	64500	D
Satluj at Bridge Harike	3.1	16.5	6.1	16387	D
Harike lake at Harike	1.1	7.9	6.8	612	C
Harike Lake D/S from canal	1.3	11.1	6.7	1362	C
U/S Husaniwala H.W. Firozpur	1.0	7.2	6.7	575	C
D/S Husaniwala a H.W. Firozpur	1.0	7.2	6.7	575	C

Source: Statistical Abstract of Punjab, 2007

WATER QUALITY OF RIVER BEAS

The important towns situated along the banks of river Beas are Talwara, Mukerian and Beas town. The variations in major physico-chemical parameters of river Beas have been depicted. Data indicates that the quality of water of river Beas when it enters Punjab at Talwara is class 'B'). The river has sufficiently high dissolved oxygen content (7.6 mg/l) and 88/100ml of coliform at this point. The quality of water remains so till it receives effluents and sewage from Beas at Gurudaspur and Mukerian town where it drops down generally to class C. Further downstream, the water quality deteriorates due to discharge of industrial effluents and sewage from Goindwal town and industrial complex.

Table 27: Status of Water Quality of River Beas & Ravi (2006-07)

Name of River	Sampling Points	BOD (mg/l)	COD (mg/l)	DO (mg/l)	Coliform MPN/100	Water Class as D.B.U.
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					ml	classification
Beas	Beas at Talwara H.W.	0.3	2.2	7.6	88	B
	U/S Pathankot	1.1	3.6	7.4	230	B
	D/S Pathankot	1.3	4.0	7.3	280	B
	Beas at Mirthal Bridge Gurdaspur	1.4	5.2	7.3	895	C
	Beas at 1 Km. D/S of effluent discharge at Mukerian	1.4	4.1	7.1	4392	C
	Beas at G.T. road under bridge near Kapurthala Punjab	1.2	4.5	7.4	4292	C
	Beas at U/S Goindwal	1.0	5.9	7.4	3417	C
	Beas at 100 Mts.D/S industrial discharge point Goindwal	1.0	6.4	7.3	4917	C
	Beas at Harike	1.2	6.3	7.1	1587	C
Ravi	Ravi at U/S of Modhopur H.W. (Gurdaspur)	0.4	1.8	7.7	966	B

Source: Statistical Abstract of Punjab, 2007

WATER QUALITY OF RIVER RAVI

There is only one sampling station U/S Madhopur Head Works, Gurdaspur on this river. The variations in physico-chemical parameters of river Ravi have been depicted. The water quality of the river is more or less similar along its entire length. The water quality predominately conforms to B class as per designated best use classification of CPCB. The physico-chemical analysis of water at Madhopur suggests that the water is clean and almost free from pollution. The river water has 7.7 mg/l of DO and 966/100 ml of coliform.

Water Quality of River Ravi

Table 28: Status of Water Quality of River Beas & Ravi (2006-07)

Name of River	Sampling Points	BOD (mg/l)	COD (mg/l)	DO (mg/l)	Coliform MPN/100	Water Class as D.B.U.
---------------	-----------------	------------	------------	-----------	------------------	-----------------------

					ml	classification
Beas	Beas at Talwara H.W.	0.3	2.2	7.6	88	B
	U/S Pathankot	1.1	3.6	7.4	230	B
	D/S Pathankot	1.3	4.0	7.3	280	B
	Beas at Mirthal Bridge Gurdaspur	1.4	5.2	7.3	895	C
	Beas at 1 Km. D/S of effluent discharge at Mukerian	1.4	4.1	7.1	4392	C
	Beas at G.T. road under bridge near Kapurthala Punjab	1.2	4.5	7.4	4292	C
	Beas at U/S Goindwal	1.0	5.9	7.4	3417	C
	Beas at 100 Mts.D/S industrial discharge point Goindwal	1.0	6.4	7.3	4917	C
	Beas at Harike	1.2	6.3	7.1	1587	C
Ravi	Ravi at U/S of Modhopur H.W. (Gurdaspur)	0.4	1.8	7.7	966	B

Source: Statistical Abstract of Punjab, 2007

WATER QUALITY OF RIVER GHAGGAR

This river is a predominantly monsoonal stream. There are 12 sampling locations on the river. The water quality at all the sampling location is belongs to 'D' category excluding Mubarakpur Rest house at Patiala (category 'D'). The BOD, COD and Coliform MPN values are very high and are depicted.

These issues, if unattended, will pose major problems to provide safe drinking water during 21st century especially in S.W. parts of the state where drinking water supply is canal based.

Table 29: Status of Water Quality of River Ghaggar (2006-07)

Sampling Points	BOD (mg/l)	COD (mg/l)	DO (mg/l)	Coliform MPN/100 ml	Water Class as D.B.U.
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					classification
Ghaggar at Mubarakpur Rest House (at Patiala)	1.2	5.8	7.3	3275	C
Ghaggar near Bhankarpur, Dera Bassi	11.2	32.2	6.0	119500	D
D/S Chhatbir	6.2	21.5	6.3	41750	D
U/S Jharmal Nadi	6.1	15	6.3	47000	D
D/S Jharmal Nadi	7.6	22	6.2	89250	D
U/S Dhakansu Nallah	3.6	14.6	6.5	23333	D
D/S Dhakansu Nallah	11	31	5.8	88750	D
Ghaggar at Ratanheri D/S of Patiala Nadi after confluence	69	26	5.2	67500	D
Ghaggar at 100 Mts. D/S confluence with river Khanauri	8.6	29.5	5.2	55000	D
Ghaggar at Moonak	16.4	40	4.6	75000	D
U/S Sardulgarh	14.5	51.5	4.6	125000	D
D/S Sardulgarh	15	53	4.5	157500	D

Source: Statistical Abstract of Punjab, 2007

GROUND WATER QUALITY

Groundwater is the primary source of drinking water for more than 95% of the population in Punjab. Groundwater in the central districts (Kapurthala, Jalandhar, Ludhiana, Patiala and Sangrur) is getting depleted at 20-30 cm/year (Planning Commission, Government of India, 2007-2012).

Further, as per studies conducted by various workers on heavy metal contamination in ground water of Punjab due to industrial and agricultural activities especially in few cities.

- **Selenium Contamination in Ground Water**

Selenium ranging from 2.5 to 69.5 mg/l has been reported in the ground water of several villages in districts Nawanshahr & Hoshiarpur (Panam, Nazarpur, Simbli, Barwa, Jampur, Menhdpur, Rakkara, Dhahan and Bhano Majra) and in Kandi area as shown in Fig. below. Further, the maximum permissible limit of 10 mg/l for drinking water was exceeded by 11.1% in tube well samples whereas the maximum permissible limit of 20 mg/l for irrigation water was exceeded by 4.4% sample as reported in joint studies conducted by PAU and PSCST (Dhillon, *et al.*, 2004, unpublished).

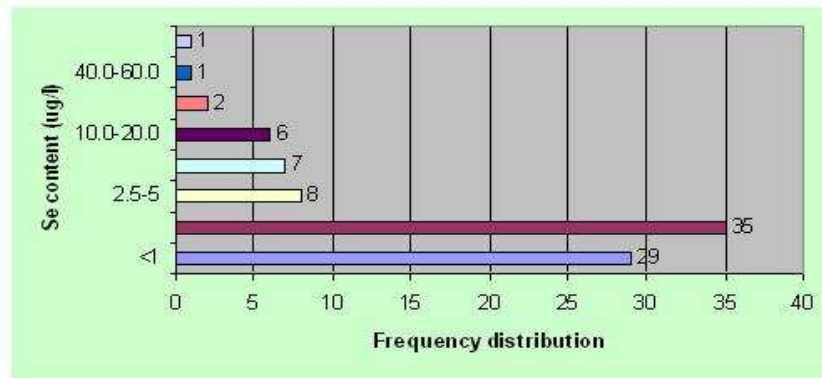


Fig. No. 3 Frequency distribution of Selenium Concentration in Underground Waters located in Seleniferous Region of Punjab

- **Fluoride contamination in Ground Water:**

Fluoride is known to contaminate groundwater reserves globally. Sporadic incidence of high fluoride content in groundwater has been reported from India. As per Ministry of Water Resources, Government of India, thirteen states in India have been identified as fluorosis affected due to presence of natural fluoride bearing minerals in subsoils. Punjab (Bhatinda & Sangrur), is one of them (Tiwana et al., 2005). Further, the fluoride content in groundwater (about 1.5 mg/l) has also been reported in Bhatinda, Patiala, Faridkot, Mukatsar and Mansa. The maximum value of fluoride 22.6 mg/l has been reported in Kachi Khanauri in Sangrur district.

(Source: Central Groundwater Regulation and Management Department, 2008as cited in www.expressindia.com).

- **Arsenic contamination in Ground Water:**

Arsenic contamination has been reported by the following studies:

Deep-water tube wells used for domestic water supply for urban population located in Amritsar has shown the arsenic concentration ranging from 3.8 to 19.1 ppb with mean value of 9.8 ppb (Hundal et al., 2008). Further, arsenic content in hand pump water is reported varying from 9 to 85 ppb with a mean value of 29.5 ppb. According to the safe limit of 54% and 97%, water samples collected from deep water tube wells and hand pumps, respectively, were not fit for human consumption. Arsenic content in canal water varied from 0.3 to 8.8 ppb with a mean value of 2.89 ppb (Hundal et al., 2008).

The problem is more severe at several sites in South West districts of Punjab where the arsenic concentration exceeded more than 20-30 folds of the WHO safe limits. In this region, Department of Sanitary and Public Health preferred to supply canal

water to urban population due to brackish under ground water which is usually unfit for human consumption (Hundal et al.,)

Uranium poisoning in Punjab

In June 2010, studies carried out amongst mentally retarded children in the Malwa region of Punjab, revealed 87% of children below 12 years and 82% beyond that age having uranium levels high enough to cause diseases. Causes an investigation carried out by the observer newspaper, in 2009, revealed the possible that cause of contamination of soil and ground water in Malwa region of Punjab, to be the fly ash from coal burnt at thermal power plants, which contains high levels of uranium and ash as the region has state's two biggest coal-fired power stations.

IV. Air pollution

In Punjab there are basically three types of air pollution:

1. **Industrial Pollution**
2. **Vehicular Pollution**
3. **Noise Pollution**

1. Industrial Pollution

Modernization and progress have led to air getting more and more polluted over the years. The major factors responsible for industrial air pollution are thermal power plants, cement, steel, refineries, petro-chemicals, and mines and other factors, which indirectly responsible for air pollution and associated with industrial growth are vehicles, over population and urbanization.

In Punjab the total number of industries has increased tremendously over the past 20 years. The industries contributing to air pollution mostly use coal or rice husk as fuel. Together these contribute to suspended particulates, oxides of nitrogen and sulfur, organic compounds and other pollutants in the air.

Table 30: Status of Air Polluting Industries of Punjab

Years	Large & Medium (No. of Units)		Small Scale Industries (No. of Units)		Categories (No. of units)		
	With APCD	Without APCD	With APCD	Without APCD	Red	Orange	Green
2002-03	396	-	6942	925	9068	-	4912
2003-04	413	-	7804	747	10459	-	5173
2004-05	431	-	8016	630	10767	-	5690
2005-06	417	-	7819	516	9788	-	7528

2006-07	494	01	8589	384	11173	-	5965
2007-08	494	0	8975	227	11703	0	6245
2008-09	394	-	7216	169	10753	-	7867

Source: Punjab Pollution Control Board as cited in Statistical Abstract of Punjab, 2007, 2008 & 2009

Punjab is also vulnerable to Vehicular and Noise Pollution.

2.3 VULNERABILITY

I. Socio-Economic Vulnerability

Socio-economic vulnerability of Punjab can be understood, first, as a group of characteristics and tools that the state possesses. In this sense, we can call socio-economic vulnerability the endogenous inability of the state to face shocks. This endogenous inability is a function of risk exposure and other socio-economic factors. The socio-economic vulnerability, more specifically, is the result of the risk exposure of the Punjab state, coupled with the people's socioeconomic characteristics and their ability to adequately respond to shocks so as to avoid declines below a certain benchmark of well-being. Socioeconomic vulnerability is also the susceptibility of an economic agent to absorb external shocks (hazards) negatively, given its assets possession and entitlements system (coping capacity), as well as its implemented risk management and protection measures (adaptive capacity). Though being poor does not necessarily imply being vulnerable, but poverty makes individuals relatively more vulnerable to a given hazard. Adverse economic conditions make individuals less able to invest in all items, including those to manage risk and increase disaster protection. The developing countries have historically been more severely damaged as compared to developed countries

Various indicators of socio-economic vulnerability are poverty, illiteracy, unemployment, inaccessibility to physical and social infrastructure, unawareness, lack of community participation in the development process and other social and economic issues.

Table 31: Major Socio-economic Indicators of the State

Sl. No.	Particulars	Units/ Magnitude
1.	<u>Geographical Area</u>	50,362 km ²

2.	<u>Demography</u> Men Women Total Population Density Sex ratio (female per '000 Males) Child Sex ratio: (0-6) age group Decennial growth rate %SC Population %of Urban population % of Rural population Total literacy rate Male literacy rate Female literacy rate SC literacy rate Disabled Population % of Disabled population to total population	1,46,350,00 (2011) 1,30,690,00 (2011) 2,77,040,00 (2011) 550 (per sq km) (2011) 893 (2011) 846 (2011) 13.73% (2001-2011) 28.9% (2001) 33.92% (2001) 66.08 (2001) 76.68 (2011) 81.48 (2011) 71.34 (2011) 56.2% 4, 24,523 2.1
3.	<u>Economics</u> Per-capita income % of people living below poverty line	Rs. 61035 (at current prices) Rs. 34935 (at constant prices) 5.20% (2005-05)
4.	<u>Health</u> Infant Mortality rate Rural Infant Mortality Rate Urban Infant Mortality Rate Birth rate Rural Birth rate Urban Birth Rate	38 42 31 24.1 (2009) 17.7 15.8

	death rate	7.0
	Rural Death rate	7.8
	Urban Death rate	5.8
	Population served per Sub-center	5,000
	Population served per SHCs/Rural	10,000
	Dispensaries/Clinics	30,000
	Population served per PHCs	100,000
	Population served per CHC	
5.	<u>Agriculture</u>	
	Total cropped area	7912 thousand Hec.
	Net area sown	(2008-09)
	Area sown more than once	4171 thousand Hec.
	Cropping intensity	3714 thousand Hec.
		190%
6.	<u>Infrastructure</u>	
	Length of National Highway	1557 kms
	Length of State & Express Highways	2166 kms
	Length of major & other district roads	5139 kms
	Railway length	2,098 kms
	Percentage of villages electrified	100%
	Number of Post offices	3854
	Number of Police Station/ Police Posts	459
	Number of Printing Presses	21
	Number of Rest Houses	358
	Number of Milk Plants	70
	Number of Telephone Connections	1244444
	Number of Telephone centers (exchanges)	1481
	Number of Market Committees)	145
7.	<u>Employment</u>	
	Main workers	78.36 Lacs
	Marginal workers	17.92 Lacs

	Non-workers	152.32 Lacs
	Cultivators	20.65 Lacs
	Agricultural laborers	14.90 Lacs

II. Physical Vulnerability

Physical vulnerability is determined by the aspects such as population, remoteness of a settlement, the site, design and materials used for housing and critical infrastructure.

Physical features in a community, such as insufficient basic infrastructure, especially water supply and sanitation, as well as inadequate health care facilities and supplies, are also expressions of increased vulnerability.

Physical factors to be considered for vulnerability assessment include the variables directly or indirectly related to the location and nature of the built environment. In case of natural hazards physical factors have direct impact on the structures and further define the vulnerability of the physical structures.

Houses condition in the State

House is one of the important basic needs of human being. Condition of houses became very important indicator for determining physical vulnerability because weak buildings are very much prone to damage.

Table 32: Condition of Census Houses Used as Residence and Residence-Cum-Other Use

	Total	%	Rural	%	Urban	%
Total	4185393	100.0	2729932	100.0	1455461	100.0
Good	2363676	56.5	1432259	52.5	931417	64.0
Livable	1640312	39.2	1171867	42.9	468445	32.2
Dilapidated	181405	4.3	125806	4.6	55599	3.8

According to Census of India

- Those houses which do not require any repairs and in good condition may be considered as '**Good**'

- Those houses which are showing signs of decay or those breaking down and require major repairs or those houses decayed or ruined and are far from being in conditions that can be restored or repaired may be considered as **'Dilapidated'**
- Those houses which require minor repairs may be considered as **'Livable'**

According to Vulnerability Atlas of India, made by Building Material and Technology Promotion Council, physical vulnerability of Punjab State is shown in below Table:-

Table 33: Physical Vulnerability of Punjab State

Wall/ Roof		Census Houses		Level of Risk under								
		No. Of Houses	%	EQ Zone				Wind velocity m/s				Flood prone area in %
				V	IV	III	II	55 & 50	47	44 & 39	3 3	
				Area in %				Area in %				
					53.0	43.4	3.7		98.0	2.0		74.6
Wall												
A1-Mud & Unburnt Brick wall	Rural	305,926	5.1									
	Urban	67,001	1.1									
	Total	372,927	6.2		H	M	L		H	M		VH
A2-Stone wall	Rural	5291	0.1									
	Urban	5709	0.1									
	Total	11000	0.2		H	M	L		M	L		VH
Total Category - A		383927	6.4									
B- Burnt Bricks Wall	Rural	3361730	56.3									
	Urban	1968857	33.0									
	Total	5330587	89.3		M	L	VL		M	L		H/M
Total Category - B		5330587	89.3									
C1- Concrete Wall	Rural	62134	1.0									
	Urban	81780	1.4									
	Total	143914	2.4		L	VL	VL		VL	VL		L/VL

C2- Wood Wall	Rural	4161	0.1									
	Urban	6268	0.1									
	Total	10429	0.2		L	VL	VL		H	M		H
Total Category - C		154343	2.6									
X- Other Materials	Rural	65833	1.1									
	Urban	32786	0.5									
	Total	98619	1.6		VL	VL	VL		H	M		VH
Total Category - X		98619	1.7									
Roof												
R1-Light Weight Sloping Roof	Rural	618126	10.4									
	Urban	182698	3.1									
	Total	800824	13.5		M	L	VL		VH	H		VH
R2-Heavy Weight Sloping Roof	Rural	1826711	30.6									
	Urban	338118	30.6									
	Total	2164829	36.3		M	L	VL		M	L		H
R3- Flat Roof	Rural	1360238	22.8									
	Urban	1641585	27.5									
	Total	3001823	50.3	Damage risk as per that for the Wall supporting it								
Total Buildings		5,967,476										

Source: Vulnerability Atlas of India, made by Building Material and Technology Promotion Council, 2006

VULNERABILITY OF CRITICAL INFRASTRUCTURE TO NATURAL HAZARDS

Table 34: Distribution of Households Living in Census Houses by Predominant Material of Roof

	Total	%	Rural	%	Urban	%
Total	201878	100.0	21302	100.0	180576	100.0
Grass, Thatch, Bamboo, Wood, Mud, etc.	11724	5.8	1990	9.3	9734	5.4

Plastic, Polythene	2486	1.2	37	0.2	2449	1.4
Tiles	2584	1.3	804	3.8	1780	1.0
Slate	222	0.1	19	0.1	203	0.1
G.I., Metal, Asbestos sheets	27638	13.7	1237	5.8	26401	14.6
Brick	9424	4.7	1944	9.1	7480	4.1
Stone	259	0.1	164	0.8	95	0.1
Concrete	146942	72.8	15033	70.6	131909	73.0
Any other material	599	0.3	74	0.3	525	0.3

Census of India, 2001

Table 35: Distribution of Households Living in Census Houses by Predominant Material of Wall

	Total	%	Rural	%	Urban	%
Total	1240633	100.0	1097520	100.0	143113	100.0
Grass, Thatch, Bamboo, Wood, Mud, etc.	8025	0.6	6912	0.6	1113	0.8
Plastic, Polythene	3023	0.2	2013	0.2	1010	0.7
Tiles	337466	27.2	323842	29.5	13624	9.5
Slate	19304	1.6	17608	1.6	1696	1.2
G.I., Metal, Asbestos sheets	5779	0.5	4556	0.4	1223	0.9
Brick	354710	28.6	254759	23.2	99951	69.8
Stone	499779	40.3	480990	43.8	18789	13.1
Concrete	11280	0.9	5790	0.5	5490	3.8
Any other material	1267	0.1	1050	0.1	217	0.2

Census of India, 2001

Slum

Urban population in Punjab is estimated to have reached nine million by the year 2001, with two cities- Amritsar and Ludhiana figuring in the million plus cities.

Punjab has the highest per capita income in the country, despite that; one fourth of the urban population in the state resides in slums.

The existing studies indicate that emergence of slums in Punjab is essentially the:-

1. Product of demographic growth in the cities.
2. Inability to meet the housing demands.
3. Existing urban land policies which prohibit the access of the poor to the urban land market.

Table 36: Total Slum population in Punjab

S No.	State / UT	Total Slum population		
		Persons	Males	Females
1	Punjab	1,159,561	629,326	530,235

Census of India, 2011

According to the Building Material & Technology Promotion Council, 1997, 48.6% area of the state is vulnerable to Intensity VIII and 45.6% area to Intensity VII. Following table shows the multi-hazard prone districts of Punjab:

Table 37: Multi-Hazard Prone Districts in Punjab

District Name	Percent area under EQ Intensity, M.S.K.			Percent area Flood Prone	
	IX or more	VIII	VII	Unprotected	Protected
Amritsar	-	89.7	10.3	4.5	81.7
Bathinda	-	-	92.3	2.7	28.2
Faridkot	-	-	89.1	32.8	37.6
Firozpur	-	-	68.8	14.8	38.7
Gurdaspur	-	100	-	25	43.2
Hoshiarpur	-	100	-	74.8	3
Jalandhar	-	95.3	4.7	58.3	27.5
Kapurthala	-	100	-	7	31.8
Ludhiana	-	74.1	25.9	36	64
Patiala	-	41.3	58.7	48.6	43.2
Rup Nagar	-	100	-	72.4	6.7

Sangrur	-	1	99	51.6	14
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Source: Building Material & Technology Promotion Council, 1997

CHAPTER III

DISASTER PREPAREDNESS AND MITIGATION PLAN

3.1 Introduction

The State Plan for preparedness and mitigation attempts to protect the lives and properties of the people of Punjab from potentially devastating hazards. The initiatives under this plan lay down certain objectives and suggest definitive strategies leading to the achievement of goals in a set time frame. The ultimate goal for the Government of Punjab with respect to various hazards is to have prepared communities in a way that when the hazards strike, there is little or no loss of life; least number of injuries and the losses to property and infrastructure are not critical.

Each element in this plan has a specific role and significant contribution towards the end target of a safer Punjab. All the elements attend to a distinct but interrelated with the area of concern. The plan rests on the conviction that well defined strategies, goals and end targets with identified players, roles and responsibilities are the precursors of successful implementation of any project. The strategies for hazard loss reduction aim at reducing losses in the event of a future occurrence of a hazard. Mitigation measures need to be considered in land use and site planning activities. Necessary mitigation measures need to be built into the design and costing of development projects.

3.2 Disaster Preparedness

Preparedness and 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 familiarising 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. 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.

Since disasters affect economic and social processes, preparedness and mitigation must emphasise 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.

3.2.1 Important Components of Preparedness Plan

Generally community preparedness depends upon following four major components:

1. Population characteristics (number of children, squatter settlement etc)

2. Building and critical infrastructure such as road, drinking water, communication network, health and sanitation
3. Physical environment
4. Social environment (social groups)

In view of these components risk assessment study has been conducted and identified that Punjab is densely built and consists of a high number of urban population. Any major flood, earthquake or fire/chemical explosion can affect district very badly. Although various steps have been taken by the Punjab Government but still a high degree of awareness and training is required to lay down an organization system within communities.

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

3.2.2 Components of Community Preparedness Plan

Several previous attempts have been made by researchers to measure community preparedness within various indicators. Some of the important components of measuring preparedness are given below (refer fig 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.
- ✓ **Hazard awareness** i.e. awareness level about hazards which have a reasonably higher probability of occurrence
- ✓ **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

- ✓ **Infrastructure and services** which tries to measure current state of these services and how well restoring critical services as and when disruptions occur
- ✓ **Recovery ability** i.e. ability of the community members to recover from the impact of the hazard
- ✓ **Physical environment** i.e. state of environment to face hazards e.g. Condition of sub-surface aquifers and vegetation etc
- ✓ **Social capital** i.e. degree to which social networking and cooperation exists among community members
- ✓ **Psychological preparedness** i.e. how safe and prepared do community members feel in view of these hazards
- ✓ **Cultural capital** i.e. cultural richness such as existence, recognition and use of traditional mechanism to cope with such disasters
- ✓ **Household preparedness** i.e. preparedness at a house hold members

3.2.3 Components of Administrative Preparedness

Administrative preparedness is also an important component which helps in reducing relief and response time in a disaster situation. Preparedness plan is based on below-given components

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.

3.3 Preparedness Plan for Punjab

Based on above-mentioned components following arrangements are required to enhance State level preparedness level.

3.3.1 Establishment of State Emergency Operation Centre (SEOC): To ensure coordination within State, district and local authorities, SEOC 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 SEOC helps Incident Management Team to meet these conflicting demands. Keeping this in view, Punjab has identified 2 State level Emergency Operations Centres and nine Emergency Operations Centres for all the districts. At present, these Operations Centres are temporarily running in all the Districts and State but there is a plan for further strengthening the SEOC building with equipments, manpower and other facilities. Below, important activities of SEOC have been described.

(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. In future, EOC would include a well-designed control room with workstation, wire-less communication, hotlines and intercoms etc. Following other facilities will be made available within the EOC:

- A databank of resources, action plans, state and district disaster management plans, community preparedness plans would be maintained at EOC
- Maps indicating vulnerable areas, identified shelters, communication link system with state government and inter and intra district departments would be strengthened
- Inventory of manpower resources with address, telephone numbers of key contact persons has been maintained
- EOC will have provision of desk arrangements in advance
- Frequently required important phone numbers would be displayed on the walls so that they can be referred. Other phones and addresses would be kept under a easy-retrieval and cross-referring system
- Reconstruction/ Retrofitting of building will be done so that it can remain operational during disaster also.
- EOC will be made operational for 24 hours with the help of Police, Fire and Home Guard Department

(c) Communication Room (Main Message Room)

The police wireless system should be in contact with EOC. In addition to that following facilities would be available in the communication room:

- Telephones, fax and intercoms units for contact within the Commissioner
- Civil wireless network (up to *tehsildar* level-suggested)

- One computer with internet and printer facility and photocopying machine
- Help lines numbers will be setup for emergency related queries

(d) Transport Facility

A jeep with wireless communication may be assigned to the EOC for normal times. Additional vehicles may be requisitioned during the emergency.

(e) EOC Staffing/Manning EOC

Manning of EOC is required for making EOC operational during and post disaster situation. In district there would be a need of keeping adequate staff. There is a need of regular staff, staff-on requirement and staff-on disaster duty. Regular staff is required to manning communication room on 24 hours. Staff on call can be acquired immediately on requirement. Two officers of the rank of DC/ADM can be appointed during emergency. 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. Senior officers should be appointed in the capacity of desk officers for maintaining coordination for Emergency Support Functions.

3.3.2 Preparation of Resource Inventory

In a scenario of total damage due to disasters like earthquake, all communication system disrupts and disaster managers become armless in fighting the calamity. To overcome such obstacle, Government of India has developed disaster management portals which facilitate the disaster managers and administrators to track down resource stocks in the country or at least in the neighbouring area. This Website, called **www.idrn.gov.nic.in**, basically intended to gather data from the government resources. Data are collected from local units and line departments and

uploaded by the District Administration after verification and scrutiny.

Each government department in the district shall take part in updating this portal regularly. They shall give information on fresh procurement of equipments, manpower and technologies to the Emergency Operation Centre, Patiala in the prescribed format at least biannually.

3.3.3 Reliable Communication Systems

Punjab 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. Till now, Police Communication System has been found most suitable to rely upon. The plan also seeks for installation of satellite phones and HAM equipments in the EOC for strengthened communication system in all nine district offices and state headquarter office. Training to volunteers of home guards would be provided in HAM operations.

3.3.4 Preparation of a 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-term of tasks and assigned responsibilities to different agencies. It also lay down an Incident Command System under the directions of Deputy Commissioner of every district or divisional Commissioner (depending upon the extent of disaster). This whole exercise will help 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 for resolving perplexity

occurring during actual scenario. Broad details of response plan have been included in the Chapter 5.

3.3.5 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 Command System, Emergency Response Functions, basic management skills and specialized training on search and rescue, first aid etc. Persons to be trained shall be:

- Government Officers at par with the rank requirement under Incident Command System
- Team leaders and members of Emergency Support functions Quick Response Teams at headquarter and field level
- Community level taskforces including Volunteers, NGOs and home guard volunteers, school and college students, NCC and NSS scouts and NYKS etc

Punjab Government has conducted 7 training programmes and total 22544 persons are trained which is given in Annexure V. Punjab State 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 representation shall be noticed during mock-drill.

CAPACITY BUILDING

The Department has the funds from XIII FC for training and capacity buildings. The Department has made the Annual Work Plans for the XIII FC funds for the years 2010-2011, 2011-2012, 2012-2013, 2013-2014 and 2014-2015. These Annual Work Plans are given as Annexure V. The proposals from different departments for training and capacity building would be reviewed and sponsored from XIII FC Funds or the State Disaster Response Fund.

Formation of State Disaster Response Force (SDRF)

As per section 44 of the Disaster Management Act 2005, GoI has constituted NDRF [National Disaster Response Force], a battalion of which has been stationed at Bhatinda. The Act envisages creation of SDRF on the analogy of NDRF. The meeting of State Executive Committee held on 15-02-2011 has approved AWP 2011 under which there is proposal to create State Disaster Response Force taking 50 personnel including 10 as leave/ training reserves to be supported from 13th Finance Commission's Capacity Building Programme for 4 years and to be under the administrative control of Director, Disaster Management, Punjab and under the supervision of Director General, Home Guard. The budget for the salaries of these personnel would be incurred by the Department of Disaster Management, Punjab. The responsibility to select the candidates is to be given to C-PYTE and the authority for the same shall be granted / forwarded through Principal Secretary, Employment Generation and Training, Punjab.

Organization Structure

The Department of Civil Defence will appoint from amongst their staff a Company Commander rank Officer and 2nd Officer in Command to head the SDRF.

The Department of Civil Defence will prepare this force on the lines of National Disaster Response Force [NDRF]. They will coordinate with the training agencies, conduct training in their own institute and ensure that the force is available for operational purposes within six months from the date of joining.

Table 38: Previous Trainings by the Punjab Government

Sr. No.	Name of Organization	Year	Number of Trainings	Number of Trainee
1.	4 State Resource Training Institute:- Giani Zail Singh College of engineer and technology, Bathinda Guru Nanak Dev Engineer College, Ludhiana Dr. Ambedkar National Institute of Technology, Jalandhar Thapar Institute of Engineer & Technology, Patiala	2008-09		942 engineers and 86 architects attended Training on Earthquake Resistant Building Design and Technology
2.	Strategic Safety Services Pvt Ltd.	2009-2010	10 Districts 130 Training	17408 persons attended Community Based Disaster Management Training
3.	Pahal NGO	2009-10	1 District 16 Training Programme	2011 persons attended Community Based Disaster Management
4.	Surjit Sharma	2009-10	2 Districts 40 Training	800 persons attended Community Based Disaster Management
5.	Mahatma Gandhi State Institute of Public Administration, Punjab	2010-11		1274 persons attended Community Based Disaster Management Training, 8 School/ 3 day/School
6.	Police, Home Guards, Civil Defense Personnel	Sep-Oct 2010		One month training for 23 Master Trainers of Punjab Police for disaster management at NISA Hyderabad. These trainers will be deployed in the four Training Institutes of Police viz. Philaur, Jalandhar; Jahankhelan, Hoshiyarpur; Ladakothi, Sangrur and Bahadurgarh, Patiala, to further train the forces.
7.	NDRF/ Civil Defense Draft Punjab State Disaster Management Plan	2011-12	9 Districts completed 11 left Days Training Programme	30 Volunteers of NSS, NCC, NYK are being trained

8.)	22544 Trained	Total	Person
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Equipment

The equipment needed by the SDRF would be provided by the Department of Disaster Management, Punjab. The Department would also buy a Truck and a Bus for the transportation of the SDRF personnel.

District Disaster Response Force/ Master Trainers for Communities

The department is conducting the process of formulating Disaster Response Force in all the 20 districts of Punjab.

The district disaster response force would be fully trained and fully equipped Teams who can serve as master trainers for communities during peace times. The districts are in the process of identifying a team of 30 Volunteers interested, able youth who are partly employed or unemployed from Nehru Yuva Kendra/C-PYTE etc. who can be trained and those found good can be designated as District Disaster Response Force [DDRF]. These persons would be in-charge of handling the rescue equipment placed in the districts.

These persons would be imparted basic training in flood rescue, first aid and dos and don'ts during fire accidents and earthquakes. So, 3 types of trainings, would be conducted first flood rescue training through NDRF or Civil Defence, Secondly 3 days First Aid Training through St. John Ambulance and District Red Cross Society and Third is one day training on Dos and Don'ts during Earthquake, Fire and other disasters. All the districts have volunteered to provide 30 persons. The training venues for flood rescue training are as follows:

Table 39: Training Venues for Flood Rescue Training

<u>SN</u>	<u>Venue</u>	<u>Agency</u>	<u>Districts</u>
1.	Harike Wet Lands	NDRF	Ferozepur, Amritsar, Tarn Taran, Gurdaspur, Moga, Fatehgarh Sahib, Faridkot
2.	Beas River	NDRF	Hoshiarpur
3.	NDRF Bathinda	NDRF	Mansa, Barnala, Sangrur, Bathinda, Muktsar
4.	Kanjli Wet Lands	NDRF	Kapurthala
5.	Sutlej Phillaur	NDRF	Jalandhar, Ludhiana
6.	Sutlej Head Works	NDRF	Roopnagar, SBS Nagar
7.	Sukhna Lake, Chandigarh	Civil Defence	Patiala, SAS Nagar,

The training of District Disaster Response force has already been conducted for two districts. The department plans to conduct trainings of all the 20 district disaster response teams by October 2011.

Purchase of Equipment

The Department plans to procure inflatable lighting towers for effective night time operations. These inflatable lighting towers have inbuilt Genset and can operate for 10 hours. It is proposed to buy one for each district and two for State Disaster Response Force (22 in total).

The Department is processing the purchase of 22 motor bikes loaded with Water Mist Foam Fire Extinguishers. These motor bikes would be used to reach the narrow lanes of Punjab where fire brigade vehicles can not reach. Out of these 22

motorbikes 20 would be provided to the DDMA (1 each for each district) and the rest 2 motor bikes would be provided for the SDRF.

The Department plans to buy three Aerial Ladders for search and rescue operations in Punjab. These aerial ladder would be one each for the districts Ludhiana, Amritsar and Jalandhar. The first aerial ladder would be purchased soon and based on its performance the next two aerial ladders would be purchased.

Besides the department has identified some other search and rescue equipment to be purchased like lifting bags to lift any collapsed structure including overturned vehicles where space is not available to use other equipment.

Apart from these the Department is also in the process of purchasing 4 Inflamable Boats, 100 Life Jackets with reflectors, 16 Life Buoys, 2 Water Rescue Rockets, 16 Ropes (ordinary 15 m Length), 2 Temporary Shelters and Diving Kits.

3.3.6 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. Punjab Government shall develop large scale Information Communication and Education material in the form of booklets, handbooks, manuals, posters and flyers etc. These documents shall be 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.

District authorities shall 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 and Home Guards, 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 (refer Table 5.1).

3.3.7 Capacity Building of Community Task forces

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

District level Medical Officer shall organize seminars for training taskforces and volunteers in basic first-aid with the help of Civil Defence & Home Guard. Punjab Fire Service along with Civil Defence & Home Guard shall impart training on search and rescue and fire fighting.

3.3.8 Simulation Exercises

To encourage participation in a coordinated manner simulation exercises on various disasters are very important. These exercises help in institutional building at various levels. Mock-exercises shall be promoted at state, district and community level. Those community members have completed their disaster management plans and have constituted several taskforces shall conduct regular mock-drills. At least two mock-drills shall be conducted by community representatives to improve and update plan.

Smilarly, once State response plan is ready, mock-drills shall be organized by State Government. Mock exercises help in improving response time and also test reliability. Therefore at least one mock-drill shall be arranged involving all required agencies. These drills will also help in updating the response plans. Punjab Disaster Management Authority/ District Disaster Management Committee are responsible to conduct yearly mock drills and update plans.

Table 40: Community Preparedness Strategies

S. No.	Tasks	Mode of Conduct	Nodal Agencies	Supporting Agencies
1	Information Dissemination of various hazards and their precautionary measures (do's and don'ts). Also, preparation of community based disaster management plans shall be promoted in these area First priority shall be given to the schools, industrial	Through Nukaad Nataks, Film Shows, Rallies, Media, Newspaper Media, Posters and Pamphlets, Groups discussions and workshops etc.	District Administration	Civil Defence and Home guards volunteers, Nehru Yuva Kendra Sangthan (NYKS), Residential Welfare Associations (RWAs), Market trade Union (MTAs), Rotary Clubs, Non Government Organizations (NGOs), Schools and colleges volunteers, NSS,

S. No.	Tasks	Mode of Conduct	Nodal Agencies	Supporting Agencies
	clusters, Market Trade Associations and Residential areas, slums and resettlement colonies etc living in the densely populated areas. Second Priority shall be given to the communities living in the outer part			NCC etc.
2	Formation of Community Based Disaster Management Committees and Taskforces	Through community level meetings	District Administration	Representatives of RWAs and MTAs Members, Local Volunteers etc.
3	Capacity Building of Community Members	Through mock-drills, preparation of community plans, trainings and workshops on disaster specific topics	District Administration	CD & HG, Local NGOs, NYKs, St. John Ambulance, C.A.T.S etc.
4	Training to the taskforces and committee members <ul style="list-style-type: none"> • First-Aid and Trauma Counseling • Search and rescue and fire-fighting • Warning Dissemination etc. 	Training and workshops	Revenue Department along with Health, Police and Fire Departments	CD & HG, St. John Ambulance and CATS and NGOs
5	Post disaster epidemic problems	Seminars and community meetings	Health Department	Local health departments and NGOs
6	Trainings for construction of seismic resistant buildings and	Showing Films, videos, distributing posters and brochures, reading materials, etc in trainings and	Revenue Department	MCD, PWD, Private Contractors and NGOs etc

S. No.	Tasks	Mode of Conduct	Nodal Agencies	Supporting Agencies
	retrofitting of the buildings. Target groups are 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)	workshops or any other community gathering		
7	Orientation/Training of government and non-government officers and various other stakeholders	Organizing State level sensitization programmes in their roles in disaster management	State Nodal Agency/Punjab Disaster Management Authority	DHS, social Welfare Department, Fire Department, Research/Academic Institutions like IIT Kanpur and roorkee, School of Planning and Architecture, Punjab College of Engineering, Punjab University etc.
8	Establishment and Strengthening of Emergency Operation Centres	Construction/Restrengthening of the building for EOC, Manning of EOC, Strengthening of EOC with equipments and IT facilities	Punjab Disaster Management Authority	Funds of United Nations Development Programme
9	Response Planning and Simulation Exercises	Based on Incident Command System and emergency Support Functions Developing Partnership with various public support units and private agencies	Punjab Disaster Management Authority/ District Authority	

S. No.	Tasks	Mode of Conduct	Nodal Agencies	Supporting Agencies
		Organising mock-drills exercises at state/district level		

3.4 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 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:

- (iii) Risk Assessment and Vulnerability Analysis
- (iv) Applied Research and Technology Transfer
- (v) Public Awareness and Training
- (vi) Institutional Mechanisms
- (vii) Incentives and Resources for Mitigation
- (viii) Land Use Planning and Regulations

A better disaster management with minimum vulnerability is possible only by means of preparedness and mitigation measures. Maximum the disaster preparedness, minimum the vulnerability. Neither a disaster can be prevented nor diverted to any other place. The only possible thing is to minimize the effect.

The changing concept of disaster management has taken its birth. Today there is a paradigm shift in the approach to disaster management from a culture of relief and rehabilitation to that of preparedness and mitigation. In Punjab State, there shall be two approaches in disaster mitigation viz. structural mitigation and non-structural mitigation.

3.5 STRUCTURAL MITIGATION MEASURES

It is immensely pivotal for the planning community to respond towards disaster management positively. Urban disaster management is intimately connected to the wholesome process of urban development and therefore needs a sincere incorporation in the development planning itself.

The industrial relocation/location, unauthorized-regularization issue, slumming, over densification and continuous influx of population to State are some of the open concerns and that besides a planning challenge it is a concern for disaster management.

The state shall take steps for structural mitigation of disaster management. The departments that are associated with development of residential and commercial plots shall strict the NOC norms. The Building codes shall be strictly enforced in the state. Only seismically oriented engineers, contractors and masons shall be given certificates for multi story constructions and real estates. Simultaneously retrofitting is to be promoted with the expert advice. The possible two structural measures for disaster protection are Retrofitting of the existing building and Earth Quake Resistant new construction.

3.5.1 Retrofitting

For an existing building, Retrofitting or Seismic Strengthening is the only solution to make it disaster resistant. In Punjab State, all lifeline buildings such as major hospitals, Schools with large space for storage, state administration offices and other vital installations shall be retrofitted in the **first phase**. In the **second phase** all other significant buildings shall be given priority for seismic strengthening. Before carrying retrofitting, a panel of experts shall be approached for assessing the structure and to suggest the type of retrofitting required.

3.5.2 Earth Quake Resistant Construction

Promotion of Earth quake Resistant construction mainly includes construction safety, quality control and inspection. In the previous decades, there were no specific guidelines on EQ resistant constructions and seismic strengthening. Due to the very fact, most of the buildings till 1990s were built without any safety measures. But in the present scenario, there are building byelaws and guidelines. Civic Bodies like MC, PUDA, and PWD in the state shall try to enforce these laws.

All construction except load bearing buildings up to 3 storeys shall be carried out under the supervision of the Construction Engineer on Record or Construction Management Agency on Record for various seismic zones. They shall be given a certificate based on the norms on completion of the construction.

All the constructions for high-rise buildings higher than seven story's, public buildings, and special structures shall be carried out under quality inspection programme prepared and implemented under the Quality Auditor on Record or Quality auditor agency on Record in Seismic Zones IV and V. SDMA shall look in to this aspect and ensure that such prerequisites are completed and observed by the concerned agencies and construction engineers.

Illegal constructions, Encroachments, unapproved additions, alterations etc of residential buildings and conversion of residential building in to commercial purpose etc shall be checked by the State Administration with strict measures. These unauthorized activities may lead to disasters in that particular area.

3.5.3 Afforestation

The first and foremost step to control flood is to look into the basic causes of inundation. It is rather obvious that the root cause behind the high surface runoff resulting in floods in high intensity of rainfall. Man can not interfere with rainfall but he can delay and reduce the surface runoff. This can be done through the large scale reforestation and afforestation in the catchment areas of the river Ghaggar, Sutlej, Ravi and Beas and its tributaries. Thich vegetal cover will intercept the raindrops and will encourage more infiltration of water resulting into the reduction of the amount of runoff in river Ghaggar and its tributaries. It will also reduce the soils erosion and siltation of the water reservoirs and beds of the streams.

3.5.4 Multipurpose Dams

The state of Punjab has four major rivers namely Sutlej, Ravi, Beas and Ghaggar. The rivers like Beas, Ravi and Sutlej have been channelized and multipurpose dams have been constructed on them except river Ghaggar. That's why area along river Ghaggar is more prone to floods. After the construction of reservoirs on these rivers of Punjab it has been proved that reservoirs can moderate the intensity of the floods. The cost of providing storage for flood management is always very high but the water stored for flood management is always very high but the water stored can be put to various uses such as irrigation, production of hydroelectricity etc. that can provide higher direct and indirect returns to meet that cost. The Punjab State has only seasonal streams but discharge in these streams is considerable to create devastations during the monsoon. So to control high volume of water during flood stage storage of reservoir is proposed at Ghaggar River at Chandi Mandir near Panchkula. Haryana government has also identified this site for the construction of a dam on river Ghaggar but the proposal is still enclosed in the files.

The construction of dams has mitigated the flood problem to a large extent. However the tributaries of the rivers downstream of the dams which bring in heavy discharges, like river ujh and bastanta Nallah outfall in river ravi. Various beins outfall in river beas and siswan, swan nadies outfall into river Sutlej results into floods in case of flash floods in these tributaries.

3.5.5 Watershed Management

Three small storage reservoirs are also suggested to be constructed on Tangri Nadi and river Markanda near village Jatwar, village Mulana and village Nurpur of the district Ambala respectively and their water should be diverted towards river Yamuna as the water of Patiali Rao is diverted to river Satluj through Jainta Devi Ki Rao and Siswan Nadi. Before constructing these structures a proper watershed management programme should be designed. A detailed study is also recommended for the identification of other minor watershed in the Punjab state. Timely cleaning, de-silting and deepening of natural water reservoir and drainage channels (both urban and rural) must be taken up.

3.5.6 Embankments

Embankments confine the flood flows and prevent spilling thereby reducing the incidences of flooding and associated damages. These are the oldest, the cheapest, the quickest and most popular methods of flood protection. This method of flood protection is also being adopted in the Punjab State. As in the Punjab State embankments are protecting the Punjab State. However, the embankments also aggravate the problems of floods if, they are not maintained properly and looked after but if they are supplemented with the reservoir then these embankments are very effective and can easily contain the residual floods. Dhussi bunds constructed after the provision of reservoir on river Sutlej are protecting a large area in Punjab floods.

Therefore, proper embankments should also be constructed in the Patiala District on river Ghaggar and its tributaries after providing reservoirs. A few to mention here are embankments on both sides of Ghaggar River in Patiala District.

Embankments on the left bank of river Ghaggar from village Bhankarpur upto village Manauli in Dera Bassi block are also suggested. Patiala District comes in their way. Apart from the construction of the embankments, maintenance, strengthening and proper care of the embankments should be taken on priority basis year. Proper inlets should be provided at a distance of 2 kilometers on each and every embankment to take in the rainwater from outside of the embankment. These inlets should be provided with proper sluice gates which prevent the back flow of water. Otherwise breaches in embankments can cause much more damages. The main advantage of embankments is their flexibility to protect either a specific site or a larger area however; they can be sustained only if they are properly and subsequently maintained adequately.

3.5.7 Improvement in Drainage efficiency

The drainage efficiency of the streams can be improved by the removal of meanders and sinuosity in the channel. Sharp meanders in river Ghaggar, near village Maru in Bhunarheri block should be removed immediately to improve the smooth flow of water. Similarly, channels of Patiala Nadi particularly, downstream of Patiala city and Tangri Nadi in Bhunarheri block in the Patiala District are also very sinuous. These sections of the channels must be made straight for the free flow of monsoon water.

3.5.8 Desiltation of Stream Beds

The stream in the Punjab State should be desilted properly before the onset of monsoons every year. The weeds, shrubs, water hyacinth plant and silt should be removed properly especially from the beds of the rivers in Punjab State. Every year even the drainage department claims the removal of weeds and desiltation but it is done only in files and not on the ground. The amount sanctioned should be spent properly so, that these streams can carry their discharge within their banks.

3.5.9 Check on the Encroachments

The administration must put check on the encroachments of the channels. Small rivulets like Sukhmana Choe, a tributary of Patiala Nadi and Tolewali Choe and Umla Nala tributaries of Tangri Nadi should also be restored. The encroachments along the Choti Nadi, Ganda Nala and Patiala Nadi in Patiala city particularly between the Patiala Nadi and Urban Estate, Phase-II must be checked. The people should be prohibited from constructing houses or other establishments in the low lying area along the Nadi. These encroachments also create hindrances in the flood management programmes like functioning of draglines, as desilting of Choti Nadi is not possible due to the encroachment carried out right upto the bed. Revival of these channels will be very helpful in carrying the high floodwater thus, saving the areas from any kind of devastations.

3.5.10 Check on the Disposal

The discharge of polluted sewer waste and industrial waste in the streams should also be checked because, such pollutants increase Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) and cause eutrophication which checks the flow of water. The drainage department is liberal in granting permission to the industry to dispose off the effluents in the streams. The only condition imposed is that BOD of the effluents should not exceed 30 milligram per liter. The check is imposed on the basis of a conditions set by Central Pollution Control Board. As per Central Pollution Control Board, the BOD level of effluents for surface drainage should not exceed 30 milligrams per litre because in perennial stream adequate

dilution is available and this amount of BOD will not change the character of the stream. But the discharge conditions of the rivers in the Punjab State are exactly opposite. The river is neither perennial nor is any kind of dilution is available (Pollution Control Board, 2002). So the disposal of the untreated sewerage and industrial waste should not be permitted in the streams to check eutrophication.

3.5.11 Improving the Capacities of Bridges/Aqueducts

The capacities of bridges and waterways under railways and roads should be reviewed and updated. Such a review is very essential because lot of changes have taken place in the catchment areas of the streams after their construction. The deficiency should be removed. The road bridge on Pachis Dara near village Suron should be widened. Similarly, Dakala Road Bridge, Daulatpur Bridge, Daroli Road Bridge on Patiala Nadi near village Daroli should be made adequate for smooth flow of water. In general the capacity of the bridges should be increased downstream of all the streams of the Patiala District as the amount of discharge increases downstream.

The problem of floods in the Patiala District is difficult to be managed without concentrating on Satluj Yamuna Link Canal. The breaches occurred due to the faulty design (across the slope) and incomplete aqueducts without maintenance are playing destructive role during the monsoon period.

The aqueducts under Narwana branch canal and Satluj Yamuna Link Canal are not only inadequate in number but also small in size to allow the free flow of water. Moreover, the capacity of these aqueducts is further reduced by accumulation of silt and wild growth that is seldom removed. Since, these canals are aligned across the slope therefore, proper location, adequate size and proper functioning of these aqueducts can save the area from seasonal flooding. These aqueducts should be redesigned taking into account the discharge of high floodwater like the flood of July 2010, particularly near village Lachru Khurd. Similarly, the aqueduct under Bhakra Main Line Canal crossing river Ghaggar at Khanouri should be widened as early as possible. The capacity of the present aqueduct is 15,000 cusecs, which is insufficient against the abnormal flow during monsoon. The widening and regular desiltation of this aqueduct will definitely save a large area of Patran block from annual devastations.

3.5.12 Intra and Inter-State Coordination

The measures suggested above to solve the problem of floods in the Patiala District will remain ineffective unless there is cooperation from the adjacent state of Haryana. Therefore, unless adequate flood management measures are carried out by the Haryana state the problem of flood in the Patiala District. However, a dam proposed by Haryana government near Panchkula if constructed will certainly provide relief from floods in the Patiala District. But it may create problem of water utilization as both the Punjab and Rajasthan are also the beneficiaries of Ghaggar water.

Therefore, an inter-state board may be constituted under the direction of Central Government to carry out intensive watershed management in catchment area of river Ghaggar and its tributaries not only to solve the problem of floods but also for proper utilization of water that creates miseries in one part or the year after year.

Apart from inter-state cooperation inter-district understanding is also very essential because, the flood protective measures adopted by Patiala district administration and Sangrur district administration emerge as bone of contention between the two administrations as, the flood protective measures taken by one district may enhance the problem of flood in other district.

3.5.13 Water Harvesting Measures

The present study is not only confined to save the Patiala District from floods but is also an effort made to suggest some measures to utilize the surface flow through different harvesting measures. Apart from the watershed management measures discussed above certain local level measures to utilize the available water are also suggested as under:-

a) Water Harvesting Tank

Many small seasonal streams descending from the Shiwalik hills create the problem of flash floods in the foothill areas. These streams gradually disappear after traversing a few kilometers distance from the hills. The speed of water in these streams is always so high that they wash away anything that comes in their way. Thus apart from creating flood hazard large amounts of water also go waste. It is therefore, suggested that water harvesting tanks should be constructed to collect the water of these streams. Mangat, H.S. (1994) has suggested these water harvesting tanks will not only save the Patiala District from the fury of floods but they will also provide irrigation, improve sub-soil recharge and enhance the possibility of aqua culture in agriculturally backward areas of the district. Afforestation and construction of check dams in the catchment areas is also suggested.

b) Injection Wells

To improve the subsoil water table, injection wells should be constructed along the streams and canals. Ground water cell of Patiala district had already experienced this process along Bhakra Main Line Canal at village Dhaneta of Samana block. The department has constructed four injection wells with a capacity of 10 liter per second each and operated in the winter season, when surplus water is available in Bhakhra Main Line Canal. They have observed 10 per cent less fall of water level in the year 2002 than in the previous years, in that area. So such injection wells should be constructed along all the Ghaggar river in the Patiala District. To check the problem of sedimentation, small tanks

should also be constructed before the injection wells apart from the already suggested measures watershed management.

3.5.14 Other Structural Measure:

1. Revival of Bhupindera Sagar Lake

The lake Bhupindera Sagar created by Jhambo Wali Choe near town Patran must be restored not only to protect a vast area of Patran block from floods but also to restore the disappeared wetland biodiversity. Revival of Bhupindera Sagar lake is very difficult and costly also. But nothing is costlier than human life and annual devastations suffered by the people of this area. The state government has been spending crores of rupees on flood protective measures like embankments etc. apart from providing compensation every year in this area since the disappearance of lake Bhupindera Sagar. Being a depression no other flood protecting measure will be effective. This lake will also be helpful in recharging the ground water, which has gone down considerably after disappearance.

2. Revival of Village Ponds

Encroachments and extinction of village ponds in the Patiala District should also be checked at the earliest. Effort should be made for their revival as these can contain considerable amount of rain water which otherwise will be available for inundation. The water in these ponds can be utilized for different purposes. Apart from this village panchayats can earn a good amount by raising fish in these ponds and the amount earned can be spent on the developmental projects of the villages.

3. Changing Crop Pattern also added to floods: Earlier the people in the surrounding areas use to sow one crop only. The level of X-drainage works were decided in such a way that it helped for the irrigation of barani crops. The cross drainage work was kept at higher elevation to achieve spreading of flood water on upstream to benefit the barani crops and altered the flow on d/s. Now after green revolution the cropping pattern has changed with double and even triple crops. The spreading of water, which was a necessity at the time of construction of cross drainage works, now causes damage to the crops. **Previous boon has been turned to devastation.**

4. Need for repair of SYL and new structures on SYL: It is necessary to strengthen the embankments of Pachisdhara Nallah, strengthen the banks of SYL. Construction of new syphons on SYL canal e.g. upstream Banur Rajpura Road etc. Cleaning and repair of already constructed cross drainage works. Complete the 3 abandoned cross drainage works of SYL canal. It would be worth mentioning here that Government of Haryana is not maintaining the

capacity of SYL in its territory which adversely effects the flood situation in Haryana. Due to decrease in capacity of canal in Haryana, the flood water overtops and causes breaches in Haryana.

5. **Situation around Narwana Branch:** Similar situation is observed at siphon of Narwana Branch. During the recent rains, the flood water overtopped SYL canal and thus about 6500 cusecs flowed to Haryana after causing floods in villages upstream of SYL canal. Similarly, about 80,000 cs of discharge upstream of siphon of Narwana Branch caused floods in Punjab villages. Since the capacity of the siphon at Narwana Branch is 50,000 cs. and discharge was of higher magnitude, it caused breach in Mehdudan Bundh and also caused breach in SYL canal. On that day, even flood water over topped Narwana Branch at RD. 150000 but for a short duration and because of the vigil of the field staff the mishap at this site was averted. As such it is proposed to construct two additional cross drainage works at RD. 136000 and RD. 144500 of Narwana Branch
6. Hansi Butana canal should be dismantled.
7. Weighted discharge should be established for which Ghaggar section is to be designed. It should not be less than 50,000 cusecs. Accordingly channelization of river Ghaggar shall be done in the entire length of River Ghaggar upto Sardulgarh in State of Punjab and also further in the portion falling in the Haryana Territory. The proposal shall be got cleared from Ghaggar standing committee.
8. Channelization and increase in capacity of Ghaggar in the State of Punjab and also further in the portion falling in Haryana. The Channelization and increase in capacity shall enable more water to be carried through the cunnettee and prevent sheet flow in the adjoining areas out side the cunnettee thus preventing floods.
9. Providing one way valve at outfall end of tributaries of River Ghaggar.
10. Utilizing accumulated water along Canal for irrigation.
11. Construction of regulating gate at outfall Sekhupura adaltiwala drain out fall into Tangri Nadi is required. It will prevent the back flow of water during high flood and prevent the submergence of the area.
12. Water logging:- There is a necessity of rehabilitation of 57 No. drains and construction of 20 No. V.R. Bridges on these drains in Kahnuwan Bet Area, rehabilitation of 12 No. drains of Chamkaur Sahib Block and rehabilitation of 3 No. drains in Sri Anandpur Sahib Block.
13. **Constructing various flood protection works to check land erosion for the safety of village Abadies and other strategic defence installation along river Ravi in district Gurdaspur:** In Gurdaspur district, the main problem is the erosion of berms of the River on both sides due to meandering of the river flow. Due to paucity of funds in the state the required flood protection works for proper canalizing/taming the river current are not being done. With the result massive erosion is taking place during every flood season causing severe damages to agriculture land in side thr river bandhs

and river flow is coming closer to Dhusi Bandh. Large chunk of agriculture land washed away. At such sides river flow has become a threat to life and property of near by villages causing fear in the mind of people. If the tendency of river is not checked at this site river may after damaging the FPE will start flow through Naumnai Nallah which flows very close to river ravi. There are number of alarming site created during the past floods which are given in the Annexure A. Due to direct hit of river water in various complexes. A spurs, studs and reventment etc. are required to be provided and some of the existing works damaged due to their proper function during previous floods are needed to be restored. The scheme is located on left and right bank of river ravi in district Gurdaspur district in the state of Punjab.

14. **Construction and Strengthening Flood Protection Works on river Sutlej in District Ferozpur & Tarn Taran:** The main problem is the flood water of river Sutlej which flows through out of the length of Tarn Taran & Ferozpur district. Due to paucity of funds in the state the required flood protection works for proper canalizing/ taming the river current are not being done, with the result massive erosion is taking place during every flood season, causing severe damage to the agriculture land inside the river bandhs, and river flows is coming closer to the bandhs which cause erosion to Bandhs and river berms. At such sites flows has become threat to the life and property of the nearby village, causing a fear in the mind of the people. There are number of alarming sites created during the past floods where a low discharge to the tune of 50000 to 140000 cusecs can create breach in the bandhs. During the recent flood season of 2008, the discharge of only 1,10,000 cusecs D/s Ropar Headwork's in river Sutlej has created no. of breaches in Jalandhar districts and in Ferozpur district and made numbers of sites vulnerable which may likely to breach even with low discharge. Hence it can be easily observed about the fate of the state during the high discharge of 250000 to 300000 cusecs in river Sutlej. The position of existing bandhs is miserable due to wear and tear during the past decade. There is no work to maintain their design parameters due to paucity of funds. These bandhs are required to be restored along with the flood protection works. The scheme is located on left and right bank of river Sutlej in district Firozpur district in the state of Punjab.
15. **Construction of flood protection works along river Sutlej from RD 19817-65854 mtr of 1-R bandh, R.D. 0-18293 mtr of 2-R bandh and R.D. 0-55373 mtr of 3-R bandh and Gidderpindi extension bandh Rd 0 to 6098 mtr and RD 14329-65854 mtr of 3-L bandh, 0-20122 mtr of 4-L bandh and 0-27439 mtr of 5-L bandh (D/S of Ropar Head Works to U/s Harike Head Works) in district Shaheed Bhagat Singh Nagar (Nawanshehar), Jalandhar, Kapurthala and Ludhiana:** The main problem is the erosion of berms of the river on both sides due to meandering of the river flow. Due to paucity of funds in the state, the required Flood protection works for proper canalizing/taming of the river current are not being done, with the result massive erosion is taking place during every flood

season, causing severe damage to the agriculture land inside the river bandhs, and at many places has eroded the bandh, and some breaches have occurred in the past years. At such sites river flow has become a threat to the life & property of the nearby villages, causing a fear in the mind of people. There are number of sites with alarming situation created during the past floods where even a low discharge to the tune of 20000 to 25000 cusecs breach in the bandhs. During the recent Flood season of 2008, the discharge of only 1,10,000 cusecs D/S Ropar Headworks in River Sutlej has created 3 No. beaches in Jalandhar & Ferozpur districts and made number of sites vulnerable which are likely to breach even with low discharge. During the flood season of 2010, even a low discharge of 20000 to 60000 cusecs D/S Ropar which has run for almost 40 days has caused extensive damage to the flood protection works i.e. stud, spur and eroded the main bandh at no. of places. Due to continuous low and medium discharge from the Bhakhra Reservoir of the meandering action continuously changed the course of the river at many places which causes severe damage to the bandh. A number of breaches had occurred in the bandh at no. of sites which were saved by construction of ring bandh. Hence the fate of state can be easily be gauged during the high discharge of 250000 to 300000 cusecs in river Sutlej. The positions of existing bandhs are miserable due to wear & tear during the past decade. In the past no works has been executed to maintain their design parameters due to paucity of funds. These bands are required to be restored along with the flood protection works. The scheme is located on left and right bank of river Sutlej in district Shaheed Bhagat Singh Nagar, Jalandhar, Kapurthala & Ludhiana district in the state of Punjab.

16. **Construction of flood protection works along left and right side of river beas in district Gurdaspur, Hoshiarpur, Kapurthala:** The main problem is the erosion of berm of the river on both sides due to meandering of the river flow. Due to paucity of funds in the state the required Flood Protection Works for proper canalizing/taming the river current are not being done, with the result massive erosion is taking place during every flood season, causing severe damage to the agriculture land. River flow is coming closer to the bandhs. At such sites river flow has becomes a threat to the life & property of nearby villages, causing a fear in the mind of people. During the recent flood season of 2008 discharge of about 90000 cusecs has passed due to which sharp loops have been developed at different sites on left and right side of river beas. To avoid further advancement of loops and to control erosion, flood protection works such as A/spurs, spurs, studs and reventment are required. The scheme is located on left and right bank of river Beas in district Gurdaspur, Hoshiarpur and Kapurthala.
17. **Natural water retention Basins:** Construction and protection of all the flood protection embankments, ring bunds and other bunds. Dams and levees can also be constructed which can be used as temporarily storing space which reduces the chances of lower plains getting flooded.

18. **Buildings on elevated area:** The buildings in flood prone areas should be constructed on an elevated area and if necessary on stilts and platform.

However, complete flood control in terms of structural methods of flood protection are neither economically viable nor these are environment friendly. Therefore, non-structural methods are becoming popular in mitigating flood disaster.

3.6 NON-STRUCTURAL MEASURES

The non structural mitigation is basically framed in such a way that the whole population of the state will be sensitized on disaster management and their capacity is developed to cope up with a hazardous situation.

3.6.1 Preparedness Methodology

Instead of waiting for a disaster to occur and then to manage it, this concept envisages to make people part of the management process. The plan contains a series of measures for preparedness in schools, colleges, hospitals, and all other vital institutions and ultimately the community itself. In a disaster management cycle, preparedness shall be the first step. People of a given area have to be guided to prepare their own coping mechanism. For this the plan various activities and reach out to the local level. The SDMA shall suggest apt and proper methodology for preparedness on regular basis.

3.6.2 Sensitization/Awareness Campaigns

The state administration must reach out to the local residents and general public of the state with various level sensitization programmes. Sensitization programmes shall be conducted for schools, hospitals, colleges, communities, policy makers and all other specific sectors including rickshaw pullers. Awareness on multi hazards and dos and don'ts to solve it are most import and basic for a human being to save him/herself. Disaster strikes everywhere everyone irrespective of land, caste, creed, color, people, and gender. The basic information shall be given in forms of booklets reading materials, audiovisual material etc. The broad objectives of such programmes shall be as follows:

1. To bring awareness about disasters among the inmates of all institutions and residents of all communities in Patiala.
2. To pave way for strict enforcement of building rules in construction departments and contractors.
3. Preparation of Building Evacuation Plans and training the general public on basics of self defence thereby building capacities of school authorities and saving lives in the event of an Earthquake or Fire accidents or any other disaster.
4. To sensitize officers from the state Administration, Ministry of Education, Ministry of Disaster Management, Patiala Police, GTB Hospital, Patiala Fire Service and all other parallel agencies.

Different methods and techniques shall be utilized to spread awareness on disaster in the state. Some sample techniques and methods are listed below:

- Public meetings and loud speaker announcements
- Group meetings of RWAs and other logical units
- Wall painting in the communities
- Distribution of reading materials to the general public
- Distribution of posters and other Information Education and Communication (IEC) materials to children and community people
- Street plays, documentaries and films on the subject
- Use of electronic media, especially cable channels
- Quiz-painting competitions, special types of books, etc for students
- Any other means the DDMC feels apt and proper

3.6.3 Training and Capacity Building

A series of training programmes shall be organized for specialized groups like, community level office bearers, teachers and principals, doctors and engineers, architects and masons and builders and contractors etc. All walks of people shall be trained. This can even be on construction of buildings and other structures earthquake resistant.

Training Programmes

The annual work plan mainly consists of widespread training and awareness generation programmes in all the state of Punjab. The Information Education and Communication projects (IEC) to be thus undertaken by Government of Punjab are described in the subsequent sections.

Community Training Programmes

The Department of revenue Rehabilitation and Disaster Management plans to carry out total 1600 Community Training programmes in the state of Punjab till March 2012. The department would conduct 80 community training programmes in each of the 20 districts. The District Disaster response Force would carry out these trainings with the assistance from local NGOs, CBOs, individuals etc. The staff at the district EOCs would coordinate the conduct of these training and the district administration would be responsible for providing necessary support. Details of community training programmes to be carried out are given as Annexure VIII.

College Training Programmes

The Department of Revenue Rehabilitation and Disaster Management plans to carry out total 1600 Training programmes in the colleges/educational institutes in the

state of Punjab till March 2012. The department would conduct 80 such training programmes in each of the 20 districts. The District Disaster response Force would carry out these trainings with the assistance from local NGOs, CBOs, individuals etc. The staff at the district EOCs would coordinate the conduct of these training and the district administration would be responsible for providing necessary support. Details of College training programmes to be carried out are given as Annexure XVIII.

Train the Trainer Model for Schools

The Department of Revenue Rehabilitation and Disaster Management intends to conduct programmes for train the trainer model for schools in Punjab. One such programme would be carried out in each of seven flood prone districts viz. Patiala, Sangrur, Mansa, Ludhiana, Amritsar, Jalandhar and Moga. A programme would be conducted for 4 teachers each from 10 schools. Out of these 4 teachers one would be Physical Trainer, one would be Geography Teacher and the rest two would be other active teachers of the school. At least one teacher would be female from each school. The 40 teachers thus gathered would be given three days training on life savings and Disaster Management. The teachers are then expected to impart the acquired trainings to the students of their respective schools which will be monitored by the EOC coordinators of the districts through the Principal. A budget of 80,000 per training programme is allocated which includes Honorarium, Training Material, Lunches, Tea, Travelling and lodging expenses of trainers and others.

3.6.4 Enforcing Existing Codes and Laws

Lists of codes are already in place to monitor the construction practices in the state. Bureau of India Standards, national Building codes of India and subsequent amendments in various acts provides sufficient legal protection to the enforcing agencies for safe construction practices. In the Punjab State, the major government bodies undertaking construction and grant permission to the private players' viz. MCP, PWD, DDA and Irrigation and Flood Control Department shall ensure that structural safety measures are followed well. In the state the following general structural safety codes shall be followed strictly:

1. IS: 456:2000 "Code of Practice for Plain and Reinforce Concrete"
2. IS: 800-1984 "Code of Practice for General Construction in Steel"
3. IS: 801-1975 "Code of Practice for Use of Cold Formed Light Gauge Steel Structural members in General Building Construction"
4. IS: 875 (Part-2): 1987- "Design Loads (other than Earth Quake) for Building and Structures, Part 2 Imposed Loads.

5. IS: 875 (Part-3): 1987- "Design Loads (other than Earth Quake) for Building and Structures, Part 3 Wind Loads.
 6. IS: 875 (Part-4): 1987- "Design Loads (other than Earth Quake) for Building and Structures, Part 4 Snow Loads.
 7. IS: 875 (Part-5): 1987- "Design Loads (other than Earth Quake) for Building and Structures, Part 5 Special Loads and Load Combination.
 8. IS: 883:1966 "Code of Practice for Design of Structural Timber in Building"
 9. IS 1904:1987 "Code of Practice for Structural Safety of Buildings: Foundation"
 10. IS: 1905:1987 "Code of Practice for Structural Safety of Buildings: Masonry Walls
 11. IS: 2911 (Part 1) section 1: 1979 "Code of Practice for Design and Construction of Pile Foundation Section 1
 - Part 1: Section 2 Based Cast-in-situ Piles
 - Part 1: Section 3 Driven Pre Cast Concrete Piles
 - Part 1: Section 4 Based Pre Cast Concrete Piles
 - Part 2: Timber Piles
 - Part 3: Under Reamed Piles
 - Part 4: Load Test on Piles
- Besides the DDMC shall take appropriate decisions to enforce Codes for Earth Quake Protection, Wind Storm protection, etc

3.6.5 Flood Plain Zoning

Flood plain zoning, which places restrictions on the use of land on flood plains, can reduce the cost of flood damage. Local governments may pass laws that prevent uncontrolled building or development on flood plains to limit flood risks and to protect nearby property. Landowners in areas that adopt local ordinances or laws to limit development on flood plains can purchase flood insurance to help cover the cost of damage from floods. Flood plain zoning if carried out will also help in reducing the expenditure on various structural measures to be adopted for flood management. There is no flood plain zoning done in the State of Punjab.

3.6.6 Flood Proofing

Such measures help greatly in mitigation of disasters to the population in flood prone area. It is essential combination of structural change and emergency action without evacuation. A program of the flood proofing provides the raised platforms as flood shelter for human beings and cattle, through raising the public utility installations above flood levels. There is no flood plain proofing done in the State of Punjab.

3.6.7 Flood Fighting

On receipt of flood forecasts, the flood forecasting stations (agencies) disseminate flood warnings to the officials concerned and the people of the affected area, to take necessary precautionary measures, like strengthening of the flood

protection and mitigation works, evacuation of people to safer places, etc. The essential material is stocked in advance at appropriate places and measures for distribution of supplies are initiated to mitigate the miseries. Every one or two years Punjab State is prone to floods. There is a need of flood fighting but it is not done in the Punjab State.

3.7 Early Warning and Dissemination System

In most disaster situations, the experience has shown that loss of life and property could be significantly reduced because of preparedness measures and appropriate warning systems. The importance of warning systems therefore hardly needs any emphasis. Indiscriminate warnings may result in non-responsiveness of the people. It is therefore necessary that with respect to every disaster a responsible officer is designated to issue the warnings. Alert/Warning indicates the onset of a disaster for which a warning system is essential. This system may range from alarms (e.g., for fires), sirens (e.g., for industrial accidents) to public announcements through radio, television etc. (e.g., for cyclones, floods). Other traditional modes of communication (e.g. beating of drums, ringing of bells, hoisting of flags) are also used in inaccessible areas.

The district administration is the prime agency responsible for issuing the disaster warning. Additionally the technical agencies authorized to issue warning will also communicate the same to the District Control Room and in case are mentioned below.

Table 41: Nodal Agencies

Disaster	Nodal Agencies
Earthquakes	IMD
Floods	Meteorological Department, Irrigation Department
Epidemics	Public Health Department
Road Accidents	Police
Industrial and Chemical Accidents	Industry, Police
Fires	Fire Brigade, Police

3.7.1 Dissemination of Warning

- Communities in disaster prone areas are made aware of the warning systems.
- All warning systems and technologies are maintained in working condition and checked regularly.
- Alternate warning systems must be kept in readiness in case of technical failure (e.g., power failure).

- Only the designated agencies/officers will issue the warning.
- All available warning systems should be used.
- The warning should to the extent possible be clear about the severity, the time frame, area that may be affected.
- Warning statements should be conveyed in a simple, direct and non-technical language, and incorporate day-to-day usage patterns.
- The do's and don'ts should be clearly communicated to the community to ensure an appropriate responses.
- Warning statements should not evoke curiosity or panic behavior. This should be in a professional language devoid of emotions.
- Rumor control mechanisms should be activated.
- All relevant agencies and organizations should be alerted.
- Wherever possible, assistance of community leaders and organized groups should be sought in explaining the threat.
- Once a warning is issued, it should be followed-up by subsequent warnings in order to keep the people informed of the latest situations.
- When the disaster threat tiding away, an all clear signal must be given.

3.7.2 Communication and Warning

3.7.2.1 Current communication System

At present, there is no separate and independent communication network for Disaster Management in the state. After renaming and reorganization of the Department of Relief to that of Disaster Management, the prevailing and conventional communication network is being used along with other State Government Departments.

Existing communication network systems are PSTN, CELLULAR NETWORK & Broad-Band network from State level to Gram Panchayat level.

WBSWAN system

VSAT network system is available from State Government level to Central Government. At present the existing system of receiving and conveying the cyclone warning system and other natural hazard reports are originated from the Indian Meteorological Department (IMD) and then it is conveyed simultaneously to State Disaster Management department, concerning District and Zilla Parishad authorities and to the AIR & electronic (TV channels) and non-electronic media(newspaper). Existing communication network systems are being used for this whole activity. The Government administration and media depend on the existing telecommunication network.

The population of the affected areas is dependent only on radio & TV broadcast.

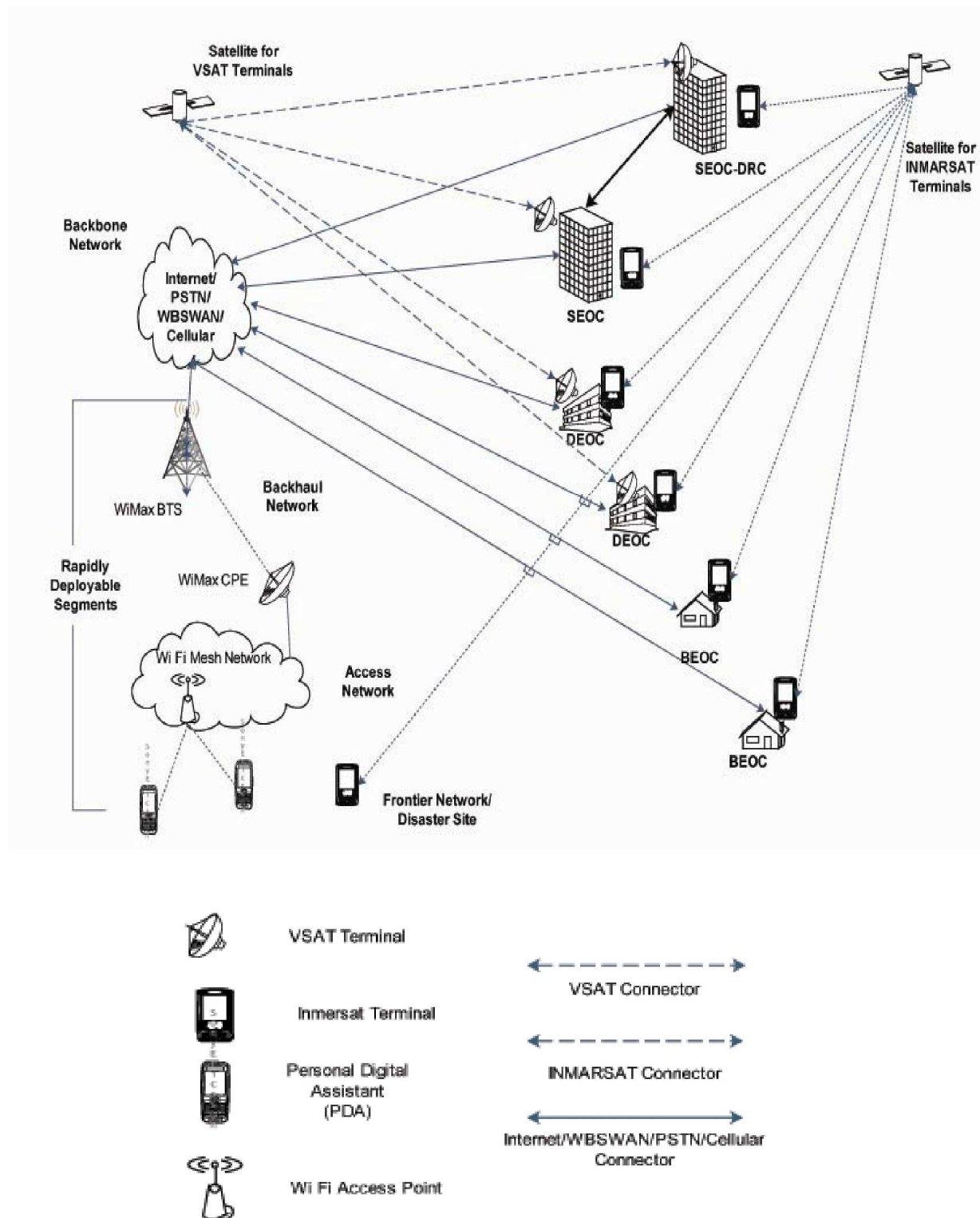
3.7.2.2 Proposed Communication System

Apart from contingency planning, sustainable development process can mitigate the hardships faced by the people due to disasters. This can be done through various structural and non structural measures. Structural measures include strengthening of embankments, anti-erosion work, village-raising, channel improvement through desiltation, removal of obstacles from the drainage channels and reservoirs, etc. Of the Non-structural methods, improved Communication System is a must. Communication plays a vital role in the matter of rescue and relief operations in all disasters. We should take steps to connect all the Gram Panchayats with sub-divisional and district headquarters so that the District Magistrates receiving any information of natural calamities, should be ideally communicated immediately to the Principal Secretary, Department of Disaster Management and ensure rescue /relief operation as early as possible.

The proposed Central Communication Network for Disaster Management will connect the State Emergency Operation Centre (SEOC), District Emergency Operation Centre (DEOC) and Block Emergency Operation Centre (BEOC). SEOC will be connected to the DEOC and DEOC will be connected to the BEOC through PSTN/CELLULAR/WBSWAN/VSAT as part of the said communication network. The other technologies like INMARSAT, HAM radio, Loudspeakers, World Space Radio Receiver (WSRR) system at different levels with fixed, nomadic and mobile communication equipment shall also be considered.

In case, when the existing communication system breaks down due to natural hazards (like, Tropical Cyclone), a Rapidly Deployable Communication system shall be required for proper Disaster Management, which may includes various wireless communication technologies like Wi-Fi, Wi-Max, etc. and the available existing network will be used wherever possible. This network component shall be divided into four network zones namely Frontier, Access, Backhaul, and Backbone. Frontier network zones is the nearest reachable location from the core of disaster zone. Using nomadic wireless communication components and mobile handheld devices disaster related data shall be collected and transmitted via Wireless mesh network to a Local information Repository. This mesh network along with Local information Repository shall be called *ACCESS Network*. A copy of the received information in the Local information Repository shall be transmitted to the Central Information Repository partly via a long range communication link using WiMax /WiFi link with High Gain antennas (the Backhaul Network) and partly via existing communication network like (Cellular/ WBSWAN/PSTN/ VSAT) (Backbone Network , Backhaul network will merge to it). The received information at the Central Information Repository can further be divided to different departmental Network via Internet/ LAN/WBSWAN. Also INMARSAT terminals can be used at disaster site.

Following is the complete network architecture in picture:



3.7.3 Communication Procedures shall be established by the entity and regularly exercised to support the program.

The following communication facilities should be available in the control room of EOC.

- Telephones.
- Intercom units for contact within control room.
- Police Wireless
- Civil Wireless
- VSAT connection to the Divisional Commissioners and Collectors with video-conferencing facilities
- Hotline
- One Mobile with the Relief Commissioner
- Networking of Computers
- One PC with printer
- Photocopying machine
- Television unit

There should be phones, i.e. intercom, STD phone, EPBX extension, hotline etc., of different colors, and with distinct rings, to enable them to be distinguished from each other. The color codes for the telephone instruments should be displayed on the display board. An emergency light, fire extinguishers, and a generator for the computer and fax machine should be provided in the control room.

During Disaster Hotlines from EOC should be connected to

- Divisional Commissioner/s of the affected district/s
- District Collector/s of the affected district/s
- Superintendent of Police of the affected district/s

Each of the workstation should have

- an independent phone with STD facility
- intercom units for contact within control room.
- hotline connection for all Branch/Nodal officers to their respective departments/agencies.
- Central secretarial facility for all Branch/Nodal officers should be provided in the EOC.

A car with wireless communication should be assigned to EOC. Information on additional vehicles requisitioned for the emergency should be available with Logistics branch. As you will see, the EOC is equipped with number of devices and instruments which are crucial for establishing rapid contact and communication and getting feedback from the disaster site.

It is therefore important that all the instruments and devices are in good working condition all the time. To ensure this regular maintenance is being undertaken by competent technical personnel through a contractual arrangement. The EDP Manager is responsible for ensuring renewal of maintenance contracts and attending to maintenance requirements. All requirements regarding maintenance must therefore be reported to EDP Manager.

Establish communication links with

- Appropriate central government departments, agencies and institutions such as railways, defense services, IMD.
- Police, fire brigade, PWD, MSEB, Irrigation, MWSSB, and all other State department.
- Private donors.

3.7.4 Alert Procedure

The entity shall develop and maintain the capability to alert officials and emergency response personnel.

Establish an on-going VSAT, wireless communication and hotline contact with the Divisional Commissioner, and Collector so that warning message should flow between state, district, and block rapidly. Any warning or alert received from any agency which is competent to issue such warning, or on the basis of reports from Divisional Commissioner/District Collector of the occurrence of a disaster, all community preparedness measures including counter -disaster measures will be put into operation. The Chief Secretary/Relief Commissioner will assume the role of the Chief of Operations for Disaster Management.

In most disaster situations, the experience has shown that loss of life and property could be significantly reduced because of preparedness measures and appropriate warning systems. The importance of warning systems therefore hardly needs any emphasis. Indiscriminate warnings may result in non-responsiveness of the people. It is therefore necessary that with respect to every disaster a responsible officer is designated to issue the warnings. Alert/Warning indicates the onset of a disaster for which a warning system is essential. This system may range from alarms (e.g., for fires), sirens (e.g., for industrial accidents) to public announcements through radio, television etc. (e.g., for cyclones, floods). Other traditional modes of communication (e.g. beating of drums, ringing of bells, hoisting of flags) are also used in inaccessible areas.

The occurrence of the disaster will be communicated to

- Governor
- Chief Minister
- Finance Minister
- Minister-in-charge of Disaster Management
- MPs and MLAs from affected areas
- PMO
- Cabinet Secretary
- Secretary, Home
- Secretary, Border Management
- Joint Secretary, NDMA, Ministry of Home Affairs, GOI

3.7.5 Emergency Communications and Warning Protocols

Emergency communications and warning protocols, systems, processes, and procedures shall be developed, periodically tested, and used to alert people potentially impacted by an actual or impending emergency.

For efficient management of disaster different communication protocols should be developed. For this satellite communication is a best way to provide communication. Advantages of communications satellites are the inherent broadcast capability, high bandwidth, reliability and flexibility in network expansion. Small transportable terminals can be made operational very quickly. Recent developments in communications and computer technology allow to provide low-cost equipment. Communications satellites can play an important role in case of emergencies or natural disasters. The combination of satellite communications and navigation can support new services for emergency teams.

Satellites can be a vital communications element in case of emergencies or natural disasters. The transfer of remote sensing and meteorological images, aerial photographs and situation maps can be carried out at high speed. In parallel, voice (telephony) and videoconferencing services may be utilized by decision makers. Furthermore, the emergency teams get connection to the Internet as well as Intranets to access databases, which are vital for their work. This implies that the satellite network and its terrestrial tails should ideally all support the Internet protocol suite. Data services, these days, are by definition using the internet protocols (IP). Telephony is supported by voice over IP (VoIP), video services are also provided on top of IP.

Effective communication system is essential for proper management of disaster. It will give on one hand the warnings which will reach the target group at regular intervals with minimum time delay, at times on real time basis, On the other hand it will be in use during disaster and post disaster rescue and relief operations and during non-disaster period. There should be disaster Communication Network connecting the SEOC, DEOCs and BEOCs for all the elements of the Programme like Risk Assessment, Planning, Incident Prevention, Mitigation and management, Crisis Communication, Public Information and Warning Dissemination. Using effective and well managed communication system multiple organization like various Government Organizations, NGOs can communicate to each other and respond quickly depending upon the situation.

Flood Warning

Flood warning is also essential task of the civil administration responsible for rescue, evacuation and relief operation. The proper flood warning can reduce the damages and losses upto considerable extent. In Punjab State flood warning is done through loudspeakers by the Sarpanch and/or patwari of the villages. Sarpanch receives warning about the floods before 3 or 4 hours from the government when water is discharged into the floods.

These are issued for different areas mostly by the Central water Commission/ Meteorological department and by the State Irrigation/ Flood Department.

However, an effective Warning System is one that can release warning in advance, i.e. 72hrs, 48hrs and 24hrs. It can change the existing scenario substantially and render informed decision making in adopting proper measures towards disaster preparedness, mitigation, control, planning and management. This kind of advance warning can help the authorities for better flood preparedness and also effective flood mitigation. Therefore, initiatives have to be taken to modernize the operation of Flood Forecasting & Warning by adopting the state of art technology and integrating it into the forecast and warning dissemination process.

3.7.6 Flood Forecasting in Punjab

Arrangements are made with the Local Office of the Meteorological department, Govt. of India, for weather forecast report. These reports will be conveyed to the SEs of Drainage Administration through the Sinchai Bhawan Control room for the safety of the embankment/dhussies. The present level of Bhakra Dam, Pong Dam, RSD Dam as on 9.4.2010 are 1516.48 ft.(maximum level 1680.00ft.), 1297.69 ft.(1390.00 ft.), and 497.34 mt.(524.91 mt.) respectively. The maximum water level attained during September, 2009 at Bhakra Dam, Pong Dam and Ranjit Sagar Dam was 1638.97', 1339.48' and 502.26 mtr. respectively. It is apprehended that these dams are likely to be get filled up due to the snow melting in the catchment area of said dams and accordingly the releases on downstream of dams may take place during coming rainy season.

Warning System from Bhakra and Pong Reservoir in the Case of Floods/ Rains

RIVER SUTLEJ

Following norms are maintained for the issue of flood warning as per standing instructions issued by the Executive Engineer, Regulation, Irrigation Branch Head Office, Chandigarh (Punjab) :-

Bhakra Beas management Board will issue flood warning to police wireless station at Nangal when the releases below Nangal Dam exceed 50,000 cusecs and through their own wireless systems to Chief Engineer, Drainage, Chandigarh. Executive Engineer, Head Works, Ropar will convey warnings to the concerned District Civil authorities and officers of the Drainage organizations whenever the releases D/s Ropar exceed 80,000 cusecs (revised limit).

There are four hill torrents which outfall into river Sutlej D/s Nangal Dam. Two of these i.e. Swan and Sirsa outfall U/s Ropar Head Works. During the Flood Season, additional wireless sets will be installed at following sites:-

- i) Sirsa On Nangal Hydel Channel Crossing Sirsa, Nadi.
- ii) Siswan Nadi and Budki Nadi Will be manned by deputing men at both sites but wireless set will be installed at Budki site where Accommodation is available.
- iii) Swan Near Una.

If the discharge in these rivulets exceeds 15000 cs. A 2-hourly message conveying the flood will be issued to Director, W.Regulation, B.B.M.B., Nangal through wireless by the following officers:-

Sirsa and Swan Nadies, J.E. Drainage of Water Management Sub Division No.II of Water management Investigation Division, Ropar.

Flood warning shall also be issued from Phillaur Railway Bridge through the existing police wireless set of the concerned District Civil Administration to Irrigation and Drainage Officers concerned for advance information whenever the flood exceeds 1,00,000 cusecs. The flood subsides below the limit stated above.

However, in case of high flood, warning will also be sent to the Financial Commissioner Revenue, Secretary to Govt. Punjab Irrigation Department, Chandigarh and Commissioners of Divisions.

RIVER BEAS

Information regarding water level, inflow and outflow at Pong Dam is received at the Sinchai Bhawan Control Room from the B.B.M.B Authorities, and is included in the daily flood report sent to the State Flood Control Room. The D/s site at Naushera Mirthal and Dhilwan are manned by the staff of the Executive Engineer, Discharge Division, Mohali who also sends the information to the Sinchai Bhawan Control Room.

System of Flood Warning Signals In Punjab

Flood protection Embankments have been constructed along major rivers, choes and nadies with a total length of about 1800 Kms in the state. The embankments are designed for flood discharge of a specified return period (as per Rashtriya Barh Ayog a return period of 1 in 25 years as recommended keeping in view the high investment cost for higher return periods). The embankments are liable to be overtopped during exceptionally high floods. The embankments are liable to damage due to change in river course where the water current suddenly changes direction. In such cases breaches can occur causing flooding of area adjoining the embankments. As such, flood warnings have to be issued to all areas along with the rivers, near the affected embankments.

A system of warning signals to be followed in case of floods in Punjab State, predetermined gauge/discharge sites is proposed. Three categories of warnings signals are proposed to be issued by the District Authorities after they receive information of the Drainage Administration at Divisional level or directly from the authorized officer. These signals can also be given as per local conditions in case of threatened isolated reaches.

Table 42: System of Flood Warning Signals

BLUE Signal	Start of Low flood range	Issue of alert
YELLOW Signal	Start of Medium flood range	Ready for evacuation
RED Signal	Start of High flood range	Immediate evacuation

The red signal has to be given after assessment of the threat to the embankments and trend of the inflow flood i.e. whether rising or falling. The signal for immediate evacuation by the District Authorities is to confirmed from the State Flood Control Room. Details of various control points in various reaches on different rivers are given below:-

Table 43: Control Stations

RIVERS/REACH	CONTROL STATION	DISCHARGE/GAUGE LIMITS
RIVER SUTELJ	Ropar Head Works	Low 80,000-1,40,000 Med. 1,40,000-2,00,000 High 2,00,000 and above
	2. Railway Bridge, Phillaur	Low 1,00,000-1,50,000 Med. 1,50,000-2,00,000 High 2,00,000 and above
	3. Harike Head Works	Low 50,000-2,00,000 Med. 2,00,000-3,00,000 High 3,00,000 and above
	4. Ferozepur Head Works	Low 50,000-1,50,000 Med. 1,50,000-2,25,000 High 2,25,000 and above
RIVER BEAS	Naushera Mirthal	Low 80,000-1,50,000 Med. 1,50,000-2,25,000 High 2,25,000 and above
	2. Dhillwan	Low 1,50,000-2,00,000 Med. 2,00,000-3,00,000 High 3,00,000 and above
RIVER RAVI	1. Madhopur Head Works	Low 30,000-60,000 Med. 60,000-1,00,000 High 1,00,000 and above
RIVER GHAGGAR	Bhankarpur	Low 21,000-31,500 Med. 31,500-42,000 High 42,000 and above
	2. BML Xing	Low 10,000-14,999 Med. 15,000-19,999 High 20,000 and above
	3. Crossing with Narwana Branch	Low 21,000-31,500 Med. 31,500-42,000 High 42,000 and above
PATIALA KI RAO	Road Bridge on Rajpura Patiala Highway	Low Gauge upto 7.10' Med. Gauge upto 8.5' High 10' and above

Chapter IV

Mainstreaming Concerns into Developmental Plans/Programmes/Projects

4.1 Concept on Mainstreaming

Disaster impacts considerably all the sectors of development and thus results in a serious social and economic setback to the development. On the other hand, the process of development, and the kind of development choices made in many countries, sometimes creates disaster risks. The intricate relationship between disaster and development is outlined in the following Table.

Table 44: Relationship between Disaster And Development

	Economic Development	Social Development
Disaster limits development	Destruction of fixed assets. Loss of production capacity, market access or material inputs. Damage to transport, Communications or energy infrastructure. Erosion of livelihoods, savings and physical capital.	Destruction of health or education infrastructure and personnel. Death, disablement or migration of key social actors leading to an erosion of social capital.
Development causes disaster risk	Unsustainable development practices that create wealth for some at the expense of unsafe working or living conditions for others or degrade the environment.	Development paths generating cultural norms that promote social isolation or political exclusion.
Development reduces disaster risk	Access to adequate drinking water, food, waste management and a secure dwelling increases people's resiliency. Trade and technology can reduce poverty. Investing in financial mechanisms and social security can cushion against vulnerability.	Building community cohesion, recognising excluded individuals or social groups(such as women), and providing opportunities for greater involvement in decision-making, enhanced educational and health capacity increases resiliency.

Further, mainstreaming is a cross-cutting issue which requires political commitment, public understanding, scientific knowledge and know-how, responsible risk sensitive development planning and practice, a people-centred early warning system and disaster response mechanisms. In addition, safeguarding human rights and integrating gender concerns are central to achieving mainstreaming concepts at the local and national level. Because disaster risks impact multi- sectoral development activities (such as education, health, environment, governance, employment and livelihoods) they influence development gains. So an assessment of the extent to which these social domains consider natural or human-induced factors of risks (existing and prospective) in the conceptualization and implementation of programmes, is crucial. This also means that development programmes need to assess whether a development project could cause/increase

risk of any kind of disaster in future and if necessary identify/introduce counter-measures for risk control.

There is an emerging consensus that the key to achieving sustained reductions in disaster losses lies in factoring risk considerations into both development and post-disaster recovery activities. Managing risks could become a means of reducing future disaster risks through 'corrective' development planning which ensures, through measures such as land-use planning, building controls and others, that development activity does not generate new risks.

The economic development which has a spin of effect on housing, education, nutrition, health etc does help vulnerability reduction, however, there is always the danger that unplanned growth of human settlements and unhindered exploitation of natural resources especially would create new risks in the long run. Therefore mainstreaming disaster risk reduction in development would be one of the most challenging tasks of development planning in the coming years. Innovative tools and methodologies have to be developed to ensure that development does not create new disasters and that risks of disasters created by unplanned developments in the past are reduced in the future. These tools have to be tested, further adapted according to the local needs, capacities and resources and applied in a systematic and sustainable manner through a participatory process.

a) Identification of development induced disasters

It is a well known fact that inappropriate development processes are contributing to risk accumulation. There are many examples demonstrating how economic growth and social improvement lead to increase in disaster risk. Rapid urbanisation is an example. The growth of informal settlements and inner city slums, whether fuelled by international migration or internal migration from smaller urban settlements or the countryside, has led to the growth of unstable living environments. These settlements are often located along flood plains or adjacent to noxious or dangerous industrial or transport facilities. One such development has led to increase in risk due to floods in state. This is true in other cities and towns as well and in rapidly expanding small- and medium-sized urban centres. When population expands faster than the capacity of urban authorities or the private sector to supply housing or basic infrastructure, risk in informal settlements can accumulate quickly. Third, in cities with transient or migrant populations, social and economic networks tend to be loose. Many people, especially minority or groups of low social status, can become socially excluded and politically marginalised, leading to a lack of access to resources and increased vulnerability.

b) Developing guidelines on mainstreaming

All development projects should have mandatory guideline to address how exactly it is going to implement DRR in terms of social and physical vulnerability. Risk can be reduced by making efforts wherein either the vulnerability or exposure is reduced. Risk can also be reduced by reducing the hazard probability. Similarly, the poverty alleviation or education programme can also reduce the social vulnerability, thus reducing overall disaster risk. Similarly limiting development in high risk area, it is possible to reduce exposure, and thus overall risk is reduced.

c) Develop sector specific guidelines on mainstreaming

It is necessary that appropriate strategy is developed to mainstream DRR into following specific sectors with clear cut guidelines and objectives. Some of the suggestive sectoral guidelines could be as under:

Infrastructure: Public Works, Roads and Construction

- Promote use of hazard risk information in land-use planning and zoning regulations.
- Conduct disaster risk impact assessments as part of the planning process before the construction of new roads or bridges.

Housing: Urban and Rural Housing Development

- Encourage use of hazard-resilient designs (e.g. flood proofing, or seismic safety) in rural housing programmes in hazard-prone areas.
- Promote utilisation 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 national building codes in urban hazard-prone areas.

Health

- To promote programmes to identify hospitals and health facilities that are located in hazard-prone areas, analyse their internal and external vulnerability during emergencies, and increase the hazard resilience of these hospitals through "Safe Hospital" programme.
- To prepare and implement a Hospital Preparedness Plan for all such health facilities.

Agriculture

- To promote effective programs of contingency crop planning to deal with year to year climate variations.
- To promote effective programs of crop diversification including the use of hazard resistant crops, to deal with shifts in climate patterns.
- To ensure sustainable livelihoods in areas of recurrent climate risks (i.e. arid and semi-arid zones, flood and cyclone prone areas) by promoting supplementary income generation from off-farm (e.g. animal husbandry) and non-farm activities (e.g. handicrafts).
- To promote effective insurance and credit schemes to compensate for agricultural related damage and losses to livelihoods due to natural hazards.

Education

- To incorporate DRR modules into the school curriculum.
- To construct all new schools located in hazard-prone areas to higher standards of hazard resilience as has been attempted in Kashmir and Bhuj region under "Safe School" programme.

- To add features in schools in hazard prone areas for use as emergency shelters such as facilities for water, sanitation and cooking as envisaged in coastal areas as possible cyclone shelters.

Financial Services

- To 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.
- To encourage the financial services sectors and local capital markets to develop schemes for financing disaster risk reduction measures.

d) Carrying out of cross-sectoral risk analysis

Cross -sectoral risk analysis needs to be carried out at national, local as well as regional level. Ongoing schemes across the sectors should be critically revisited and wherever possible the development aspects of these schemes should be integrated for a better result. This should be done in a futuristic mode with immediate medium and long terms planning. For example, if a hydroelectric project is being implemented, attempts must be made to assess the change in the hydrological regime and its impacts on soil erosion. This would require a multidisciplinary approach across sectors.

f) Creating techno-legal regime for mainstreaming

It is necessary that appropriate techno- legal mechanism is developed to implement the regulations made with respect to DRR strategy. There may be a statutory organisation responsible for the undertaking assessment on compliance and implementation on ground. For example, the hydro-projects have a mandatory provision of afforestation and it is imperative that it is implemented on ground and proper assessment is done with respect to its positive impact.

h) Private-Public Partnership:

In the present scenario, it is visualized that more and more unorganized and organized private sectors would play major role in developmental activities. It is important to foster collaboration with private sector in a Public-Private partnership to address the implementation of DRR in development initiative. This partnership could play a key role in communication, infrastructure, market, health and many others areas. Recently, a leading software industry in Hyderabad has demonstrated a disaster response system for the citizens of the city which is operational 24/7 and is fully endorsed by government.

i) Research and development:

It is one of the major elements of mainstreaming disaster mitigation/reduction into development. R&D capacity in earthquake, flood, drought, climate change, industrial, nuclear disasters and many other fields must identify areas and strategies how to identify risk at early stage in a holistic manner and minimize it by suitably integrating mitigation measures in to development model. Various professional scientific organizations must reorient their programme to support the safe developmental needs. For example the road development agencies, must take into account the present requirement of mass transport and suggest suitable

infrastructure which is viable and environmentally sustainable.

a) Awareness generation, training and capacity building:

It is important to make aware all stake holders about the coupling of disaster and development. It must be understood and communicated that there exist a mechanism by which development can be implemented with DRR provisions. This awareness will lead to public demand for disaster audit and in turn will ensure sustainable development. It is important to note that awareness development must be initiated at all levels starting from school curricula to basic training in safe construction to advance project management. Capacity building through education, training and mid career intervention using on campus as well as off campus model must be implemented for quickly covering large manpower base. Building on capacities that deal with existing disaster risk is an effective way to generate capacity to deal with future risk arising out of new context which is often not visualised.

b) Recognition of best efforts:

Recognition of efforts is one of the best incentives that promotes and attracts many to emulate the good practice in implementing DRR in development. It also acts as stimulant for the recipients to carry on the good work and innovate ways the efforts will have far reaching results across the society. Numerous such examples can be cited from drought management and poverty alleviation programmes that are being implemented in western part of India and have received international accolades.

4.2 Following Project/Programmes are taken by the State of Punjab

4.2.1 National Disaster Communication Network (NDCN)

- Aims and objectives of the Project: Communication & IT support is absolutely basic to disaster management. In fact communications are the first causality during disaster. Vertical as also horizontal communications support need considerable infrastructure for routine functioning and during live disaster management. NDMA requires dedicated Communication & IT support for pro-active disaster support functions including for early warning & forecasting. The support has to be Converged (Voice, Video& Data), Adequate as also Responsive. It also has to be multilayered-both for command & control as also for execution and early warning/forecasting.
- Component-wise activities indicating structural and non-structural measures (e.g. Infrastructure, Equipments and Stores, Capacity Building, etc):

The key components are as under –

- i. Basic network including Standby; satellite based.

- ii. Network Control Centres.
- iii. Mob equipment for NDRF.
- iv. Equipment for Emergency Operations Centres at National, State & District levels.

4.2.2 National Earthquake Risk Management Programme

A National Core Group for Earthquake Disaster Mitigation has been formed by the MHA (Ministry of Home Affairs) to advise on various tasks associated with earthquake risk reduction. A National Earthquake Vulnerability Reduction Programme has been launched by MHA together with United Nations Development Programme (UNDP) in 37 cities of the country: these cities have been chosen on the basis of seismic zone (zone III and above) and population (more than 500,000).

A comprehensive National Programme on Earthquake Engineering Education (NPEEE) has been launched by the Ministry of Human Resource Development of the Government of India. The project envisages eight premier institutes of technology (the seven Indian Institutes of Technology and the Indian Institute of Science Bangalore) to act as resource institutes. The project includes components such as short-term (one- to four-week) and medium-term (one semester) training programmes for faculty members within the country, international exposure to faculty members, development of resource materials and teaching aids, development of library and laboratory resources, and organisation of conferences and workshops. Complete details of the programme are available at the NPEEE web site (www.nicee.org/npeee). The programme started in April 2003 initially for three years with a budget of about Rs. 137.6 million (about US\$ 3 million). The Programme has made considerable progress in less than one year.

Bureau of Indian Standards (BIS) in India is responsible for developing various standards related to wide ranging products and services, including all sectors of civil engineering. The country has a number of seismic codes:

- IS:1893-1984 Indian Standard Criteria for Earthquake Resistant Design of Structures
- IS:4326-1993 Indian Standard Code of Practice for Earthquake Resistant Design and Construction of Buildings
- IS:13827-1993 Indian Standard Guidelines for Improving Earthquake Resistance of Earthen Buildings
- IS:13828-1993 Indian Standard Guidelines for Improving Earthquake Resistance of Low Strength Masonry Buildings
- IS:13920-1993 Indian Standard Code of Practice for Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Forces
- IS:13935-1993 Indian Standard Guidelines for Repair and Seismic Strengthening of Buildings.

Of these, the code IS:1893 is the main code.

URBAN EARTHQUAKE VULNERABILITY REDUCTION PROJECT

The GoI-UNDP Disaster Risk Management Programme is a national initiative to reduce vulnerabilities of communities in some of the most hazard prone districts of India (169 districts and 17 states). The Programme (2002-2007) aims to contribute to the social and economic development goals of the National and State Governments, enable them to minimise losses to development gains and to reduce their vulnerability to natural disasters.

The programme relies upon a community based approach to disaster management, and seeks to build capacities of communities, government functionaries at all levels, and other stake-holders in disaster management, at all levels, in an organised manner. Please refer to the programme document or www.undp.org.in for details on the objectives, spread, activities, etc. The Ministry of Home Affairs is the executing agency with UNDP Country Office support for implementation.

1. Border Area Development Programme

Border Area Development Programme has been started by the Government of India with the twin objectives of balanced development of sensitive border areas through adequate provision of infrastructure facilities and promotion of sense of security amongst the local population.

• Coverage-Border Area Development Programme

Punjab has 553 KM long International border with Pakistan with 4 districts of Amritsar, Ferozepur, Tarn Taran (this district was created in April 2006) and Gurdaspur abutting the International border. The following 19 blocks (Attari block included in 2010-11) with area of 6369.82 sq. km are being covered under Border Area Development Programme:-

Table 43: Blocks covered under Border Area Development Programme

Gurdaspur:	Kalanaur, Dera Baba Nanak, Narot Jaimal Singh, Bamial, Dina Nagar, Dorangla, Gurdaspur.
Amritsar :	Ajnala, Chogawan and Attari
Tarn Taran:	Gandiwind, Bhikhiwind and Valtoha
Ferozepur:	Ferozepur, Guru Harsahai, Jalalabad, Fazilka,, Khuian Sarvar & Mamdot

• Funding - Border Area Development Programme

The Border Area Development Programme is a 100% centrally funded Area Programme. Funds are provided to the States as Special Central Assistance for execution of approved schemes on a 100% grant basis and allocated amongst the seventeen beneficiary States on the basis of (i) length of international border (ii) population of border blocks and (iii) area of border blocks. Each of these criteria is given equal weightage. The border block is the spatial unit for the programme and all schemes are implemented within the border blocks only. The funds received from Govt. of India are allocated among the four border districts of Amritsar, Gurdaspur, TarnTaran and Ferozepur on the basis of criteria adopted by Govt. of India for distribution of funds amongst Border States.

Table 44: Distribution of Rs. 126 Cr ACA in Border Blocks

Sr. No.	Year	District selected for the distribution of funds
1	2004-05	Amritsar, Gurdaspur, Ferozepur
2	2005-06	Amritsar, Gurdaspur, Ferozepur
3	2006-07	Amritsar, Gurdaspur, Ferozepur, Taran Tarn
4	2007-08	Amritsar, Gurdaspur, Ferozepur, Taran Tarn
5	2008-09	Amritsar, Gurdaspur, Ferozepur, Taran Tarn
6	2009-10	Amritsar, Gurdaspur, Ferozepur, Taran Tarn
7	2010-11	Amritsar, Gurdaspur, Ferozepur, Taran Tarn

Strengthening of Fire and Emergency Services

A Scheme for Strengthening of Fire and Emergency Services in the country was launched in 2009 with an outlay of Rs. 200 crores, (2009-2012). The Punjab state allocation of funds for conducting activities under the scheme is given in the following table:-

Table 45: Punjab State Allocations of Grants in Aid

(Rs. in lakh)

State	Centre Allocation	State Government Contribution
Punjab	323.00	80.75

Revamping of Civil Defence Setup: The Government of India has launched a Centrally Sponsored Scheme in April 2009 with an outlay of Rs. 100 crore during the 11th Five Year Plan for revamping of Civil Defence setup in the country (2009-2012). The Punjab state allocations of funds for conducting the above stated activities are given in the following Table:

Table 46: Punjab State Allocations of Grants in Aid for revamping of Civil Defence

(Rs. in lakh)

State	Centre Allocation	State Government Contribution
Punjab	728.20	25.00

4.2.3 Approved Master Plans

Urban areas in past have not received much attention in terms of their planning, development and management despite the fact that cities and economic development are inextricably linked. Because of high productivity of urban areas, economic development activities get located in cities. Accordingly, it is desirable

that human settlements are provided with necessary planning and development inputs so that their orderly growth and development is ensured. This would also be necessary for ensuring efficient functioning of human settlements for improving their productivity and for providing desirable quality of life to its residents in order to cater to their economic, physical and metaphysical needs. The urban development strategy for any state thus assumes importance for not only its economic emancipation but also its physical well-being.

The real challenge before the planning and development of towns/cities is to have balanced development in all spheres of urban life: physical, social and economic in a comprehensive manner. There is need to make urban transition efficient, equitable and cost effective by making policies and bringing out new projects/schemes. For this preparation of Master Plan becomes the guiding principle for wiping out the deficits in urban infrastructure, mining the problems and exploring the potentials of the city. In order to ensure a planned future expansion and to prevent mushrooming of unplanned construction in Punjab, the state government is deliberating over to design the master plan for 30 towns. Following are the approved master plans of Punjab:

1.1. GMADA (Greater Mohali Area Development Authority)

- 1.1.1. Dera Bassi
- 1.1.2. Banur
- 1.1.3. Mullanpur
- 1.1.4. S.A.S Nagar
- 1.1.5. Zirakpur
- 1.1.6. GMADA Regional Plan
- 1.1.7. Mandigobind garh
- 1.1.8. Kharar

1.2. GLADA (Patiala Development Authority)

- 1.2.1. Khanna
- 1.2.2. Ludhiana
- 1.2.3. Baghapurana

1.3. BDA (Bathinda Development Authority)

- 1.3.1. Abohar
- 1.3.2. Bathinda
- 1.3.3. Raman Mandi
- 1.3.4. Kotakpura Plan

1.4. ADA (Amritsra Development Authority)

- 1.4.1. Amritsar
- 1.4.2. Rayya
- 1.4.3. Sri Hargobindpur
- 1.4.4. Govindwal Master Plan
- 1.4.5. Tarntaran

1.5. JDA (Jalandhar Development Authority)

- 1.5.1. Jalandhar

- 1.5.2. Hoshiarpur
- 1.5.3. Sultanpur
- 1.6. PDA (Patiala Development Authority)
 - 1.6.1. Patiala
 - 1.6.2. Sangrur Plan
- 1.7. PUDA (Punjab Urban Development Authority)
- 2. DHUD (Department Housing and Urban Development)

4.2 Inclusion of Disaster Risk Reduction (DRR) in Development Planning

The current level of urbanization is likely to increase. Urbanization is inevitable and growing at a fast pace, urban settlements are bound to be confronted with problems of greater magnitude in terms of shelter options, cramped living spaces, problems of transportation, access to facilities, services etc and above all, climate change, mainstreaming Disaster Risk Reduction (DRR) issues in Development Plans etc are to be interlinked vertically and horizontally for fail safe infrastructures in Punjab.

The Major challenges which need to be addressed are as follows:

Technical:

- ☐ Microzonation
- ☐ Risk Identification & Assessment
- ☐ Vulnerability Assessment

Regulatory:

- ☐ Development Law
- ☐ Apartment/Real Estate Law
- ☐ Building Bylaws
- ☐ Building Inspection and compliance of BIS
- ☐ Retrofitting methodologies
- ☐ Soil Improvement measures

Activities required to be taken up as DRR initiatives

A.Hazard Specific

1. Mapping hazard prone areas to an appropriate scale in respect of earthquake, floods, landslides, coastal inundation etc
2. Assign appropriate land uses with low intensity of development

3. Devise appropriate zoning
4. Implementation and enforcement of zoning regulations and building bye laws

SDMA

Further, State TCPDs /UDDs/ULBs must focus on

- ☐ Vulnerability Assessment of buildings
- ☐ Categorization of Buildings i.e. high/ very high risk
- ☐ Feasibility study for retrofitting of residential and lifeline buildings
- ☐ Prepare a Framework for Re Development

Urban Planning Specific Development Control Regulation issues

Externally Aided Schemes

UNDP-GOI Disaster Risk Reduction Programme

A programme with external aid from United Nations Development Program (UNDP) known as GOI-UNDP is being implemented by NDMA with an outlay of USD 12.6 million (approximately Rs. 63 crore) and by MHA with an outlay of USD 7.4 million (Rs. 37 crore) for the period of 2009-2012. The Joint Secretary, Ministry of Home Affairs is the National programme Director for URR component and Joint Secretary, NDMA is the National Programme Director for DRR component. The programme is being implemented in all the states. Following table shows the Punjab state allocation of grants in aid:

Table 47: Punjab state Allocation of Grants in Aid

(Rs. in lakh)

State	Allocation for DRR	Allocation for URR
Punjab	150	50

Chapter V

RESPONSE PLAN

I. INSTITUTIONAL MECHANISM

Although the primary responsibility of disaster management is of the State Governments, the Central Government plays a key role in providing financial and logistic help to the states in tackling both natural and human induced disasters. Till the recent past, India had an entirely different mechanism for disaster management.

5.1 NATIONAL LEVEL MECHANISM

The administration of natural disaster management is the responsibility of the Ministry of Home Affairs, where as certain disasters such as chemical and biological disasters as well as aviation disasters are dealt by the concerned Ministries. The elaborate structural framework in national level is given broadly for understanding.

5.1.1 National Crisis Management Committee

Cabinet Secretary, who is the highest executive officer, heads the National Crisis Management Committee (NCMC). Secretaries of all concerned Ministries/ Departments as well as Organizations are members of the Committee. The NCMC gives direction to the Crisis Management Group as deemed necessary. The NCMC gives directions to any Ministries/Departments/ Organizations for specific action needed for meeting the Crisis situation.

5.1.2 National Crisis Management Group

The Central Relief Commissioner in the Ministry of home Affairs is the Chairman of the Crisis management Group, which consist of nodal officers from concerned Ministries. The CMGs function includes reviewing every year contingency plans formulated by various Ministries/Departments/ Organizations in their respective sectors. The other functions include:

1. To review measures required dealing with natural disaster.
2. Coordinate activities of Central Ministries and state Governments in relation to disaster preparedness and relief
3. To obtain information from the nodal officers on measures relating to the above.

5.1.3 National Disaster Management Authority

For better coordination of disaster management in national level, National Disaster Management Authority (NDMA) is being constituted. This is a multi disciplinary body with nodal officers from all concerned departments/ministries/ organizations.

Apart from these developments, the government of India has its national Contingency Action Plan prepared by the nodal ministry of disaster management. Also a National Emergency Operation Centre (NEOC) has been started functioning in the Ministry of Home Affairs with all sophisticated equipments and most modern technologies for disaster management.

Management of disasters at various levels in India

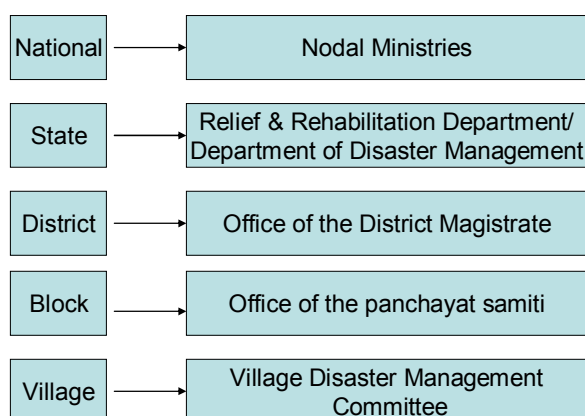


Fig. No. 4 Management of disasters at various levels in India

NATIONAL DISASTER RESPONSE FORCE

Constitution and role of NDRF: The National Disaster Response Force (NDRF) has been constituted under Section 44 of the DM Act, 2005 by up-gradation/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. 7th NDRF Battalion is placed in Bathinda in Punjab. It consists of 1149 personnel organised in 18 teams comprising of 45 personnel, who are being equipped and trained for rendering effective response to any threatening disaster situation or disaster.

5.2 STATE LEVEL MECHANISM

The State Government has adopted the Disaster Management Act as enacted by the Govt. of India to provide effective management for disaster

5.2.1 State Disaster Management Authority

As per clause b of sub-section (2) of Section 14 of the Disaster Management Act, 2005, the Punjab Disaster Management Authority under the chairperson of the Honourable Chief minister was constituted on 22nd/24th February, 2006 with the following persons as member of the SDMA:

Table 48: State Disaster Management Authority

1.	Honourable Chief Minister	Ex-Officio Chairperson
2.	Hon'ble Revenue Minister	Ex-Officio Vice-Chairperson
3.	Principal Secretary, Home	Member
4.	Principal Secretary, Finance	Member
5.	Principal Secretary, Local Government	Member
6.	Financial Commissioner, Revenue	Member
7.	P.S.C.M	Member
8.	Chief Town Planner, Punjab	Member
9.	G.O.C. in Chief, Western Command or any other Army Officer not below the rank of Major General	Member

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.

As stated in the Disaster Management Act 2005, the State DM Authority has the following roles and responsibilities:

1. Lay down the State disaster management policy
2. Approve the State Plan in accordance with the guidelines laid down by the National Authority.
3. Lay down guidelines to be followed by the departments of the State Government for the purpose of coordination and integration measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefore;
4. Coordinate the implementation of State Plan at State and District level
5. Recommend provision of funds for mitigation and preparedness measures
6. Review the development plans of different departments of the State and ensure that prevention and mitigation measures like earthquake resistance structures are built at least for life line structures.
7. Review the measures being taken for mitigation, capacity building and preparedness by the departments of the State Government and issue

such guidelines as may be necessary

5.2.2 The State Executive Committee (SEC)

As per sub-section (1) of section 20 of the Disaster Management Act, 2005, the State Executive Committee under the chairperson of Chief Secretary was constituted by the Government of Punjab on 22nd/24th February, 2006 with the following persons as member of the committee:

Table 49: State Executive Committee

S.No.	Officials	Designation
1	Chief Secretary	Ex-Officio Chairman
2	Financial Commissioner, Revenue	Member
3	Principal Secretary (Home)	Member
4	Principal Secretary (Finance)	Member
5	Principal Secretary (Local Government)	Member

As per the Disaster Management Act 2005, the State Executive Committee may discharge following functions:

1. Coordinate and monitor the implementation of the National Policy, the National Plan and State plan.
2. Examine the vulnerability of different parts of the State to different forms of disasters and specify measures to be taken for their prevention or mitigation.
3. Preparation of State disaster management plans.
4. Monitor the implementation of State Disaster Management Plan (SDMP) and Crisis Management Plan (CMP) prepared by the line departments of the State Government and District Authorities.
5. Monitor the implementation of the guidelines laid down by the State Authority for integrating the measures for prevention of disasters and mitigation by the departments in their development plans and projects.
6. Evaluate preparedness at all government or non-governmental levels to responds to any threatening disaster situation or disaster and give directions, where necessary, for enhancing such preparedness.
7. Coordinate response in the event of any threatening disaster situation or disaster;
8. Give directions to line Departments of the government of the state or any other authority or body in the State regarding actions to be taken in response to any threatening disaster situation;
9. Promote general education, awareness and community training and to conduct regular Mock drills to test the plan in regard to the forms of disasters to which different parts of the State are vulnerable and the measures that may be taken by such community to prevent the disaster, mitigate and respond to such disaster;

10. Advise, assist and coordinate the activities of the Departments of the Government of the State, District Authorities statutory bodies and other governmental and non-governmental organizations engaged in disaster management.;
11. Provide necessary technical assistance or give advice to District Authorities and local authorities for carrying out their functions effectively;
12. Advise the State Government regarding all financial matters in relation to disaster management.

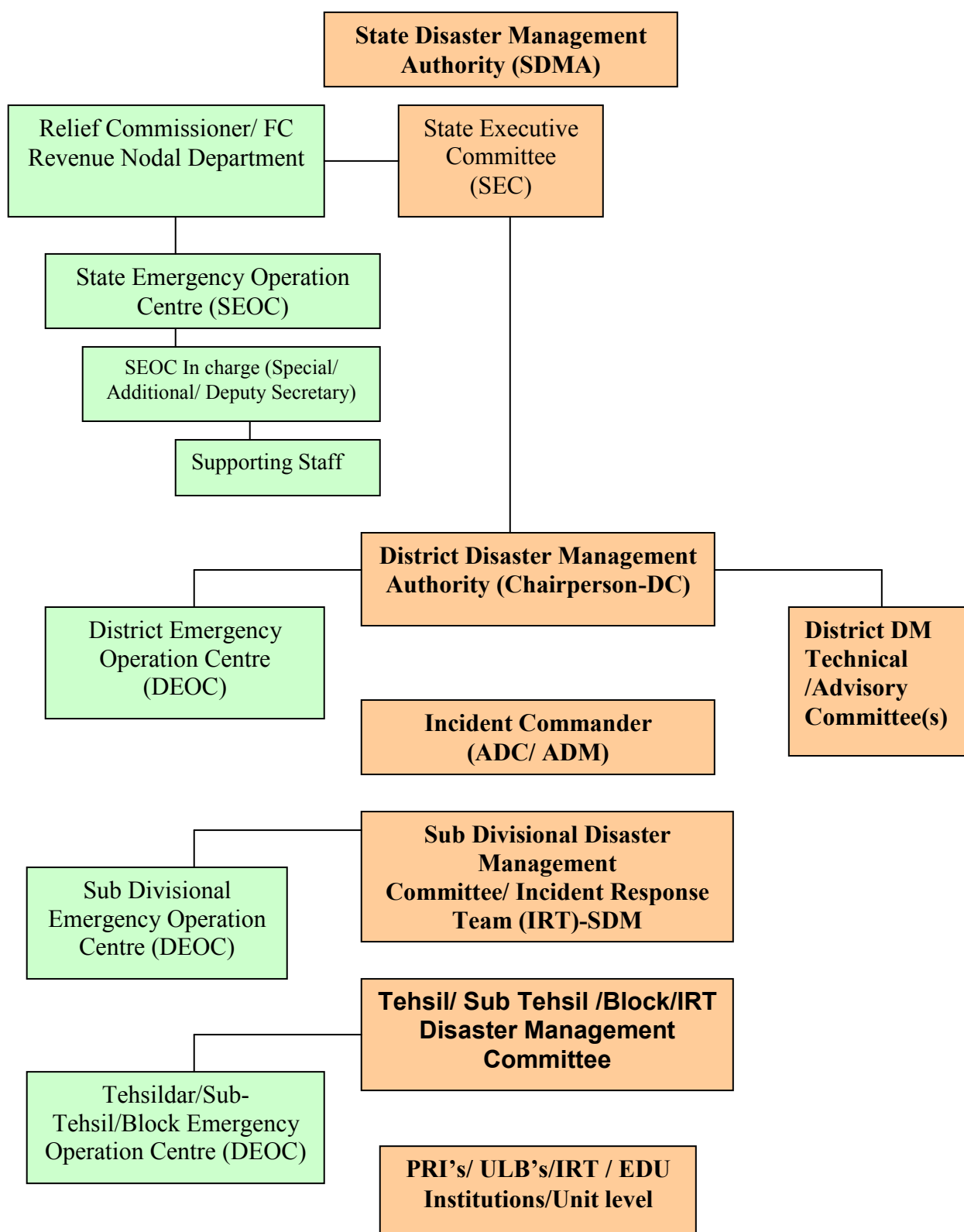
5.2.3 Technical Committee(s)

Under sub-section (1) of Section 21 of the Disaster Management Act, 2005, the SEC will constitute the Technical Committee (s) for efficient discharge of its functions. The Technical Committee(s) will be appointed by the SEC. It will comprise disaster management experts, professionals and NGO field practitioners. They will be responsible for ensuring community participation in the disaster management activities. They will also advise the SEC on implementation of activities at State level.

5.2.4 State Crisis Management Group

The State Crisis Management Group's function includes reviewing every year contingency plans formulated by various Ministries/Departments/ Organizations in their respective sectors. The other functions include:

1. To review measures required dealing with natural disaster.
2. Coordinate activities of state Governments and districts in relation to disaster preparedness and relief
3. To obtain information from the nodal officers on measures relating to the above.



5.2.5 State Working Groups

A couple of working groups are constituted in state level in line with the national set up. These working groups are given with particular responsibilities and they are the core group of such functions. Besides, there is an Emergency operation Centre at the state level to coordinate and perform disaster management activities in a disaster situation as well as in the preparatory stage.

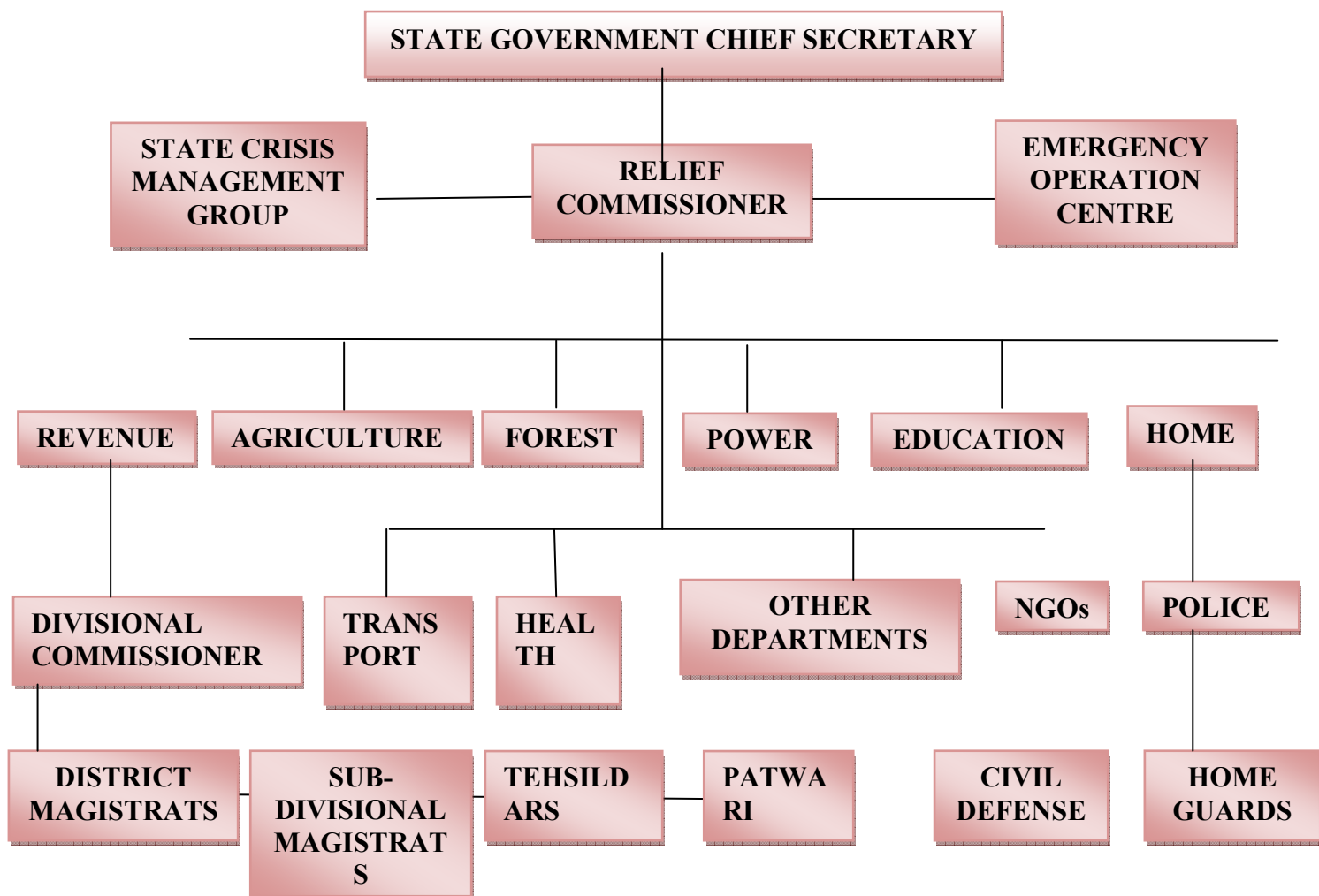
State Disaster Response Team: It is proposed to raise a State disaster response team to be stationed at central location so that these team alongwith resources can reach the site of disaster in shortest possible time. This team will be under the administrative control of Director, DM and operational control of Department of Civil Defence and Home Guards. On the lines of NDRF, they will be imparted trainings in Medical First Responders, Flood Control, Search and Rescue etc. During peace times, they will assist in imparting trainings to general public. The manpower to be either recruited afresh or taken on deputation with the Department of Civil Defence from amongst the newly recruited constables of Punjab Police. PS Home has been requested to confirm if the second option is possible. Decision in this matter may kindly be taken.

Civil Defence: The Civil Defence Policy of the GOI until 1962 was confined to making the states and UTs conscious of the need of civil protection measures and to keep in readiness civil protection plans for major cities and towns under the Emergency Relief Organization (ERO) scheme. The Civil Defence Organization is raised only in such areas and zones which are considered vulnerable to enemy attacks. During times of war and emergencies, the Civil Defence organisation has the vital role of guarding the hinterland, supporting the armed forces, mobilizing the citizens and helping civil administration for saving life and property, minimizing damage, maintaining continuity in production centres and raising public morale. The concept of Civil Defence over the years has shifted from management of damage against conventional weapons to also include threat perceptions against nuclear weapons, biological and chemical warfare and environmental disasters.

Fire Services: Fire services are mandate of the Municipal Bodies as estimated in item 7 of Schedule 12 under Article 243W of the constitution. The structure across is not uniform. Presently Fire prevention and Fire Fighting Services are organized by the concerned States and UTs. Ministry of Home Affairs, Govt. of India, renders technical advice to the States and UTs and Central Ministries on Fire Protection, Fire Prevention and Fire Legislation. Fire Services in Punjab is under the Municipal Corporations.

Home Guard: The role of Home Guard is to serve as an auxiliary to the police in the maintenance of law and order, internal security and help the community in any kind of emergency such as air-raids, fire, cyclone, earthquake, epidemic, etc. They are also expected to help the police in maintenance of communal harmony, assist the administration in protecting weaker sections, participate in socio-economic and welfare activities and perform Civil Defence duties.

Border Wing, Home Guard serves as an auxiliary to the Border Security Force. Punjab has 6 battalions of Border Wing Home Guards for preventing infiltration on the international border.



5.2.6 The State Emergency Operations Centre

The State Emergency Operations Centre (SEOC) will be hub of all the activities related with disaster response in the State. SEOC is discussed later.

5.2.7 District Disaster Management Authority

The District Disaster Management Authority (DDMA) will act as the district planning; coordinating and monitoring body in accordance with the guidelines laid down by the State Authority.

As per Section 25 of the DM Act 05, A DDMA for every district in the State of Punjab has also been constituted, consisting of the following members:

Table 50: District Disaster Management Authority

S.No.	Officials	Designation
1.	Deputy Commissioner	Ex-Officio Chairperson
2.	Chairperson of the Zila Parishad	Co-Chairperson

3.	President of Mayor of the ULB at District Headquarters	Co-Chairperson
4.	Senior Superintendent of Police	Member
5.	Chief Medical Officer	Member
6.	Superintending engineer (PWD)	Member
7.	District Food Supplies and Controller	Member
8.	Additional Deputy Commissioner (General)	C.E.O.-cum-Member

5.2.8 District Disaster Management Advisory Committee (s)

District level Disaster Management Advisory Committee(s) will be appointed by the District Disaster Management Authority to take advice on various subject specific fields within the overall context of disaster management. The committee will comprise disaster management experts, which may from government departments, research institutes or NGO's.

5.2.9 District Emergency Operation Centre

The District Emergency Operation Centre (DEOC) will be hub of all the activities related with disaster response in the District. It will coordinate and communicate upward and down ward communication with regard to emergency response.

5.2.10 Tehsil/sub Tehsil/Block Disaster Management Committee

Subject to the directions of the District Authority, the Tehsil/Sub Tehsil/block disaster management committee will be responsible for the development and implementation of block level disaster management plans.

5.2.11 Gram Panchayat/Village Disaster Management Committee

Subject to the directions of the District Authority, the Gram Panchayat Disaster Management committees will be responsible for the development and implementation of GP level disaster management plans.

The response plan has been subdivided into the following sections-

- a) Response Management Arrangements
- b) State Disaster Response Plan
- c) Emergency Support Functions

Village Level DM Teams: The village level DM Teams of 20 volunteers of each village is planned to be trained on all types of Disasters and improvisations. They will be trained on temporary flood protection jobs as well.

Proposed Composition of Village teams

Drivers owning tractors-	4
Electricians-	2
Plumbers-	1
Para medical individual-	2 (Preferably one lady)
Individual having net knowledge-	1
Male (Individuals between 18 to 45 years-	8
Females (between 18 to 40 yrs)-	2

II. Response Management Arrangements

The response management task is to optimise the outputs, given the resource constraints. Response management is based on the three key management tasks of command, control and coordination. These roles and responsibilities are defined as follows:

5.3.1 Command

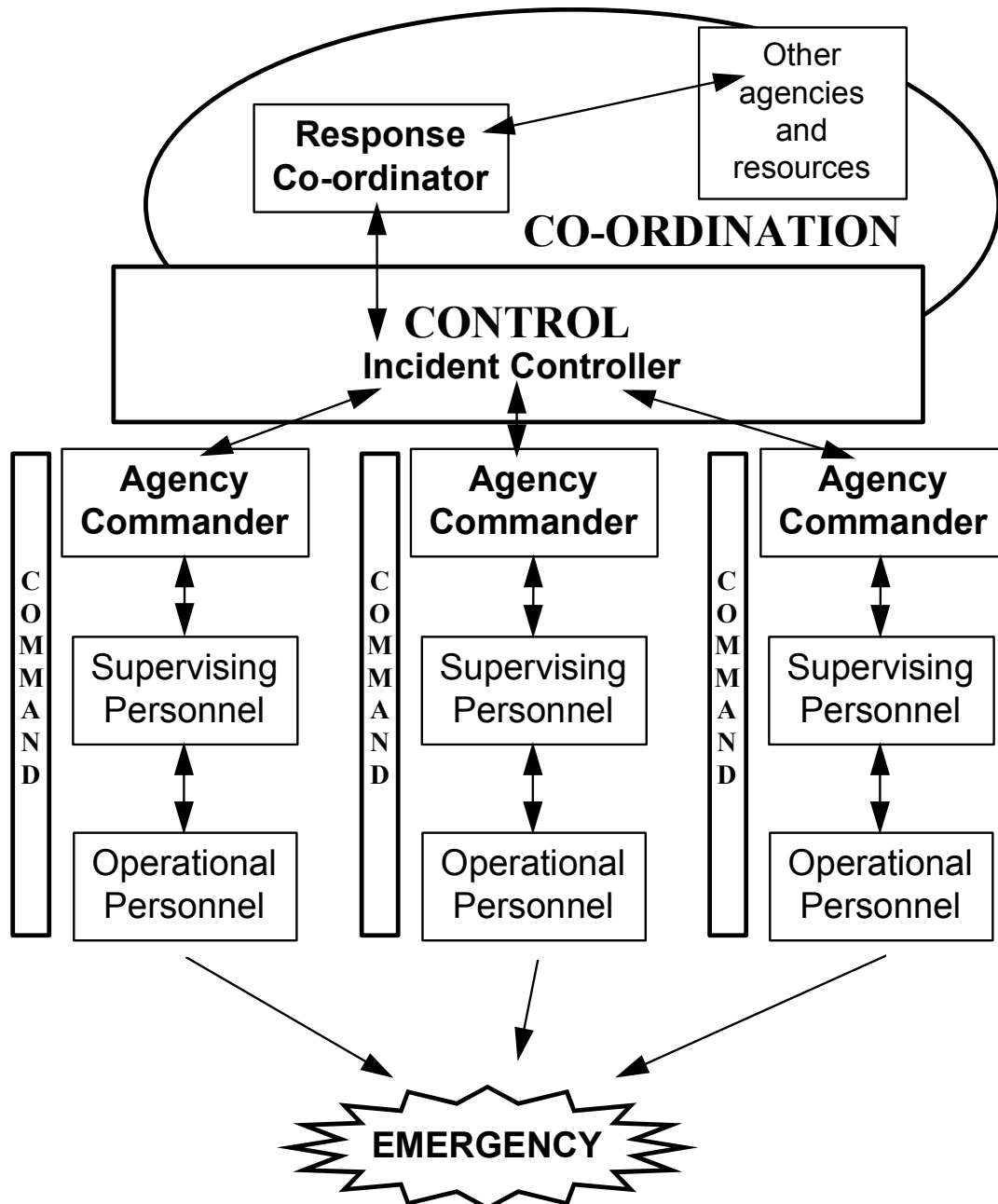
Command depicts the hierarchical managerial order. It elucidates the type and amount of resources that would be handled at different levels in the performance of that organisation's roles and tasks. Command structure will be decided as per the rules within an agency/department.

5.3.2 Control

Control provides the direction for best possible utilisation of resources and most advantageous deployment of manpower. Control system will be developed on the basis of laid down policy of the Govt.

5.3.3 Coordination

Coordination involves the bringing together of agencies and elements to ensure effective response to emergencies. It is primarily concerned with the systematic acquisition and application of resources (agencies, personnel and equipment) in accordance with the requirements imposed by emergencies. Co-ordination aims at bringing out synergy in operation. The command, control and co-ordination functions are demonstrated in the Figure given below.



Emergency Response Management Arrangements Demonstrating the Tasks of Command, Control and Coordination

5.3.4 Incident Controller

Incident Controller is the officer with overall responsibility for emergency response operations. The incident controller will normally be appointed by the control agency, but can also be appointed by the SRC or DRC (the District Collector) if the circumstances so require.

5.3.5 Emergency Management Team (EMT)

The emergency management team will consist of the incident controller, the support agency commanders (or their representatives) and the emergency response co-ordinator (or representative). The EMT exists when two or more agencies combine or work in co-operation to respond to an emergency.

Once the control strategy has been determined by the incident controller (in consultation with support agency commanders), the commanders implement the strategy through their respective command structures. The emergency response co-ordinator's role in the team is to ensure a co-ordinated multi-agency response, and to provide for the systematic acquisition and utilization of the required resources.

5.3.6 Incident Management System (IMS)

This is a system used by the EMT in fulfilling its role. An IMS lays down a set of flexible set of rules and a dynamic methodology, which can accommodate escalation or changes in the severity of any emergency. The system will be established by the control agency and will involve use of personnel for the various functions which may need to be individually managed in dealing with the event, such as operations, planning, logistics (in conjunction with the emergency response co-ordinator), finance and administration. Each response agency will draw up an operational management system to assist in carrying out its role. The important aspect is that they all provide an effective interface between co-operating agencies, when necessary.

5.3.7 Co-ordination Role of the State Relief Commissioner & District Collector

Emergency response co-ordinators will be responsible for ensuring the co-ordination of the activities of agencies having roles or responsibilities in response to emergencies, with the exception of emergencies involving defence force vessels or aircraft.

5.3.7.1 Principal Role of Emergency Response Co-ordinators (SRC & DRC)

The principal role of emergency response co-ordinators is to:

- Ensure that the appropriate control and support agencies have been identified and will be responding for the emergency management;
- Ensure that effective control has been established in responding to an emergency;
- Ensure effective co-ordination of resources and services;
- In the event of uncertainty, determine which agency is to perform its statutory response role within a district or other specified area, where more than one agency is empowered to perform that role;
- Arrange for the provision of resources requested by control and support agencies;
- Review and dispatch situation reports;
- Ensure that consideration has been given to:
 - Alerting the public to existing and potential dangers arising from a serious emergency direct or through the media;
 - Any need for evacuation.
 - Advise recovery agencies of the emergency.

5.3.7.2 Field Emergency Response Co-ordinator

The field emergency response co-ordinator will be an experienced person designated by SRC, DRC, BDO, etc. at the scene of an emergency. The response roles, responsibilities and duties of the field emergency response co-ordinator are to:

- Ensure that the necessary control and support agencies are in position or have been notified of the emergency and are responding.
- Liaise with all agencies at scene.
- Ensure an incident controller has been identified, and liaise directly with that person, in order to be satisfied that the emergency is being responded to efficiently and effectively.
- Arrange for meeting the requests for provision of resources to the control/support agencies by:
- Ensure provision of available resources from within the Gram Panchayat, Block, Municipality District; or mobilise additional resources through the Gram Panchayat, Block, Municipality, District emergency response co-ordinators.
- Provide situation reports to the Block, Municipality and District emergency response co-ordinators.
- Ensure that consideration has been given to:
- Alerting the public to existing and potential dangers arising from a serious emergency;
- The need for evacuation;
- Public information;
- Traffic management, including access/egress for emergency response vehicles.
- Make necessary arrangements at the scene for media in accordance with direction from the incident controller.
- Advise recovery agencies of the emergency situation.

5.3.7.3 Block/Municipal Emergency Response Co-ordinator

The District Response Coordinator will appoint for each Block or Municipality, the B.D.O. or the Chief Executive of the Municipality as the Emergency Response Coordinator. The responsibilities and duties of the Block or Municipality Coordinator will be to:

- Ensure that immediate relief provisions are available and their movement activated in the event of an emergency
- Ensure activation of the Block/Municipality Emergency Operation Centre
- Regularly apprise the District Collector if the emergency, cannot be controlled within his/her resources.
- Advise recovery agencies of the emergency

5.3.7.4 District Emergency Response Coordinator

The District Collector will be the District Response Coordinator. The response roles, responsibilities and duties of the District Response Coordinator are:

- Responsible to the SRC for the effective coordination of resources or services within the District as per the provisions of the ORC.
- In the event of uncertainty, determine which agency is to perform its statutory response role within the District or within a specified area of the District, where more than one agency/department is empowered to perform that role.

- Ensure that an effective control structure has been established by the control agency in responding to an emergency.
- Obtain and forward regular advice regarding the potential of an emergency, which, is not under substantial control of the control agency.
- In an emergency, arrange to provide requested resources to the control/support agencies from:
 - Within the District
 - Outside the District through the SRC
- Monitor the provision of emergency relief and supply
- Review and dispatch situation reports to the SRC
- Ensure that consideration has been given to:
 - Alert the public to existing and potential dangers arising from serious emergency
 - The need for evacuation
 - Other public information

5.3.7.5 Additional Objectives for Emergency Response Co-ordinators

- To ensure that the role of emergency response co-ordinator is effectively performed, the following objectives will be adhered to:
-
- Provision of medical treatment / first aid.
- Notification of hospital(s).
- Registration of persons evacuated or otherwise affected.
- Provision of relief needs of evacuees, control and support agencies where necessary.
- In consultation with the control agency, assess need for declaration of an emergency area.
- Maintenance of order around the emergency site.
- Fact gathering for inquests or judicial inquiries.
- Notification of relevant government and non-government agencies.
- Co-operation with all participating departments/agencies and authorities.
- Maintenance of proper records.
- Bringing relevant matters to the notice of the appropriate agencies/authorities for action.

5.4 Step-up Arrangements

5.4.1 Resourcing

A three-tiered framework (block/municipal, district and State) exists for implementing response to emergencies. Response arrangements are designed to assess an emergency, and to provide for the graduated marshalling and utilisation of the resources required to deal with it in accordance with the emergency response plan and the plans of participating agencies. At the blocks/municipal/gram panchayat levels, resources owned or under the control of the G.P, block or municipal council will be used to supplement those of the control and support agencies. As the effects of the emergency escalate, or the resource requirements are in excess of what is available locally, district, State and external resources will be explored.

5.4.2 Co-ordination

At the district level, the inter-agency response management structure involves the co-ordination of resources to support operations which cannot be resourced locally, or which extend over more than one block or municipality. The highest level of operational co-ordination and support takes place at State level. It is at this level that resource support from other States, Central Government and/or the other agencies is assessed and requested.

5.4.3 Procedures

Where an agency/department requires resources beyond its own capacity to satisfactorily complete a task, it will request for assistance as appropriate:

- If at the local level, from the B.D.O. or Municipal Executive Officer.
- If the request cannot be satisfied at the local level, then via the BDO/Municipality to the District Collector
- If the request cannot be satisfied at District level, then request will be made to the State Emergency Response Coordination Centre for additional support (for L2 level disasters).
- If a request cannot be satisfied from resources within the State it will be referred to the SRC as the State Emergency Response Coordinator to seek Central Government or external assistance (For L3 level disasters).

5.4.4 Information Management

The objective of information management is to provide the right information to the right person at the right time in the right format. During emergency response activities information is needed by all participating agencies, persons affected and the wider community. But the requirement of information by the different groups could be different. Processing of the sea of data in to the right kind of information will be an important task while managing an emergency.

5.4.5 Post-operational Debriefing

The block, municipal or district emergency response co-ordinator is responsible for convening a debriefing conference as soon as practicable after cessation of response activities. All agencies that participated in those activities will be represented with a view to assessing the adequacy of the response and to recommend any changes to the relevant plan(s).

5.4.6 Media Liaison

Media management during a disaster is an important aspect. The incident controller will ensure that up-to-date and accurate information is made available.

A clearly defined area, as close as practicable to the incident, should be established as a media centre.

If the control agency is not equipped, or is otherwise unable to deal directly with the media, the assistance of the State may be requested.

5.5 Emergency Relief

This section covers the provision of emergency relief to persons affected by, or responding to, an emergency.

5.5.1 Requesting Emergency Relief

- **Control and Support Agencies**

Control and support agencies that have the capacity to provide emergency relief functions for their own personnel (i.e. food relief, first aid, health care) will use their own resources before requesting emergency relief from the state emergency relief system.

- **Support to the Community**

Requests for emergency relief will, in the first instance, be directed to the block, municipal council or the Gram Panchayat via the Block or Municipal Emergency Response Coordinator.

5.5.2 Block/Municipal Level: (Coordinator Block/G.P./Municipal Councils)

Local Councils or Emergency Response Committees will be responsible for coordinating emergency relief at the local level. The relief function roles and the nominated primary agencies for food relief, emergency relief centres and material needs at the local level will be designated in the G.P., Block or Municipal Emergency Management Plan. Should the event exceed the capacity of the council/committee to perform this function, the G.P., Block or Municipal Emergency Response Coordinator, through the District Collector will arrange for the State or District Authorities to assume coordination. The local committee/council, to ensure a smooth transition of responsibility, will notify the District and State Authorities as soon as it becomes apparent an event will exceed their capacity.

5.6 Evacuation

5.6.1 Legal and Operational Considerations

The response agencies will make an assessment of the situation and will recommend evacuation and assist evacuation of affected people through a safe and efficient evacuation process.

The decision to recommend that people evacuate rests with the control agency, in conjunction with police and other expert advice, unless time constraints prevent this consultation. Once the decision is made, police and the local administration are responsible for carrying out the evacuation process.

5.6.2 Evacuation Process

Evacuated people are taken or directed to a place of relative safety, usually to a shelter or an emergency relief centre, which might have been identified in the relevant G.P., Block or municipal emergency management plans.

Tehsildars will be responsible to ensure the registration of the evacuated people. Emergency relief will be provided to evacuees as needed. They will remain at the centre or in other emergency shelters until the danger is over and it will be safe for them to return home. The evacuation process includes the returning of evacuees to their homes. In situations when evacuated persons must remain away from home for an extended period, temporary accommodation may be necessary. This will be managed under the recovery arrangements.

- Emergency Response Arrangements:
- The control rooms at various levels will be modernised and upgraded to act as an Emergency Operation Centre with facilities for Emergency

Response Coordination where the designated Emergency Nodal Officer and other response agencies' representatives can operate jointly in times of emergency to ensure effective coordination.

The State Government can hire the services of an architect for designing the layout of the EOC where all the ESFs will be located during Emergencies and will have the following facilities: (a) Conference Hall; (b) Press Room (c) Work Stations for ESFs (d) Dormitories (e) Television, Film & LCD Screening Rooms, (f) Video Conferencing facilities with Emergency Electric Generators, UPS System, Dual Decoders, Stock room, Network Control Room, Studio and pantry for food and drinking water facilities. **All**

EOC facilities will be made disaster resistant.

The proposed arrangements for effective response and inter-agency coordination are given below. However, till such systems are not put in place, the existing control rooms will act as the main hub for response activities.

5.6.3 State Emergency Operations Centre (SEOC)

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 emergency supports functions. It is a combination of various line departments of Government and other agencies, whose services are generally required during incident response,

It will allow all collaborating agencies and departments inside and outside EOC environment to share information, make decisions, activate plans, deploy IRTs, perform and log all necessary response and relief activities and make the EOC effective.

EOC Norms

It will have:

- a. One Sr. Administrative Officer as EOC in-charge having experience in DM with required assistants;
- b. Representation of all concerned line departments with authority to quickly mobilize their resources;
- c. Adequate space with proper infrastructure to accommodate the participating agencies and departments;
- d. Communication facilities with last mile connectivity;
- e. A vehicle mounted with HF, VHF and satellite telephone for deployment in the affected site to provide immediate connectivity with the headquarters and ICP;
- f. A representative of central teams (NDRF, Armed Forces) whenever they are deployed to integrate their resources, expertise and to resolve conflicts that may arise during the response effort;
- g. Provision and plan for dovetailing the NDRF, Armed Forces communication capabilities with the local communication set up. There will be proper plan

- so that all are able to connect with each other in case of large scale disasters or failure of the local communication systems;
- h. Map depicting affected site, resources deployed, facilities established like Incident Command Post, Staging Area, Incident Base, Camp, Relief Camp, Helibase, Helipad, etc.
 - i. DM plans of all line departments;
 - j. DM plans of the State and the District;
 - ☐ Directories with contact details of all emergency services and nodal officers;
 - ☐ Connectivity with all District headquarters and police stations;
 - ☐ Database of NGOs working in different geographical areas;
 - ☐ Demographic details of the State and Districts;
 - k. Online / Web based DSS with the availability of at least the following components:
 - ☐ Standardization of Command Structure with the details of the earmarked and Trained personnel in IRS;
 - ☐ Proactive planning facilities;
 - ☐ Comprehensive resource management system;
 - ☐ Geographic Information System (GIS) for decision support; and
 - ☐ Modelling capability for predicting casualties and resources for large scale incidents including CBRN emergencies.
 - m. Socio-economic, demographic and land use planning;
 - m Resource inventories of all line departments and connectivity with database of India Disaster Resource Network (IDRN) India Disaster Knowledge Network (IDKN) and Corporate Disaster Resource Network (CDRN); and

Incident Response Team (IRT)

The ROs of the State and Districts will constitute IRTs from among officers at the State and District level respectively. The members of IRTs will be properly trained and sensitised regarding their roles during the pre-disaster phase itself. Selection of different section chiefs will be guided by the nature and type of disaster. The headquarters IRT will provide continuous support to the on-scene IRT(s) and if required join them or take over response on the directions of the RO.

Incident Response System (IRS) - Facilities

For effective response the following facilities may be required to be established depending on the needs of the incidents, the length and time the facilities are needed to be used, the cost to establish it and prevailing weather conditions etc.

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 only be 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 can be located with other incident facilities like Incident Base.

.The ICP may be located at Headquarters of various levels of administration of State (State, District, Sub-Division, Tehsil / Block). In case of total destruction or reasons of non availability of any other space, the ICP may be located in a vehicle, trailer or tent. It should however have adequate lighting, effective communication system and other such facilities so that one can function effectively.

Deployment of IRT

Some of the natural hazards have a well established early warning system. States and Districts also have a functional 24 x 7 EOC / Control Room. 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. At times the information about an incident may be received only on its occurrence without any warning. In such cases the local IRT (District, Sub-Division, Tehsil / Block) as the case may be, will respond and inform the higher authority and if required seek reinforcement and guidance.

Standard Operating Procedures

The Standard operating procedure (SOP) is the set of routine activities to be followed by the staff at the E.O.C. (Emergency Operation Centre i.e. Control Room of the district Administration/State Administration etc. for observation, evaluation, Confirmation and dissemination of bulletins. The SOPs are emergency procedures, where the activities of a specific situation are described in a clear, logical, sequential and methodical manner. Hence activities in the emergency plan or DDMPs include evacuation, search and rescue, relief, rehabilitation reconstruction resettlement text food, water, clothing, medical first aid, sanitation, disposal of dead bodies' carcasses, sanitation, etc.

The objectives of the SOP are –

- (a) To provide, in a concise and convenient form, a list of major executive actions involved in responding to natural disasters and necessary measures for preparedness, response and relief required to be taken;
- (b) To ensure that all concerned Ministries, Departments and Organisations of the Government of India, State Governments and District Administrations know the precise measures required of them at each stage of the process and also to ensure that all actions are closely and continuously coordinated; and
- (c) To indicate various actions this would be required by the State Governments/UT Administrations within their sphere of responsibilities so that they may prepare and review the Contingency Action Plans accordingly.

EMERGENCY OPERATIONS CENTRES (EOCs):

Emergency Operation Centres/Control rooms will be set up at National, State and district levels with requisite facilities. The EOCs/Control Rooms already in

existence at these levels will be suitably upgraded.

Objectives of the Emergency Operations Centre

The EOCs/Control Rooms at National, State and District levels will be the nerve centre for coordination and management of disasters. The objectives of the EOCs shall be to provide centralized direction and control of any or all of the following functions:

- ☐ Receive and process disaster alerts and warnings from nodal agencies and other sources and communicate the same to all designated authorities.
- ☐ Monitor emergency operations
- ☐ Facilitate Coordination among primary and secondary ESF Ministry/Departments/Agencies.
- ☐ Requisitioning additional resources during the disaster phase Issuing disaster/incident specific information and instructions specific to all concerned; Consolidation, analysis, and dissemination of damage, loss and needs assessment data;
- ☐ Forwarding of consolidated reports to all designated authorities.

Location of EOC

The EOC will be set up at a suitable location and the building should be disaster proof so as to withstand the impact of disasters and remain functional during the emergency phase.

Communication Network of EOCs

Under the National Communication Plan being implemented by the Government of India, the EOCs at all the three levels shall have a fail proof communication network with triple redundancy of NICNET of NIC, POLNET of Police and SPACENET of ISRO in addition to the terrestrial and satellite based communication to ensure voice, data and video transfer. Under the network, the EOCs/Control Rooms of all the States will be directly connected with the NEOC/ Control Room of MHA at the National level. The district EOCs/ Control Rooms will be connected with the respective State EOCs/Control Room. All these control rooms will function on 24x7 basis and will be functional round the year. Suitable personnel will be selected and imparted training in the operation of Control Rooms will be posted to man these EOCs/Control Rooms.

SEOC and DEOC

State Governments and District Administration shall set up State Emergency Operation Centre and District Emergency Operation Centres and provide adequate manpower for manning them on 24x7 basis round the year and arrange training for the EOC Staff on EOC operations. State Governments and District Administration shall develop SOP/ Protocol for activation of SEOCs and DEOCs during emergency/disasters

Equipment Requirements

The SEOC will need to operate round the clock, and may itself be subjected to adverse conditions due to the impact of disaster. It needs to be equipped with the following hardware and software for its efficient functioning:

1. Resource Inventories and databank of maps and plans at block, district and state level on a GIS platform for quick retrieval and analysis.
2. State-of-art communication equipment for staying linked with the Chief Secretary's office, headquarters of line departments, district collectors, field teams, media, and national and international support agencies.
3. A mobile command vehicle with communication equipment.
4. Workstations and communication lines for all representatives of the line ministries.
5. Radios and television sets tuned to different news channels and coverage.
6. Video conferencing facility.
7. Projection equipment and screens.
8. Emergency power backup.
9. Stock of drinking water, food, medicines, bedding and essential items required for personnel manning the SEOC for long time durations.

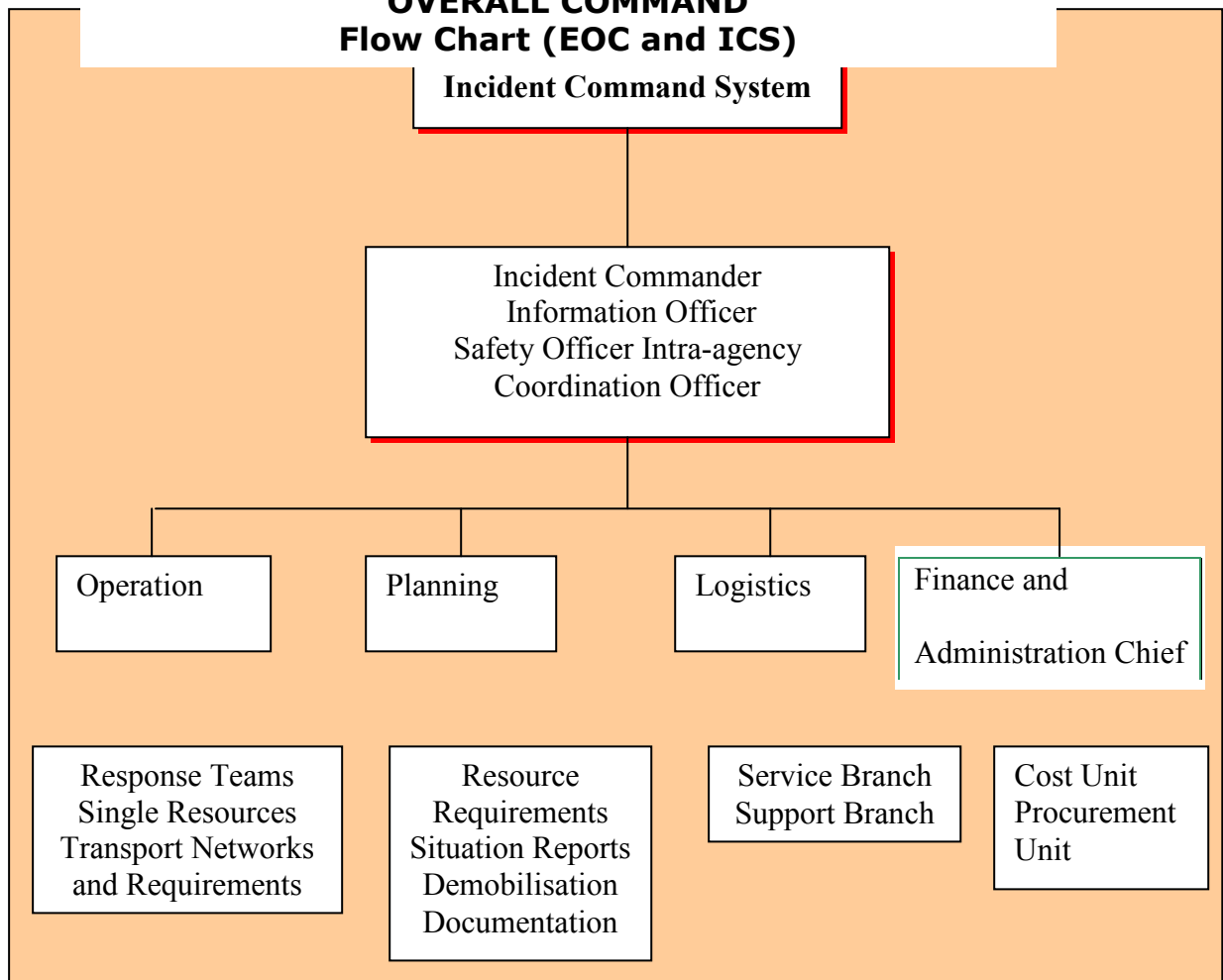
5.6.4 Incident Command System

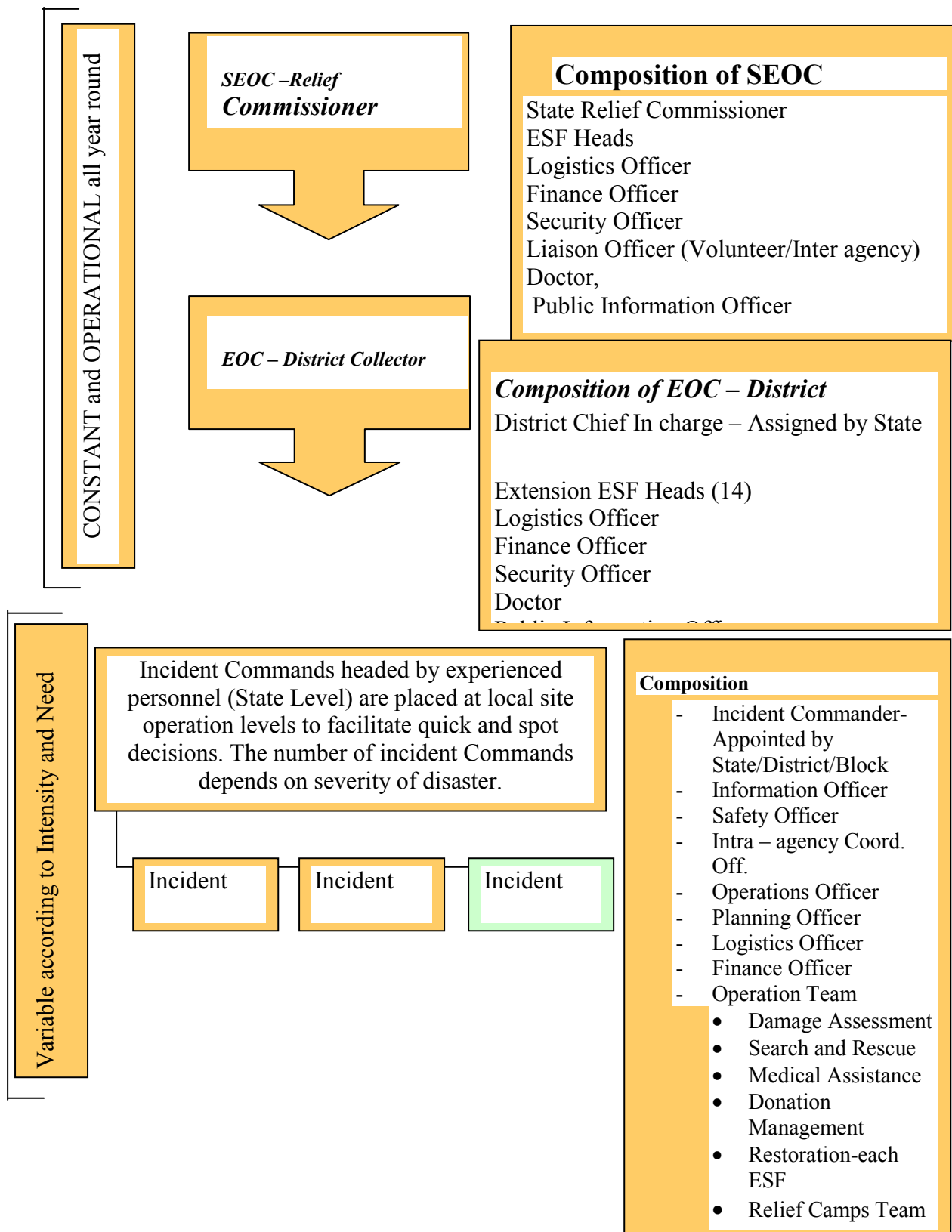
ICS is an effective model for centralized management. It can clearly define staff roles and responsibilities and lines of communications. In the ICS model the base of operations for response to a disaster (incident) is the Command centre.

5.6.5 Incident Command-Upon activation of the Plan, the Incident Commander will establish the Command Centre and initiate ICS.

The layout of the Incident Command System with concerned staff is given in the chart below:

**OVERALL COMMAND
Flow Chart (EOC and ICS)**





5.6.6 Emergency Support Functions (ESFs):

The emergency support functions deals with the first response whenever a disaster strikes. The major areas where strengthening of ESFs is required is given in the chart below

Table 51: List of ESF and desk officers

Nos.	Emergency Support Functions	Desk Officers
1	Communication	Special Relief Commissioner
2	Law and Order	Home Department
3	Search And Rescue	Punjab Police
4	Evacuation	Punjab Police
5	Food	Food & Civil Supplies
6	Medical Response And Trauma Counselling	Department Of Health And Family Welfare (DOH) / Directorate Of Health Services (DHS)
7	Equipments Support - Debris & Road Clearance	Department Of Food And Civil Supplies
8	Shelter	PUDA
9	Water	Department Of Water Supply
10	Electricity	P.S.E.B
11	Transportation	Department Of Transport
12	Help Lines and Information Dissemination	State Department of Revenue

For the emergency response at the national level and to respond to emergencies that cannot be handled by the State authorities, the State and Central Governments will form a number of self-sufficient agency/agencies that gets into actions without waiting for any notification. **The dependence of these agencies on local resources will be minimal.**

The assumption, as the definition of disaster enunciates, is that the normal systems have collapsed and the situation is beyond the control of local society. The first 72 hours are the most crucial in any emergency, because average human beings can withstand most dangers up to a maximum of 72 hours. Therefore, apart from the State Response Arrangements, the State and Central Governments will have to create quick response teams that can spring into action the moment any emergency strikes.

5.7 Response Activities

5.7.1 Warning

Most of the disasters could be predicted and the community likely to be affected forewarned about any impending disaster through a proper warning mechanism. Floods, droughts, heat and cold waves, pest attacks, epidemics, industrial and chemical disasters are some of the disasters for which adequate warning could be given.

On receipt of warning, the District/block level machinery and the concerned departments at the State level will be systematically activated for response measures at the earliest:

- ◆ Concerned officers in Revenue, Public Health, veterinary, Police, Electric, Telecom, RWSS, RD, R&B, Irrigation, PHD, PWD, Civil Supply, departments, important CBOs/ NGOs, Elected Representatives, etc. will be alerted.
- ◆ It will be ensured that all officers remain in headquarters until the situation gets back to normal.
- ◆ Warning to people through the Govt. field functionaries will be disseminated. This system of alert may range from alarms (fires), sirens (industrial disaster), to public announcement systems like radio, television, loud speakers, hoisting of flags and traditional systems i.e., beating of drums and bells, blowing of conch shells etc. (Cyclones, floods).
- ◆ Once the warning is issued, it will be followed up with subsequent warnings in order to keep the people informed of the latest situation.
- ◆ Arrangements for generators, radios, batteries, extra vehicles, Satellite telephones to meet emergency situation will be made
- ◆ Adequate fuel for generators and vehicles will be arranged
- ◆ Godowns for storage of relief materials and parking places for trucks carrying relief materials will be inspected
- ◆ Logbook for recording chronological sequence of events will be prepared
- ◆ Availability of food and kerosene at block head quarters, storage agents and other inaccessible pockets will be checked
- ◆ Stock piling of relief materials/ ORS packets at strategic points will be ensured.
- ◆ Private stockists/ wholesalers and godowns will be directed to remain open till the situation gets back to normal
- ◆ Availability of sand bags will be checked (for anticipated floods)
- ◆ A rapid assessment of the medicines, bleaching powders and halogen tables will be made and if necessary, more will be requisitioned immediately
- ◆ Start movement of medicines to hospitals, other points lacking adequate stock
- ◆ Assessment of relief materials required will be made
- ◆ Location of sites for operation camps will be identified
- ◆ Adequate number of small and big vehicles will be immediately requisitioned and kept in readiness
- ◆ Position of boats already deployed will be assessed and if necessary additional boats will be requisitioned
- ◆ If needed all the educational institutions will be closed
- ◆ Assessment of vaccines and fodder stock available with the veterinary department will be made
- ◆ Lat-long book will be kept handy for identifying the probable air dropping zones advance list of villages where air dropping may be needed will be made
- ◆ Civil society organisations will be alerted and a plan of action for working in coordination with Govt. functionaries will be drawn up.
- ◆ Concerned departments will be directed to get ready with emergency tool kits and necessary manpower
- ◆ Sufficient number of generators will be hired and fuel for running those will be stored
- ◆ Regular contact with all control rooms will be maintained
- ◆ Spare copies of block maps will be kept ready

- ◆ After quick review of the preparations taken, emergency meeting of important officials and non-Govt. agencies will be convened and clear instructions will be given about their expected role
- ◆ Necessary arrangements for evacuation will be made
- ◆ All search and rescue agencies and volunteers will be alerted
- ◆ An Incident Commander (nodal officer) will be designated
- ◆ Movement of trains, vehicles, etc., will be stopped depending on the expected intensity of the emergency

Warning System:

- Advanced technology like, remote sensing, GIS, etc, have made predictions about imminent disasters, especially for weather and climate related ones more precise and reliable. It will be ensured that the state of the art technology will be used for predictions.
- Increasing number of warning dissemination centres (for e.g., CWDS, Flood monitoring stations) will be located at critical points
- Regular and improved networking amongst all communication agencies and the response agencies will be ensured
- Warning dissemination will be taken up at the earliest in vulnerable pockets in local languages/ dialects with clear advice of what the people should do before the impending emergency- whether they should stay indoors, get ready to evacuate or evacuate.
- Tracking and information about the increasing intensity or its deactivation will be monitored.

5.7.2 Role of State Govt. in L2 disaster

Once the disaster is declared, as L2 the State Government will:

- ◆ Maintain close contact with the areas/districts likely to be affected
- ◆ Review the preparedness measures/ arrangements
- ◆ Identify key access routes, godowns for storage of relief
- ◆ Review existing stock position of relief materials, deployment of search and rescue, medical teams evacuation arrangements in areas/districts which are likely to be affected
- ◆ Liaison with the centre to provide special air and rail transport, if necessary
- ◆ Review the measures taken to protect vital installations
- ◆ Make advance arrangement to send relief materials to affected areas
- ◆ Make advance arrangement to deploy specialised team (Medical, Search & Rescue and army)

(These activities, however, will be in support of the District initiatives and their requirements of assistance.)

5.7.3 No Warning

In case of no warning, the activities and inventories maintained during the L0 stage will be operational.

Disasters for which warning is not possible include earthquakes, tornado, flash floods, hurricanes, dam bursts, thunder and lightning, fire chemical and industrial disasters, nuclear disasters, all accident related disasters and food poisoning.

5.7.4 De-Warning

In case the disaster does not occur as predicted, the Indian Meteorological Department issues a de-warning. The de-warning by IMD will initiate the following:

- ♦ Dissemination of De-warnings by respective districts and blocks
- ♦ EOC will start functioning for L0 activities again
- ♦ The specialised teams (defence/search and rescue/medical) shall also return to L0 activities
- ♦ Material resources will be returned/stored back

5.8 RESPONSE PLANNING

Planning of the operations will be done quickly and at regular intervals. To mobilise resources at the State level, the daily stocktaking will be taken in a meeting of the departmental secretaries under the chairmanship of the Chief Secretary. All planning aspects will be taken care of by this committee and execution of these will be undertaken by the SRC.

Once the alert stage has been activated, within the first **two hours** of the disaster event the Special Relief Commissioner's office or the Emergency Operation Centre will be responsible for holding a meeting of the Coordinating Officer of each ESF. They will meet as and when needed, under the leadership of the SRC, and be responsible for the following during the course of this meeting:

- ♦ Review of the situation and of submission of detailed reports to Government with recommendations
- ♦ Ensure that the officers of concerned departments immediately inspect the affected area and take appropriate protective and restorative action within the ambit of their budgetary provisions as considered necessary
- ♦ Review the actions taken for clearance of roads for movement of traffic, rescue of and relief to the marooned people, disposal of dead bodies and carcasses, restoration of communication, power and drinking water
- ♦ Damage assessment and submission of preliminary and final damage reports of the circumstance as well as loss sustained
- ♦ Arrange for reconnaissance flights and army assistance
- ♦ Review and document the resources (manpower and material) support that has already been dispatched to the affected area
- ♦ Address response issues and problems that require State level decisions or policy direction.
- ♦ Take decisions on more resources and relief material that may be required.

5.8.1 Location of the meeting

The meeting will be held in the SRC office. The first meeting will be held within two/three hours of the event parallel to the other activities that have been initiated at the declaration of L2. The following activities will be initiated parallel to the SRC meeting:

- ♦ Briefing of officers of the concerned Departments.
- ♦ Departure of first assessment team.

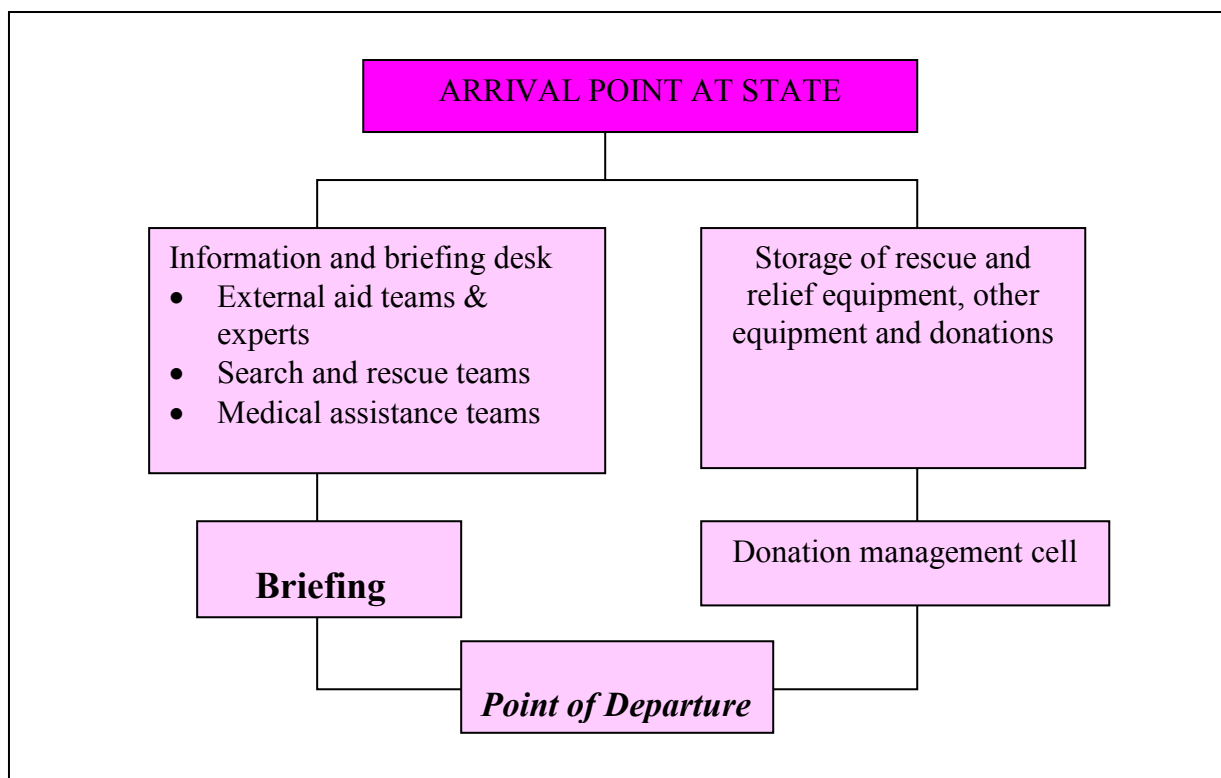
- ♦ Departure of first search and rescue team with army personnel, if required
- ♦ Aerial survey of damage.

5.8.2 Arrival Point

Material/Manpower Flow chart of Information and Arrival Centres

The response activities require active and effective coordination of ground operations. The traffic junctions such as airports, railway stations and bus terminals will establish '**Information and Arrival Centres**' which will be the key points for arrival and dispatch of relief materials and rescue workers. The incoming assets from within and outside the State will be clearly allotted and assigned to disaster sites with the help of various information centres. This information centre will function at the State level and therefore will be accountable for all international aid and related formalities.

- ♦ **Arrival point:** The transport junctions where relief materials as well as manpower can be collected for response activities. It could be the airport or railway stations.
- ♦ **Information and briefing desk:** The people / agencies will be briefed of the status of disaster, the most affected areas and the key agencies and personnel in the affected District(s). It will also coordinate and handle the relief material received from National and International agencies as a priority task.
- ♦ **Storage:** Storage facility at the arrival point where material is categorised and if needed, packed for dispatch.
- ♦ **Briefing cell:** This cell will give specific briefing for different types of field workers.
- ♦ **Donation management cell:** The donations from other states and international agencies are packed and accounted for further distribution.
- ♦ **Point of departure:** Material and manpower are dispatched according to the requirements issued by the EOC at the centres.



SRC based on the resource available and the magnitude of the particular disaster. A similar information centre is also required at the District level where all the relief and other facilities can be directed to the affected areas directly according to the needs of the incident commanders and the District EOC.

5.9 State Disaster Quick Response Mechanism

Declaration of L2

The declaration of the L2 will be done after the event has occurred by the Special Relief Commissioner in consultation with the State Natural Calamity Committee.

Factors taken into considerations for the declaration of L2:

- ◆ Parameters set by designated technical authority
- ◆ Capacity of Districts to manage the disaster independently

The Chief Secretary will head the first assessment team and the SRC will be primarily responsible for coordination of response activities at the State level and will have the discretion to chose the members for the first assessment team Before a delegation of the first assessment team leaves for the site the following will be done

- ◆ Official declaration of L2
- ◆ Meeting of the State Natural Calamity Committee
- ◆ Arranging for all required inventories from the concerned Departments
- ◆ Official appointment of all nodal officers for each ESF
- ◆ Activation of Emergency Operations Centre (EOC) at State
- ◆ Appraisal of situation to the State cabinet
- ◆ Identify the nodal transport points for the affected Districts

5.9.1 Quick Response Teams

The State, and especially the vulnerable districts, will set up well-trained teams for responding to disasters. The magnitude might be so large that medical and other response teams will be required even before any initial assessment. However, a quick assessment for further planning is also required. Therefore, the response teams can be divided into two sections:

- ◆ Assessment Teams
- ◆ Response Teams

Action Plan for First 24 hours

First assessment team will be constituted, which will mainly comprise of senior officers who will be required to make a first/preliminary assessment of damage.

Items required by the first assessment team are:

- ◆ Survival kit
- ◆ Formats for First Assessment
- ◆ Media Release
- ◆ Assessment Report, which will contain
 - Geographic estimate of damage area (administrative units and divisions)
 - Estimated total population affected
 - Worst affected areas
 - Areas currently inaccessible
 - Injury and fatality report,
 - Lists of damaged infrastructure, buildings, health facilities, water sanitation, crop agriculture,
 - Assessment of secondary threats
 - Resource needs for response operations
 - Priority needs (search and rescue, clothing, food items with quantity and specifications, cattle feeds and fodder, Sanitation, Health, Education, Crop/agriculture, Infrastructure)

Task at hand:

- ◆ Assessment of the situation
- ◆ Preparation of report(s) of assessment as per a given format
- ◆ Media release

Base Report after First Assessment

After the first assessment team has prepared the preliminary report, the EOC and the State Natural Calamity Committee will re-assess the situation at the site for taking further action. The first assessment team report will include the following:

- ◆ Extent of damage in terms of:
 - ❖ Geographical area (administrative units and divisions)
 - ❖ Expected affected population and effect on population (primary affected persons, dead, injured missing, homeless, displace, orphans, destitute, traumatised population, children under five, pregnant women, lactating mothers,
 - ❖ Districts/Areas worst affected
 - ❖ Damage to infrastructure according to each ESF

- Buildings (Major damaged/destruction and minor
- Infrastructure (road damaged/destroyed, bridge, communication network, electricity network, telecom network
- Health Facilities (Infrastructure damage, condition of equipments, staffs affected, availability of medicines/drugs, vaccination/immunisation, major health problems
- Water Sanitation (Availability of safe drinking water and sanitation facilities, environmental sanitation, stock of disinfectants, condition of water supply system, repair status of water supply system, portable water system
- Crop/ Agriculture (crop damage, livestock loss, health services for livestock, cattle feed/fodder availability, damage to agricultural infrastructures)
- Food/nutrition (adequate availability of food for family, relief, PDS, Community Kitchen, requirement of baby food
- Secondary threats (potential hazardous sites, epidemics etc.)
- Logistic and Distributions System (Availability of storage facilities, means of transportation, availability of fuel, distribution of criteria)
- Priority needs (needs of search and rescue, need for team/boats/special equipments and shelter)
- Clothing (children clothing, adult clothing, winter clothing)
- Food items (type of food, baby food, specialised food, cattle feed and fodder)
- Sanitation (portable water, chlorine powder and disinfectants, manpower for repair of drinking water points and disinfections of water bodies
- Health (medical staff, drugs, IV fluids, ORS, equipment, Mobile unit, Immunization vaccine, Cold chain system)
- Education (infrastructure both temporary and permanent, teacher kits, reading materials)
- Crop/agriculture (need of seeds, fertilisers, pesticides, implements)
- Equipments and manpower required for restoration of infrastructures
- ◆ Report by the Collectors of the affected Districts
- ◆ Operational access points
- ◆ Areas still under high risk (cut off, after shocks)
- ◆ Condition of the Government buildings and communication infrastructure in the affected areas/districts

Action to be taken within 24-48 hours

- ◆ Reinforce rescue operations through dispatch of relief material and trained human resource assistance
- ◆ Strengthen communication and coordination with the affected areas
- ◆ Accept relief and assistance from outside
- ◆ Arrange for easy distribution of the relief / assistance
- ◆ Convene situation-update meetings at regular intervals for close coordination and immediate relief response
- ◆ Send out additional search and Rescue and medical first Response teams

Deactivate response and relief operation and resume L0 activities

- ◆ Once the situation is under control of the District the response mechanism at the State level will be deactivated, step by step, in coordination with the District.
- ◆ Send out deactivation notification to all concerned departments
- ◆ Send out State team for taking stock and documentation of resources used and other preparedness activities during the alert and initial quick response phase

5.9.2 Essential Communication Links at the State EOC

The EOC at State level will have communication links with the following:

- ◆ Crisis District EOC
- ◆ Crisis Block EOC
- ◆ All concerned Departments
- ◆ Information and arrival point at the State
- ◆ Information and arrival point at the affected Districts

Within the 24-48 hours the EOC at the State and District will be jointly involved in the following

- ◆ Set up information desks at critical locations
- ◆ Send specialised teams to priority areas
- ◆ Identify location of international and other agencies to set up their site offices
- ◆ Establishment of communication with the district and block and ensuring regular flow of information

5.9.3 Tasks for internal functions at EOC

- ◆ Determine policies during disaster and post disaster period
- ◆ Adjudicate conflicting, claims and /or request for emergency personnel, equipment, and other resources
- ◆ Designate responsibilities and duties, as necessary to maintain the optimal use of national resources
- ◆ Provide operating units with requested resources for sustained operations
- ◆ Maintain documentation of resource allocation and availability

5.9.4 Checklist for EOC set-up:

- ◆ Minimum standards handbook of layout and dimensions, equipments, etc
- ◆ Hotlines, V-sat and wireless communications will be established at the EOC
- ◆ Regular staffing, staff on call and staff on Disaster duties (incident commanders, Sector/ESF experts/ESF commanders)

5.9.5 Checklist for each ESF desk:

- ◆ Matrix or primary and secondary functions of each ESF
- ◆ Do's and don'ts to be followed during disaster times in EOC
- ◆ Schedule for regular staff
- ◆ Schedule for staff on call
- ◆ Schedule for staff on disaster duty

- ◆ Databank of maps and plans at district, state
- ◆ Hardware
- ◆ GIS software
- ◆ State of the art communication equipment
- ◆ Inventories related to all ESFs and relief materials

5.9.6 Continued Response

The response and rescue operations continue till the local administration is able to take full charge of the situation

5.9.7 Deactivation and Documentation

The State EOC will deactivate and discontinue emergency response operations and undertake detailed documentation of activities and other LO activities.

Chapter VI

STATE DISASTER RECOVERY PLAN

Introduction

Disasters can and do destroy property, adversely affect the livelihood of people, undo development initiatives and damage public infrastructure and facilities. Immediate relief to affected people is addressed by arrangements under the State Emergency Response Plan. But the affected people and the communities often require support, both in tangible and intangible form, to regain normalcy and start life afresh from where it got disrupted. Each disaster could be considered as an opportunity to reinforce the resilience of the communities and the resistance of the infrastructure, so that adversity of the future disasters could be minimized.

The stakeholders in disaster management are: (a) the Community, (b) the Government, (c) the Voluntary organizations and (d) the funding agencies. All these stakeholders play specific roles at different stages of disasters, viz., (a) before a disaster, (b) during the disaster, (c) immediately after the disaster and (d) thereafter. While all the stakeholders do have some role or other to play in all the four stages the role of the community is most pronounced in all the stages, particularly during and immediately after a disaster they have to meet the challenges on their own. The community during a disaster has a shared responsibility of providing physical and psychological support to each individual, particularly to the vulnerable sections. The State Disaster Recovery Plan places the affected community as the focus of recovery management and provides a structure for the management of all the inputs into the recovery process in a way that is appropriate to the needs of the community.

Activation of arrangements under the recovery plan does not require the activation of any other disaster management arrangements. Activation of arrangements set up under this plan can occur whenever they are necessary to assist people affected by a disaster.

Chapter 8 of this Plan describes the recovery roles and responsibilities of government departments and should be read in conjunction with this part.

The recovery plan applies to all types and scales of emergencies and also to organizations having roles in the recovery from disasters, whether listed in this manual or not.

6.2 Definitions of Recovery

Recovery is an enabling and supportive process that allows individuals, families and communities to attain a proper level of functioning through the provision of information, specialist services and resources. **Recovery includes all aspects of mitigation and also incorporates the continuation of the enabling process, which assists the affected persons and their families not only to overcome their losses, but also to achieve a proper and effective way to continue various functions of their lives.**

The Recovery process is therefore a long-term process in which everyone has a role – the Government including the self-government institutions, the NGOs, and especially the affected people, their families and the community.

6.3 Recovery from Disasters

An emergency may be localised in its effects such as in a single house fire or a road or train accident, or it may have much more widespread consequences, as in the case of a major cyclone or flood. There may be a need for community support, whether the cause is 'natural' or 'man-made'.

The capacity of people to recover from a disaster using their own resources varies, depending on the circumstances of the disaster as well as on the nature of their community. Repeated occurrence of disasters, on one hand, has fortified the coping mechanism of the communities, but on the other, has trapped them in a vicious cycle socio-economic vulnerability. It is required to take up long-term disaster proofing measures to enable the communities to get out of the vicious circle and minimize their vulnerability.

Assistance provided will be adapted to meet the basic needs of those affected, with a focus on the most vulnerable sections of the people. This requires sensitivity and extensive consultation with the affected people and communities. Assistance may include material aid, temporary accommodation, financial assistance, counselling and personal services, information and community support and can come from a range of sources.

6.4 Need for Outside Assistance

The physical and emotional effects of an emergency are likely to diminish the recovery capacity of individuals, families and communities. But the underlying principles of providing assistance would be to build the capacities of the people to enable them restore and sustain their livelihood and just not give it as "charity".

6.5 Recovery as a Developmental Process

Experience demonstrates that recovery is best achieved when affected communities exercise a high degree of self-determination. It should be seen as a developmental process through which **communities attain a proper level of functioning rather than merely returning to a previous level of functioning.**

The recovery process may be:

Complex: people and communities have a variety of needs, which require numerous recovery measures involving a wide range of agencies,

Dynamic: needs are constantly changing, as difficulties are overcome and new issues arise,

Protracted: the full recovery process may take several years.

6.6 The Recovery Process

There are two interrelated aspects of losses caused by disasters:

The physical and technical aspects, which includes destruction of property, and the social or community aspect, which includes personal suffering, community disruption, loss of community amenities as well as economic and commercial losses.

The recovery process consists of a range of activities. It is important to acknowledge that these are not phases or stages of recovery, in that they are not necessarily sequential, i.e. one activity following another. They can take place simultaneously.

6.7 Physical and Technical Aspect of Recovery

This aspect of the recovery process covers two types of activities:

- Restoration activities comprise repair of public utilities, housing, etc. and re-establishment of the means of livelihood, farming and industrial activities/enterprises.
- Reconstruction activities include replacing buildings and other capital infrastructure. These activities may continue for months or even years.

6.8 Social or Community Aspect of Recovery

This aspect of the recovery process incorporates:

An initial period of high activity during which immediate individual and community needs are met. During this period special social or community support activity may be forthcoming to complement or supplement existing community arrangements. It may also involve the establishment of temporary social and administrative structures, setting priorities for medium and long-term recovery and the provision of additional personnel and resources.

A period, during which developmental strategies are implemented, monitored and adapted to changing needs. This process may extend for many months after the event and involves the provision of economic and capital resources.

Reconstruction, following a disaster, is an important part of the recovery process. However, exclusive focus on physical reconstruction can retard the recovery of affected communities, particularly if they are not involved in a meaningful way in the management process and have not been consulted about the process or nature of their own recovery.

Recovery involves much more than replacing what was destroyed and rehabilitating individuals. It also involves a complex social process, which involves the whole community, and is best achieved when the affected communities exercise a high degree of self-determination. Recovery should be regarded as a developmental, rather than merely as a remedial process.

6.9 Dispersed Population Events

The affected population may originate from a number of different areas and communities (for example in the case of a train accident). Where the affected people are dispersed, and there is no distinct geographic area, which has suffered losses, assistance with recovery may be provided by agencies as extensions of their normal programmes. Special arrangements may need to be put in place for delivering services equitably and efficiently to dispersed populations. The concept of a community recovery committee may be useful under such circumstances.

6.10 Recovery Management Priorities

The manner in which both physical and social recovery activities are carried out may have a critical impact on the affected population. Activities, which are provided without proper consultation and recognition of community needs and priorities, may actually hinder recovery. This plan sets out mechanisms to ensure that recovery management recognises community needs.

6.11 Co-ordinating Agency for Recovery

For restoration of public infrastructure the primary responsibility will vest with the concerned Govt. departments. For livelihood restoration and social security the Block will be the nodal agency. Social Capital Restoration programmes will be executed through NGOs and CBOs. SDMA will be in over all charge of identifying, formulating, monitoring and co-ordinating the Recovery Activities. The deputy commissioner will be responsible for facilitating and monitoring of the works at the district level.

6.12 Principles of Recovery

Agencies responsible for recovery management will be encouraged to incorporate the following principles into their recovery plans.

(a) Recovery from a disaster is an enabling and supportive process that allows individuals, families and communities to attain a proper level of functioning through the provision of information, specialist services and resources.

(b) The process has to be properly planned, clearly understood and effectively executed by recovery agencies, response agencies and the community. For this purpose requisite training need be imparted to the community and the people executing it.

(c) Recovery management arrangements are most effective when the complexities and dynamics of recovery processes are properly recognised and are dovetailed in to the changing needs of affected individuals, families and groups within the community.

(d) Evolution of the recovery process with the participation of the community and with use of local resources and expertise is best suited for over all community development.

(e) Recovery management is most effective when agencies providing services in health, education, social welfare sectors play a major role in all levels of key decision making.

(f) For holistic recovery environmental, social and psychological recovery processes should be integrated with infrastructural and economic recovery.

(g) Recovery process is more effective when the plan is comprehensive, executed at the earliest and as per the planned time schedule and the distribution is equitable.

6.13 Management Principles for Recovery

Recovery management should aim at bringing coordination and co-operation among participating agencies should be adaptable to a wide range of situations, and preferably, based on previous experiences.

Management of the recovery process involves two areas of management: firstly, management by each agency of its own services and programs; and, secondly, co-ordination across agencies to ensure that all services are provided equitably and efficiently.

The recovery plan should be:

- (a) practical,
- (b) cost effective,
- (c) sensitive to community needs,
- (d) conforming to the socio-political environment,
- (e) situation specific
- (f) location specific
- (g) acknowledge the dignity and identity of the target group
- (h) as far as possible, conforming to the management and administrative principles generally followed by the agencies involved in the process
- (i) transparent and having measurable performance indicators
- (j) aimed at equitable and fair distribution of outputs.

6.14 Interface with Response Activities

Though distinct, response and recovery activities could run concurrently. Recovery activities should begin as early as possible without waiting for the response activities to cease.

There may be occasions when there is overlap between response and recovery activities, for example, when an agency has responsibilities in both areas, or where response and recovery agencies both require access to the same limited resources. In such situation, planning should address potential difficulties and divided responsibilities. Resolution should occur by negotiation between response and recovery co-ordinators. Where compromise is not possible, precedence should be given to the response requirements.

6.15 Recovery and Prevention

The objective of the recovery activities should be, not only, restoration to pre-disaster stage, but also, to incorporate disaster-proofing to minimise vulnerability in future.

6.16 Recovery Management and the Community

The recovery process is usually most effective if the affected community is able to participate in the management of programmes and resources made available to it.

It will be encouraged to establish of community recovery committees, which will include representatives of the affected community with the following in view.

- reinforce the local and community orientation of recovery management, and the role of panchayat samity, block or municipal councils;
- Proper recognition of the common interests of people in affected communities;
- Ensure fair, equitable and efficient application of recovery resources and services;
- Minimise management complexity, duplication and inconsistency of approach arising from overlapping or multiple recovery agency boundaries;
- Provide a basis for the identification of individual and community needs and prioritisation and monitoring of the recovery process;
- Allow early identification of needs, which cannot be met from within the community, and for obtaining effective support from district and State levels.

Committee membership should include representatives of:

- Block, Panchayat Samity, Gram Panchayat or municipal council(s);
- Government agencies;
- Community groups;
- Non-government agencies;
- Members of affected communities, with women representatives and representation from various castes, ethnic groups, occupational groups, etc.

Each affected community has unique needs and circumstances, and the composition of each committee should reflect those needs and circumstances. In a more complex setting, perhaps in a large urban area, or one with a variety of special needs groups, it may be necessary to set up a recovery committee structure with sub-committees focusing on particular issues reporting to the principal community recovery committee.

Guidelines on the composition and appointment of community recovery committees should be addressed through the district recovery and block, panchayat samity or municipal disaster management planning processes. PSDMA shall facilitate the formation of and provide support to community recovery committees.

Tasks of the community recovery committee will include:

- Monitor the progress of recovery in the affected community;

- Identify community needs and resource requirements and make recommendations to appropriate recovery agencies, blocks, municipal councils and the recovery managers;
- Liaise, consult and negotiate, on behalf of affected communities, with recovery agencies, government departments, block, panchayat samities or municipal councils;
- Liaise with district administration.
- Undertake specific recovery activities as determined by the circumstances and the committee.

In performance of these tasks, the committee will have direct access to the designated block or panchayat samity or municipality official, who can access resources under the district recovery planning arrangements.

6.17 Recovery Management at Block/Panchayat Samity/Municipal Level (Block/Panchayat Samity Municipal Responsibilities)

The disaster management plans of Block, Panchayat or Municipal Councils will include recovery management.

The gram panchayat, block or municipal council is often the first point of contact for people requiring assistance. Gram Panchayats, Blocks or Municipal Councils should, therefore, be able to provide information about available services or further points of contact. In addition, the local units will be expected to provide assistance within their means. This may involve existing services, such as public health and emergency relief, temporary housing, etc., as well as the provision of extra services, if required.

6.18 Role of District Recovery Co-ordinators

The District Collector will designate an officer as District Recovery Co-ordinator. The role of the District Recovery Co-ordinator will be to:

- Generally oversee the management of the recovery process;
- Assist agencies, blocks, panchayat samities and municipal councils in providing services effectively, minimising overlap and duplication;
- Ensure that an assessment of needs is conducted; and, where possible, ensure appropriate services are provided.

6.19 Recovery Management at State Level

SDMA will be in charge of recovery management at State level. Its overall responsibility will be:

- Develop policy issues on recovery management
- Conceive and solicit programmes from Govt. departments, District administration and NGOs.
- Prioritise projects
- Decide on the terms and conditions of execution
- Mobilize resource for operations
- Liaise and co-ordinate with the implementing agencies;
- Facilitate and Monitor operations

- Suggest norms for the recovery projects at GP and Block level
- Represent the Government in the affected community
- Present the interests, concerns and needs of affected communities to the State Government;
- Support the local management of recovery by ensuring State co-ordination of resources from all sources;

6.20 Funding

The financing of Recovery activities will be explored from the following sources:

- From budgetary provisions for recovery plans and programmes in normal developmental activities; at State, District and GP level
- Calamity Relief Fund
- National Calamity Contingency Fund
- Prime Minister's Relief Fund
- Chief Minister's Relief Fund
- Special programmes of Govt. of India
- Loans and assistance from national and international funding agencies

6.21 Monitoring & Minimum Standards

Monitoring and evaluation will be done with a view to ensure

- That the outputs have incorporated disaster proofing measures for risk reduction
- Monitoring at different stages of the process
- Enforce the adopted quality regime
- Solicit feedback from the target groups
- Transparency of operations
- Accountability

The main thrust of the Recovery Plan will be to ensure total risk management while enabling the process of recovery through active community participation.

Chapter VII FINANCIAL ARRANGEMENTS

7.1 BY STATE GOVERNMENT:

As Stated in the section (48) of the DM Act 2005, the State Government shall establish for the purposes of the Act the following funds:

a) State Disaster Response Fund:

This fund will be constituted and made available to the SEC for meeting the expenses for emergency response, relief and rehabilitation.

b) District Disaster Response 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.

c) State Disaster Mitigation Fund:

This fund will be constituted and made available to the SEC for meeting the expenses on mitigation activities.

d) 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.

7.2 By Ministries and Departments of Government of India and State Government:

As per the section (49) of the Disaster Management Act, 2005, the every ministry or department of government of India and the state government shall make provisions in their annual budget for carrying out the activities and programs set out in their disaster management plans.

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.

Grants recommended by 13th Finance Commission for 2011-2012

The 13th Finance Commission has recommended grants of Rs. 1102.28 crore for the State for the year 2011-2012. The grants recommended are:-

1. Disaster Relief Fund: The 13th FC has recommended grant of Rs. 175.55 crore for Disaster Relief Fund of the State (National Calamity Grant) for the year 2011-2012. The State share is Rs. 58.52 crore. The State Revenue Department was requested to ensure the provision of atleast of Rs. 222.92 crore for 2010-11 (RE) and Rs. 234.07 crore in 2011-2012 (BE).
2. Capacity Building: The 13th Finance Commission has recommended the grant of Rs. 5.00 crore for the year 2011-2012 Capacity Building. The SSR

informed that the revenue department has prepared detailed plan. The CS directed the SSR that scheme for capacity building should, inter alia, include mobile no's and other details of key officials and members of the society of flood prone districts in the state.

7.3 THIRTEENTH FINANCE COMMISSION:

The Thirteenth Finance Commission allotted grant to the state during the fiscal cycle of 2010-15 for taking up "activities for building capacity in the administrative machinery for better handling of disaster risk response and for preparation of District and State level Disaster Management Plans (DMPS) as envisaged in the Disaster Management Act(2005). NCCF merged into the NDR Fund and the CRF into the SDR Fund of the respective States.

As per Commission's recommendation, the contribution to the SDR Fund should be shared between the Centre and States in the ratio of 75:25 for general category States and 90:10 for special category States And the provisions relating to the Disaster Management (DM) Act may be reviewed and setting up of these funds left to the discretion of the individual States.

7.4 Implementation of recommendation of 13th Finance Commission.

5 targets containing different activities have been proposed.

Table 52: 5 Targets Containing Different Activities

Targets	Activities	Total Amount
Target 1	Formation of district and state team for disaster response. Funds for recruitment of 20 personnel in 20 districts to work on district/block. Village DM plan and 2 State level for coordination of all activities. Travelling and other administrative expenditure of district team. Purchase of computer and other infrastructure cost (desktop, table, printer, scanner and internet connectivity and stationary expenses.	Rs. 85 lacs
Target 2	Regarding preparation of DM plan at state, district, block and village level costing	Rs. 64 lacs
Target 3	Regarding hazard, risk and vulnerability assessment with the cost	Rs. 1.50 crore
Target 4	Regarding training and capacity building of the state	
Target 5	Regarding procurement infrastructure knowledge management costing	Rs. 50 lac
Grand Total		4,96,60,000

This matter has been discussed with the Finance department to know whether we have to create new Sub Head of expenditure under Major Head 2245 for getting the grant released from Finance Department.

7.5 Annual Work Plan

1. It is proposed to have district emergency response centres. They will respond and disseminate information to various agencies and co-ordinate the response activities. They will be manned by 4 Software and GIS professionals who will prepare district level information data base during peacetime. These centres will pass on the information such as map of area, agencies likely to be involved in rescue, their contact information, record of relief material being dispatched including what type of material. After the disaster these centres will prepare analysis reports for loss and compensation assessment. For this aspect response centres at 10 districts in first phase have been proposed including one at HQ which shall be manned 24 X 7 during emergencies. In case of disaster, these teams shall man and co-ordinate the activities of disaster teams but otherwise they will prepare GIS for their district including layer of information required during disaster.
2. It is proposed to raise a State disaster response team to be stationed at central location so that these team alongwith resources can reach the site of disaster in shortest possible time. This team will be under the administrative control of Director, DM and operational control of Deptt of Civil Defense and Home Gaurds. On the lines of NDRF, they will be imparted trainings in Medical First Responders, Flood Control, Search and Rescue etc. During peace times, they will assist in imparting trainings to general public. The manpower to be either recruited afresh or taken on deputation with the Department of Civil Defense from amongst the newly recruited constables of Punjab Police. PS Home has been requested to confirm if the second option is possible. Decision in this matter may kindly be taken.
3. The village level DM Teams of 20 volunteers of each village is planned to be trained on all types of Disasters and improvisations. They will be trained on temporary flood protection jobs as well. Volunteers shall be paid honorarium of RS. 500 at the end of year and refreshment @ Rs. 100/- for two trainings per year as planned. No of days when their services are used during the disaster these volunteers shall be deployed and shall be paid as per local rates for skilled labour from the State Disaster Response Fund [SDRF]. Individuals who shall be using their tractor for these response operations shall be paid towards the cost of diesel from SDRF.

Proposed Composition of Village teams

Drivers owning tractors-	4
Electricians-	2
Plumbers-	1
Para medical individual-	2 (Preferably one lady)
Individual having net knowledge-	1
Male (Individuals between 18 to 45 years-	8
Females (between 18 to 40 yrs)-	2

4. Media plays a major role in dissemination of information. So it is proposed to recruit one Media Manager for the State headquarter, who will move on site during any disaster. In peace time, he will work towards preparation and distribution of IEC material like leaflets, calendars, documentaries, websites etc.
5. Workshops for stakeholders, doctors, army, civil defence and NGOs on DM.
6. Procurement of essential equipment for search and rescue.

The relief is provided as per the fixed scale by the government. Revised List of Items and Norms of Assistance From Calamity Relief Fund (CRF) And National Calamity Contingency Fund (NCCF) For The Period 2005-10 (MHA Letter No. 32-34/2007-Ndm-I Dated The 27th June, 2007, Modified Vide Latter No. 32-31/2009-Ndm-I Dated 31st July 2009) which is explained in Annexure 4.

PART III

Cross Cutting Issues

Chapter VIII

REVIEW AND UPDATION OF PLAN

The state disaster management plan is a “living document” and the SEC will update it every year taking into consideration:

- The resource requirements
- Updates on human resources
- Technology to be used
- Coordination issues

8.1 State Disaster Management Authority: - State Authority shall have the responsibility for laying down policies and plans for disaster management in the State.

1. Review the development plans of the different departments of the State and ensure that prevention and mitigation measures are integrated. Therein
2. Review the measures being taken for mitigation, capacity building and preparedness by the departments of the Government of the State and issue such guidelines as may be necessary.
3. lay down, review and update State level response plans and guidelines and ensure that the district level plans are prepared, reviewed and updated.

8.2 State Plan

The State Plan shall be reviewed and updated annually.

8.3 District Disaster Management Authority

1. Review the state of capabilities for responding to any disaster or threatening disaster situation in the district and give directions to the relevant departments or authorities at the district level for their upgradation as may be necessary;
2. Review the preparedness measures and give directions to the concerned departments at the district level or other concerned authorities where necessary for bringing the preparedness measures to the levels required for responding effectively to any disaster or threatening disaster situation;
3. Set up, maintain, review and upgrade the mechanism for early warnings and dissemination of proper information to public;
4. Prepare, review and update district level response plan and guidelines;
5. Review development plans prepared by the Departments of the Government at the district level, statutory authorities or local authorities with a view to make necessary provisions therein for prevention of disaster or mitigation;
6. The District Authority shall, review from time to time, the implementation of the Plan and issue such instructions to different departments of the Government in the district as it may deem necessary for the implementation thereof.

8.4 District Plan

The District Plan shall be reviewed and updated annually.

8.4.1 Plans by different authorities at district level and their implementation: Every office of the Government of India and of the State Government at the district level and the local authorities shall, subject to the supervision of the District Authority,

8.5 Responsibilities of departments of the State Government-It shall be the responsibility of every department of the Government of a State to:-

- ✓ Review the enactments administered by it, its policies, rules and regulations with a view to incorporate therein the provisions necessary for prevention of disasters, mitigation or preparedness;

8.6 Disaster management plan of departments of State:-

Every department of the State Government, in conformity with the guidelines laid down by the State Authority, shall-

- ✓ Annually review and update the plan referred to in clause (a); and

8.7 The following guidelines would be adhered to while updating the State Disaster Management Plan:

- A system would be in place to update the plan on an annual basis to ensure that the items requiring updating are considered and are current. This will involve:
- Submission of annually updated disaster management plans by all the DDMA's to SEC.
- Copies of the received updated plans from the districts to be given to the Technical committees, which will be formed as sub-committees of the SEC for review and suggestions.
- Final annual meeting to be organized by the SEC, which will be participated by SEC members, Technical Committee members and all chairpersons of the district DDMA's.
- The updated plan will be placed before SDMA for approval.
- When an amendment is made to a plan, the amendment date would be noted on the updated page of the plan.
- Copies of the amendments made and approved by the SDMA needs to be circulated to all the concerned government departments and agencies.
- All the disaster management liaison officials in every agency would be designated to ensure that all plan-holders are notified of changes as soon as possible.

8.8 Some of the priority areas which need immediate attention or updating from time to time are:

- Preparation of district, block, municipality and Gram Panchayat plans (based on village as the unit of planning)

- Preparation of Standard Operation Procedures and field manuals
- Preparation of handbooks and checklists for prevention, preparedness, response, mitigation activities
- Review existing developmental schemes/ projects and incorporate disaster management principle in all schemes and all plans
- Ensuring sensitivity and incorporation of environment, gender, ethnicity, vulnerability of socio-economically disadvantaged groups (Children, elders and the physically challenged), food and income security, disaster proofing measure in all development, response and recovery plans
- Modernisation of existing control rooms and strengthening of infrastructure in disaster prone areas keeping in mind the vulnerability to different hazards
- Preparation and updating technical and quality control aspects of all civil constructions and non civil installations based on review of past disasters
- Prepare Block level GIS maps giving location of all items/information required for response and recovery measures
- Setting up of State-of-art EOCs at State, District, Block and other strategic points.
- Updating of existing Laws, Rules and Codes for better administration of relief and recovery measures to the affected people during and after a disaster.

The activities and responsibilities of each ESF and detailed disaster-specific modules are some of the priority areas that will be further looked into for fine-tuning the Response and Recovery plans.

This Plan incorporates many new concepts and has tried to build these concepts into the existing framework and functioning of the State Government. The response to a disaster requires indigenous systems as well as effective planning and preparedness strategies. Since the damage and effect of the disasters are so extreme, in case of a response situation, multiple players have to effectively coordinate and communicate with each other for a quick and efficient recovery and control over the emergency situation. However, both the response and recovery measures require detailed and unique planning and implementation strategy from all the stakeholders keeping in mind the local economic, social and cultural variables.

8.9 Schedule and Format for updating Action Taken Reports

DISTRICT	BLOCK	EVENT	DATE	TIME	METEROL OGICAL REPORT	LINE DEPARTMENT REPORT	ACCOUNT OF LOSS IN TERMS OF LIFE, LIVELIHOOD, INFRASTRUCT URE	ACTIO N TAKEN

The above schedule is included for submitting Action Taken Reports at prescribed periodicity, confirming that their components have been duly updated.

Chapter IX

COORDINATION, IMPLEMENTATION AND DISSEMINATION OF THE PLAN

9.1 Plan Evaluation

The responsibility for dissemination of the plan will be with the SEC.

The SEC should also involve state-level NGOs in preparing suitable public awareness material to be distributed to the public.

The State DMP must be disseminated at three levels;

- ✓ National disaster Management Authority (NDMA), multilateral agencies (aid agencies), state line departments and defence services.
- ✓ To the district authorities, government departments, NGOs and other agencies and institutions within the state and
- ✓ Through mass media to the general public.

The content of the plan should be explained through well designed and focused awareness programmes. The awareness programmes should be prepared in the local language to ensure widespread dissemination.

- ✓ Media should be extensively used for public awareness programs. These will include newspapers
- ✓ TV
- ✓ Local cable networks
- ✓ Radio
- ✓ Publicity material

Schools, colleges and other public institutions should be specifically targeted.

The purpose of evaluation of the state plan is to determine

- The adequacy of resources
- Coordination between various agencies
- Community participation
- Partnership with NGOs

The plan will be updated when shortcomings are observed in

- Organizational structures
- Available technology
- Response mechanism following reports on drills or exercises;

9.2 Post-Disaster Evaluation

A post-disaster evaluation should be done after the withdrawal of relief and rehabilitation activities in order to assess

- The nature of state intervention and support,
- Suitability of the organization structure,
- Institutional arrangements,
- Adequacy of Operating Procedures,
- monitoring mechanisms,
- Information tools,
- Equipment,
- Communication system, etc.

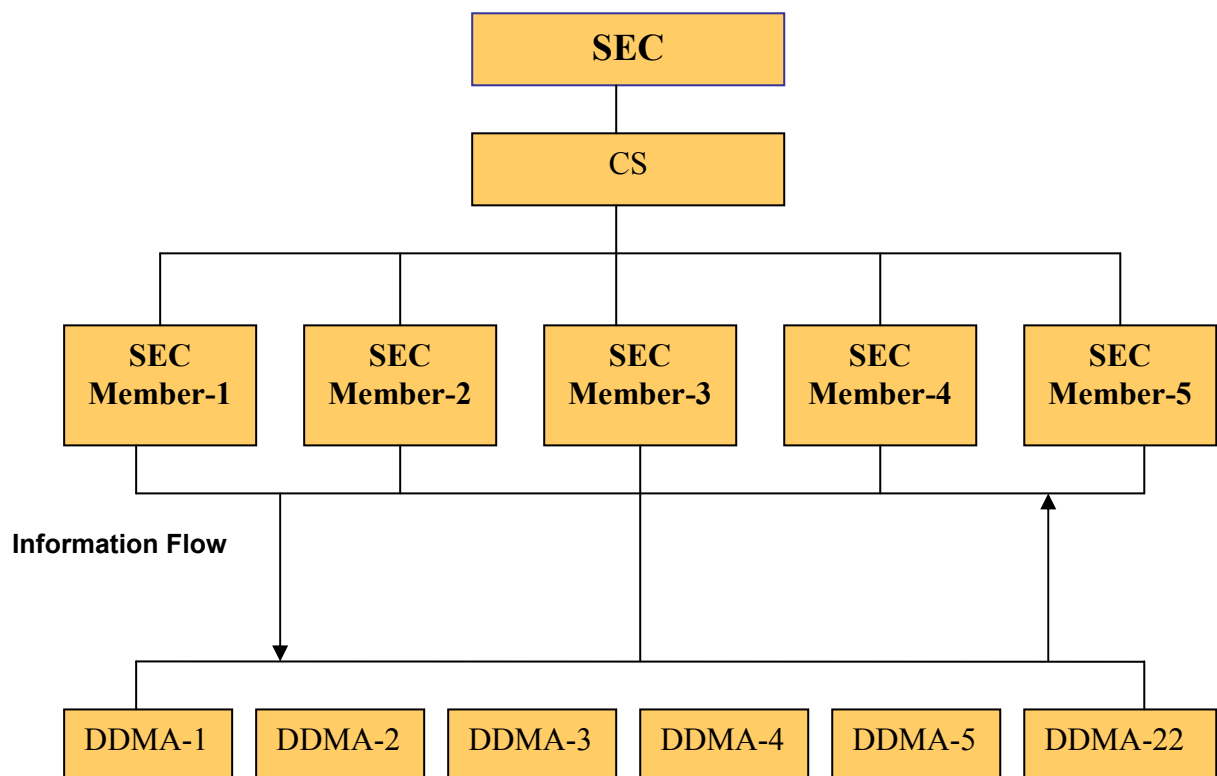
The impact studies on the above operations for long-term preventive and mitigation efforts are to be undertaken.

Evaluation exercises may be undertaken to understand the perceptions about disaster response in terms of

- Adequacy of training
- Alert and warning systems
- Control room functions
- Communication plans
- Security
- Containment
- Recovery procedures
- Monitoring

The evaluation will be done by SEC.

9.3 Coordination with District Disaster Management Authorities



Above flow chart shows the coordination of SEC and District Disaster Management Authorities. SEC members will take information from the DDMA and vice-versa and then give this information to the CS and then to the SEC.

9.4 State Disaster Management Authority

- coordinate the implementation of the State Plan;

State Executive Committee

- Make a policy environment so that Disaster Risk Reduction strategies and practices can be implemented.
- coordinate and monitor the implementation of the State Plan and the State Policy;
- monitor the implementation of disaster management plans prepared by the departments of the Government of the State and District Authorities;
- monitor the implementation of the guidelines laid down by the State Authority for integrating of measures for prevention of disasters and mitigation by the departments in their development plans and projects

9.5 District Disaster Management Authority

- coordinate and monitor the implementation of the State Policy, State Plan and District Plan;
- monitor the implementation of disaster management plans prepared by the Departments of the Government at the district level;
- lay down guidelines to be followed by the Departments of the Government at the district level for purposes of integration of measures for prevention of disasters and mitigation in their development plans and projects and provide necessary technical assistance therefore;
- monitor the implementation of measures referred to in the above clause;
- The District Authority shall, review from time to time, the implementation of the Plan and issue such instructions to different departments of the Government in the district as it may deem necessary for the implementation thereof.

9.6 Plans by different authorities at district level and their implementation

Every office of the Government of India and of the State Government at the district level and the local authorities shall, subject to the supervision of the District Authority, -

(a) Prepare a disaster management plan setting out the following, namely:-

(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 organisations at the district level including local authority, communities and other stakeholders;
- (c) Regularly review and update the plan; and
- (d) Submit a copy of its disaster management plan, and of any amendment thereto, to the District Authority.

Responsibilities of departments of the State Government

- Make provision for resources in consultation with the State Authority for the implementation of the District Plan by its authorities at the district level;

Disaster management plan of Departments of State

Every department of the State Government shall furnish an implementation status report to the State Executive Committee regarding the implementation of the disaster management plan.

As disasters affect to the whole society, therefore, to implement the plan, vertical and horizontal linkages are required between Government Departments, NGOs, CBOs and local bodies and scientific and technical institutions.

The State Disaster Management Committee have been constituted with Departments of Home, Transport, Health & Family, Agriculture, Food & Supplies, Science & Technology, Irrigation & Waterways, Public Works Department, Municipal Affairs, Urban Development, Public Health & Engineering, Animal Husbandry, Power, Fisheries, Forest, Finance, Panchayat & Rural Development, Environment & Pollution Control Board, Housing, Women-Child Development-Social Welfare, Punjab Municipal Corporation, DG & IG – Police, IAF, BSF, GSI, Indian Oil Corporation.

NGOs like Indian Red Cross Society, St. John Ambulance and other scheduled NGOs and CBOs also take active part right from mitigation, preparedness to rescue, rehabilitation programmes. There lies the need of co-operation and co-ordination both vertically and horizontally.

ANNEXURES

ANNEXURE 1

ACTION PLAN FOR FLOODS

INTRODUCTION

There are three perennial rivers namely rivers Ravi, Beas & Sutlej and one non-perennial river namely River Ghaggar in the State. Besides several Choes, Nadies & Khads also traverse the Sub mountainous & alluvial plains before outfalling into Parent River. Multipurpose storage reservoirs stand constructed on River Sutlej at Bhakra, River Beas at Pong and Ranjit Sagar Dam on river Ravi. Due to construction of Dams on the three rivers, the menace of flash floods has been considerably reduced but flash floods are still experienced in river Ghaggar due to non-construction of dam on this river. The Drainage Administration is entrusted with the work of maintenance and repair of 1800 Km. long Flood Protection Embankments (Dhusis), 3800 No. River Training Works & 7238.13 Km long Drainage system.

RIVER RAVI

River Ravi has its origin and catchment area in Himachal Pradesh and enter Punjab just upstream of Ranjit Sagar Dam. Ever since the signing of Indus water treaty of 1960 the waters of river Beas and Sutlej could only be harnessed and resultant construction of Ranjit Sagar Dam thereby reducing floods to large extent. River Ravi flows almost along Indo-Pak Border and traverses through the districts of Gurdaspur and Amritsar. Although the Ranjit Sagar Dam has been completed and chances of floods in River Ravi have consequently been reduced to some extent, but the areas downstream of the outfall of River Ujh and Jalalia and other natural Streams on the right side from Jammu and Kashmir, still continue to suffer flood damages as these two rivers are natural high velocity flashy torrents. River Ravi causes lot of destruction in Punjab area in Narot Jaimal Singh block on its right side in Districts Gurdaspur and other cropped area and culturable land on the left side in Districts Gurdaspur and Amritsar. The Vital Defence installations like BOP's Border Fencing, Border Lighting etc. are located on Flood Protection Embankments along the river. There is constant requirement of Flood Protection Remedial Works so that the river flow is maintained away from the embankment. Besides, the Natural slope of the terrain being north west to south east the Pakistan is at an advantageous position and the river training works are executed with a motive to deflect the river towards Indian territory. The fertile lands and abadies of villages are prone to flooding, as any breach in the embankment can change the course of river. The Financial assistance from Govt. of India for taking up flood protection Works on river Ravi has to be liberal and manifold.

RIVER SUTLEJ

River Sutlej originates from Mansarovar and has its catchment in Himachal Pradesh. It is 75% snow fed and 25% rain fed. It was dammed in sixties. Although the flood potential of this river has decreased from its pre-dam stage of 7 to 8 Km. of river bed to 2 to 3 Km.

in the post-dam stage with the construction of embankments on both sides, yet with the contribution of high floods from Swan, Sirsa, Budki Nadies and other drains and Nallahs in the downstream of the Bhakra Dam, the flood intensity in the River Sutlej can increase to an extent of 3,50,000 cusecs even when there are zero releases from the Bhakra spill way. The high and especially low flood discharges cause heavy damage to cropped area and culturable land on both sides along flood protection embankments, throughout its length from Ropar to the Indo-Pak Border (in District Ferozepur). The Districts affected are Nawanshehar, Jalandhar, Kapurthala on the right side and Ropar, Ludhiana, Moga and Ferozepur on the left side. After construction of earthen embankments on both sides, more than One lac. Acres of agricultural land has been reclaimed. In order to protect this land, Flood Protection Works need to be executed on regular basis. The entire reclaimed land (in a length of 400 Km) which has been put to agricultural use and habituated areas are continuously affected due to meandering action of the river.

It is worth mentioning that all the land in river bed itself (except under Flood Protection Embankments) is privately owned by local farmers and any damage or erosion of their culturable land hurts them a lot, being their only source of livelihood. It is for this reason that these farmers look forward to Financial institutions, State/Central Govt. to help them from flood damages by construction of flood protection works along the rivers when they enter the alluvial plains of the state.

RIVER BEAS

River Beas has its origin in the upstream mountainous areas of Manali in Himachal Pradesh and is mainly rainfed. This river has been dammed since seventies, thereby reducing the floods devastation in the downstream areas of Districts Hoshiarpur, Gurdaspur, Kapurthala, Amritsar and Taran Taran. But Soan Khad, River Chakki, Langerpur Group of Choes etc. outfall into River Beas downstream of the Pong Dam. These flashy torrents sometimes carry high floods during monsoon with heavy rainfall in their catchments areas. This river has isolated flood protection embankments – on right side in District Gurdaspur and on left side in District Kapurthala (there being a Dhaya on the right side, a natural high edge upto about 30 feet height), before it joins river Sutlej on its right side just upstream of Harike Head Works (Amritsar-Ferozepur Highway). The river with a length of 180 Km. in the State causes damage/erosion to the fertile land (cropped area). There is always a persistent danger of flooding/land erosion along the river which has to be tackled on priority.

RIVER GHAGGAR

River Ghaggar is a non-perennial Inter-State River, emanating from the lower Himalayas near Dharampur to Dagshai in Himachal Pradesh, flowing through the Shivaliks in Haryana State and entering Punjab near Mubarkpur in the Dera Bassi

Block of District Patiala. The river after entering the plains flows in a criss-cross manner, till it reaches Rajasthan, where it disperses in Sandy dunes. Till date, no dam has been constructed on the river due to a variety of reasons. The River Ghaggar and its Tributaries cause damage frequently to the agricultural lands as also to hebetated areas. The carrying capacity of the river within cut section is about 15000 cusecs whereas flood discharge upto more than 1.00 lacs cusecs often pass through the river. Thus fertile land on other sides is adversely affected during floods.

There has been flooding of vast tracts of land along River Ghaggar in the Districts of Patiala, Sangrur and Mansa. There is a potential obstruction to the free flow of river caused by SYL Canal, Bhakra Main Line and Bhakra Main Branch. The Drainage Crossing under these canals needs remodeling. The total length of river in Punjab is 165 Km.

HISTORY OF FLOODS

Year	No. of Villages/ town affected	Area affected in sq. kms	Population affected	Human lives lost	Cattle heads lost (No.)	Damage caused to area under crops (hects)	% of damaged area to total cropped area	Value of crops damaged (Rs. '000)
1960	2540	4638	1383796	19	311	361383	7.64	98914
1961	1792	2093	888687	13	47	200792	4.18	47983
1962	7203	15057	4301826	95	2035	957950	19.27	246035
1963	284	493	112658	5	7	14347	0.29	4723
1964	2626	8585	1733989	39	525	322787	6.31	150066
1965	16	7	1200	1	-	222	0.01	150
1966	1457	2110	770234	19	211	81265	1.57	58756
1967	419	-	-	1	13	41857	0.77	26684
1968	540	689	284718	7	2	62347	1.18	49188
1969	205	431	362758	19	157	20336	0.37	16593
1970	176	118	7541	1	5	6987	0.12	3088
1971	1227	617	336959	23	164	244083	4.26	31930
1972	68	139	6878	5	6	3369	0.57	4804

1973	1046	1651	370788	27	219	126024	2.09	70668
1974	14	120	5000	-	3	30	-	-
1975	1243	1297	479205	35	432	74759	1.19	104900
1976	3153	3564	1621426	129	1821	223578	3.56	364011
1977	373	114	233884	11	96	9476	0.15	6922
1978	1585	1450	368644	17	148	108924	1.70	220495
1979	25	19	5113	-	-	1775	0.43	4438
1980	1191	489	85724	44	117	48930	0.72	6559
1981	328	-	55579	6	37	12497	0.18	14435
1982	9	-	451	1	-	46	-	29
1983	240	39089	269548	13	27	37138	0.53	69809
1984	439	33	18794	-	1	3257	0.05	5603
1985	5274	8270	1716628	153	2805	269683	3.77	472898
1986	402	516	163503	7	14	51518	0.71	59531
1987	-	-	-	-	-	-	-	-
1988	341	741	20300	10	200	74125	10.52	25300
1989	-	-	-	-	-	-	-	-
1990	755	471	90465	13	275	47078	9.75	251086
1991	-	-	-	-	-	-	-	-
1992	459	34	47038	10	-	33762	0.45	283400
1993	5017	7977	3560122	359	8586	203957	2.68	-
1994	469	-	29451	41	369	33348	0.43	36730
1995	6585	2788	2120990	157	1310	275761	3.59	1126531
1996	-	-	-	19	1	15529	0.30	68872
1997	677	-	-	28	100	97950	1.24	366932
1998	-	126	176	22	14	8816	0.11	27564
1999	30	29	-	12	-	2764	-	12959
2000	81	127	319	5	88	12620	0.16	77116
2001	-	-	-	-	-	-	-	-
2002	-	-	-	-	-	-	-	-
2003	43	47	25	3	-	14	0.06	16784
2004	480	610	60157	15	511	46561	0.59	517010
2005	480	610	60157	15	511	46561	0.59	517010

2006	442	211	405933	10	23	21297	0.27	172539
2007	1033	1035	405911	7	3	70407	0.67	582995
2008	2001	5004	389116	34	104	70488	0.90	645084
2009	545	14967	118796	15	74	17599	12.56	279475
2010	1884	218337	101186	37	107	257657		

LIST OF VULNERABLE SITES

Name of river/choe/ Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
JALANDHAR DRAINAGE CIRCLE, JALANDHAR				
Sutlej (Right Side)	Rail Majra (1000-9000/1-R)	Tajowal, Rail Majra	Balachaur	Nawanshehar
	Pragpur Complex (28000-35000)	Mutton, Mander, Pragpur etc.	Balachaur	Nawanshehar
	Dugri Complex (45000-55000)	Dugri, Mahmoodpur, Thathal, Garion Bet	Balachaur	Nawanshehar
	Dhangerpur Complex (62000-68000)Malikpur	Aulipura Buraj Chak, Kangan bet, Chak Illahi Baksh and Malikpur	Balachaur	Nawanshehar
	Tajowal,Manadala Complex 76500-83500	Mandala, Mehandipur, Kalan, Shampur, Chandi etc.	Balachaur	Nawanshehar
	Kanon Complex RD 101500-106000	Saidpur, Hussaainpur, Nijatpur, Shekh Majara	Balachaur	Nawanshehar
	Mirjapur Complex RD 117000-121000	Mirjapur, Bairsale, Ratnana, Ibrahimpur	Balachaur	Nawanshehar
	Talwandi Sabo/ Lallewal RD 126000-132000	Talwandi Sabo etc.	Balachaur	Nawanshehar
	Jhugian 141000-144000	Jhugian	Balachaur	Nawanshehar
	Begowal, Burj Tehsal Dass RD 148500-157000	Begowal, Burj Tehal Dass, Panderawal	Phillaur	Jalandhar
	Sholley Bazar complex (200000-205000)	Sholley bazaar, Fatehpur, Achan Chak, Phillaur Town etc.	Phillaur	Jalandhar
	Meowal Mau Sahib Complex (19000-33000/2-R)	Meowal, Mau Sahib Bhollewal	Phillaur	Jalandhar
	Sangowal (Phillaur) Complex (44000-52000/3-R)	Sangowal Kallan	Phillaur	Jalandhar
	Gadra Bhoda	Gadra Bhoda, Kaiwia,	Phillaur	Jalandhar

Name of river/choe/ Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	Complex (7000-10000)	Dhagara		
	Sangowal (Nakodar) Complex (39000-43000/3-R)	Sangowal, Jhugian, Nakodar Mahdepur	Nakodar	Jalandhar
	Lohgarh Complex (51000-56000)	Lohgarh, Adarman, Parjain	Nakodar	Jalandhar
	Khera Fauja Singh Complex (56000-59000)	Khaira Fauja Singh	Nakodar	Jalandhar
	Danewal Complex (77000-80000)	Danewal, Baupur etc.	Nakodar	Jalandhar
	Thamuwal Complex	Thamuwal, Bheopur, Shallapur	Shahkot	Jalandhar
	Rajewal Complex (118000-121000)	Thamuwal, Bheopur, Shallapur, Rampur etc.	Shahkot	Jalandhar
	Pipli Miani Complex (124000-125000)	Rame Chak, Rajewal and Talwandi Bhotian	Shahkot	Jalandhar
	Ismailpur Complex (140000-148000)	Ismailpur, Fatahpur etc.	Shahkot	Jalandhar
	Bhanewal Complex (161000-165000 & 174000-181625)	Chak wadala, Mandiala Chhanna	Shahkot	Jalandhar
Sutlej (Left Side)	Shergarh complex (55000-60500/3-L)	Shergarh, Khanpur, Sherpur, Burj, Riar Majri etc.	Shahkot	Ludhiana
	Dhullewal Complex (67500-79500/3-L)	Mand, Dhullewal, Dulatpur, Issapur, Ramgarh, Khanpur, Ghumana etc.	Shahkot	Ludhiana
	Mikkowal Complex (84000-91000)	Badhowal, Jassowal, Panj Garian, Ghumana, Issapur etc.	Shahkot	Ludhiana
	Issampur complex (98000-102000)	Badhowal, Jassowal, Panj Garian, Ghumana, Issapur etc.	Shahkot	Ludhiana
	Ghumana Complex (105000-117000)	Mahal-Ghumana, Tuajh, Mand Udhawal, Ghumana, Satiana, Ghumana etc.	Shahkot	Ludhiana
	Mand Chotta complex (118000-128000/3-L)	Mand Chotta, Geonowal, Baniwal, Kadiana, Machhian Kalan.	Shahkot	Ludhiana
	Mattewara Complex (130000-145500)	Mattewara, Burj Mattewara, Rour, Ballipur, Meowal	Shahkot	Ludhiana
	Rour Complex (160000-165000)	Rour, Sashali, Gaddapur, Gaunsgarh, Habass, Mangli, Tanda	Shahkot	Ludhiana
	Bount Complex	Bount, Chuharwal,	Shahkot	Ludhiana

Name of river/choe/ Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	(178000-182000)	Sattowal, Dharri, Sujatwala, Kanjja, Seera, Bajrha etc.		
	Jamalpur Lilly Complex (194000-200000)	Talwandi, Fatehpur, Bahadur Ke, Jamalpur Lilly etc.	Shahkot	Ludhiana
	Seed Farm Complex No.1 (0-10000)	Central State Seed Farm Ladduwal, Razapur etc.	Shahkot	Ludhiana
	Seed Farm Complex No.2 (10000-20000)	Seed Farm, Noorpur, Bagga kalan etc.	Shahkot	Ludhiana
	Razapur Complex (19000-41000)	Razapur, Noorpur, Khera Bet, Gorsian, Burj Khanpur, Gaunspur etc.	Shahkot	Ludhiana
	Khera bet Complex (42000-46000)	Khera Bet, Gorsian, Burj, Lambra, Noorpur, Salimpur etc.	Shahkot	Ludhiana
	Mannewal Complex (46000-62000)	Mannewal, Ghamnewal, Talwandi, Habhrara etc.	Shahkot	Ludhiana
	Talwandi Complex (63000-66000)	Talwandi, Ahliwal, Ghamnewal, Habhara etc.	Shahkot	Ludhiana
	Rampur Complex (0-2500/5-L)	Kot Manna, Bhandari, Rampur, Ahliwal.	Shahkot	Ludhiana
	Huzzara Complex (30000-35000/5-L)	Huzzara, Biharipur, Bhainni Arian, Gagkalan etc.	Shahkot	Ludhiana
	Madhepur Complex (44000-55500/5-L)	Madhepur, Salampura, Sidhwan Bet, Bhaini Arian, Perjian etc.	Shahkot	Ludhiana
River Beas	Bein Bandh (14000-19000, 22000-35000 & 36000-42000)	Passi, Bet-Aki-Tunde Rajpur and Safderpur, Kawanwali, Khole, Gosian Chak, Lalewal, Midhian etc.	Dasuya	Hoshiarpur
	Mirthal to Begpur	Motla, Haller, Janardhan, Khollian, Mehtabpur, Miani, Naushehra, Tigger, Mirpur, Chakwal, Dhanya, Himatpur, Terkiana, Nai Chak, Bhikhowal, Begpur etc.	Mukerian	Hoshiarpur
	Mand Kulla Complex (9000-14000, 45000-46000 U/s Dhilwan)	Mand Kula, Nangal Lubana, Chaugawan, Raipur Arian.	Bholath	Kapurthala
	Mand Chakaki Complex (52000-57000)	Mand Chakoki-Mansoorwal, Batala, Majaffarpur etc.	Bholath	Kapurthala
	Dhilwan Complex (74000-79000)	Dhilwan Magewal	Bholath	Kapurthala

Name of river/choe/ Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	Kishan Singh Wala Complex (0-37000)			
	Advance Bundh-I (39000-42000)	Desal, Sabka Mand Desal, Puh Mandi and Amritpur	Bholath	Kapurthala
	Advance Bandh-II (Talwandi Chaudharian)	Channa Sher Singh, Channa Ujjagar Singh, Talwandi Chaudharian, Chuladha Passan etc.	Sultanpur	Kapurthala
	F.P.Bandh D/s Dhilwan (121000-134700)	Chak Hazara, Kabirpur, Lakhwarian	Sultanpur	Kapurthala
	RD 135000-152000	Chak Hazara, etc	Sultanpur	Kapurthala
	West Bein			
	RD 28500-43000 R/S	Ahli Kalan, Alluwal	Sultanpur	Kapurthala
	RD 28500-43000 L/S	Bharuana	Sultanpur	Kapurthala
	Gidderpindi Extn.bandh (9000-20000)	Tibbi, Tikkia	Sultanpur	Kapurthala
	East Bein			
	RD 27000-36000 R/S	Lohian, Gidderpindi, Mandiala etc.	Shahkot	Jalandhar
	RD 0-10950 L/S	Mundi Sheharian, Mundi Chollian, Mundi Kassu	Shahkot	Jalandhar
Nasrula Choe	22000-51000 & 6000-73000 (Left & Right side)	Daroli Kalan, Khiala, Kalra, Ucha Dhinga	Shahkot	Jalandhar
	U/S City bridge L/s RD 0-17000 R/s RD 8000-11000	Purani Passi, Satwal, Bassi Gulam Hussaian, Sukhiabad.	Shahkot	Hoshiarpur
	D/S City bridge L/s RD 17000-25000 R/s RD 0-15000	Dgana Kalan, Dogana Khurd, Khalwana, Taragarh, Badial, Hargarh, Taragarh, Talwandi etc.	Shahkot	Hoshiarpur
MehLanali Choe	D/s L/s Railway X-ing RD 5000-8000	Meghowal	Shahkot	Hoshiarpur
	U/s Badla Bridge L/s RD 23000-25000	Patti	Shahkot	Hoshiarpur
	U/s Badla Bridge R/s RD 25000-38000	Harmoya	Shahkot	Hoshiarpur
	U/s Badla Bridge R/s RD 39000-41000	Rajpur Rhyian, Badla Rajpur Bhyian		
	D/s Badla Bridge R/s RD 44000-49000	Badla Harts,	Shahkot	Hoshiarpur
	D/s Badla Bridge R/s 51000-53000	Mukhliana		
	D/s Badla Bridge R/s 54000-55000 L/s RD	Doraha		

Name of river/choe/Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	57000-59000			
Mehangarwal Choe	160000-170000/R/L 148000-158000/R/L	Chak Gujran, Kailan, Khude, Takhni, Hariana Town.,	Shahkot	Hoshiarpur
	148000-146000	Dadianaq, Sherpur	Shahkot	Hoshiarpur
	133000-137000 & 95000-114000	Begpur, Lambea, Bariana, Kangri, Manak Kheri, Khanpur sahota Sarhala Mundian etc.	Shahkot	Hoshiarpur
Arniala Choe	10000-25000, 5000-10000	Barota, Arniala, Hussianpur Bassi Saincha, Bhagowal Nai Bassi, Bassi Ballo etc.	Shahkot	Hoshiarpur
	Gambowal Choe 0-10000	Gambowal	Shahkot	Hoshiarpur
Gangian Choe	90000-150000	Badal	Shahkot	Hoshiarpur
FEROZEPUR DRAINAGE CIRCLE, FEROZEPUR				
River Sutlej	Gidderpindi Complex (0-20200-Advance Bandh)	Chak Khana, Barah Suleman, Bundala, Bhogewala		Ferozepur
	RD 0-2515 (FPE Bandh)	Chak Khana, Barah Suleman, Bundala, Bhogewala		Ferozepur
	Mano Machi Complex) RD 0-2000-Advance Bandh 0-16800	Bhupwala, Mehmoodwala		Ferozepur
	Ruknewala Complex) RD 17000-23260 Advance bandh RD 0-23860 and 0-3400 of retired bandh	Ruknewala Kalan, Bhutti Wala		Ferozepur
	Gatta Badshah Complex RD 7000-20000 FPE bandh D/s Harike Head Works	Dhindsa, Gatta Badshah, Fatehgarh Sabhran		Ferozepur
	MuthianWala Complex opp. RD 70000-85000 FPE band D/s Harike Head Works	Hamidwala, Usmanwala, Nizam Wala		Ferozepur
	BOP Muhammadiwala and Kassoke complex 0-5000-Advance bandh RD 0-46895 U/s Hussianiwala H/Works	Palla Megha, Nihal Wala, Dul Chike, Langiana		Ferozepur
	Site Near BOP	Palla Megha, Nihal		Ferozepur

Name of river/choe/Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	Muhammadiwala	Wala, Dul Chike, Langiana		
	Site Near BOP Kassoke	Palla Megha, Nihal Wala, Dul Chike, Langiana		Ferozepur
	DT Mal Complex 12000-20000 FPE bandh RD 0-32000	Done Telu Mal, Gandu Killan, Hithar.		Ferozepur
	BOP Joginder & Gazni wala complex Site Near BOP Joginder	Gatti Matter, Raoke Hithar		Ferozepur
	Site Near BOP Gazniwala	Gatti Matter, Raoke Hithar		Ferozepur
	Chak Bamniwala Complex 114000-124000-5L bandh	Chak Singh Pura, Chamb, Bijapur		Moga
	Sherewala complex 135000-140000 5L bandh	Manzali, Rehrwan, Said Jalal		Moga
	Sanghera Complex 27400-34000 of Gidderpindi bandh	Milak Kangan, Madarpur, Boghewala		Moga
AMRITSAR DRAINAGE CIRCLE, AMRITSAR				
River Beas	Ring Bund RD 0-23500 U/s Railway X-ing Dera Baba Jaimal Singh Complex.	Chita Sher Budha Theh, Waraich, Dera Baba Jaimal Singh	Baba Bakala	Amritsar
	Verowal bund reach RD 6000-11000 on R/s	Verowal, Hansalwali, Keri Bodal and Othian	Khadur Sahib	Amritsar
	Goindwal Singh bund RD 0-9300 Flood protection embankment on R/s	Goindwal Sahib	Khadur Sahib	Amritsar
	Fatta Kulla			Gurdaspur
	Bahadurpur Rajoa			Gurdaspur
	Fattu Barkat Aulakha 120850-1217009			Gurdaspur
	Fattu Barkat 118470-120000			Gurdaspur
	Fattu Barkat 114000-116900			Gurdaspur
	Chichian Talwandi opp. RD 20000			Gurdaspur
	Chichian Talwandi 0-7300 enclosure bandh			Gurdaspur
	Bianpur Gulleria RD 11400			Gurdaspur
	Kishanpura RD 69800			Gurdaspur

Name of river/choe/ Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	Rampur Talwara Samrai U/s Shri Hargobindpur Bridge Ganduwal			Gurdaspur
River Sutlej	RD 6000-9500 FPE D/s Harike Head Works	Bhu, Kutiwala and Harike	Patti	Amritsar
	RD 25000-42000 FPE on R/s D/s Harike H/Works	Sabraon, Kulewal, Bhoor, Hithar, Gadaike, Dhalake	Patti	Amritsar
	RD 0-4000,21000- 33000 FPE & spurs, studs D/s Patti Nallah	Ram Singh Wala, Sitto	Patti	Amritsar
	RD 0-2500 Dhaya Bund	Mehandipur	Patti	Amritsar
River Ravi	RD 3000-3500 R/s			Gurdaspur
	FPE works Narot spur Gogran Chak Hari Rai and Maksoospur			
	RD 40000-50000 R/s			
	Advance bandh opp. RD 31500-36500 R/s opp. RD 53000-61000			
	FPE works Gajju Jagir above Trimmu Road.			
	Tarpur complex			
	Makaura Pattan			
	Puthia bandh and Nam Nehar bandh			
	Kiri Mehra and Kathlour			
	Spur RD 8000 FPE above RD 0-260000 (Chauntra complex)			
	Spur RD 30745 FPE above DBN RD 0- 12000 and 16500- 18500)			
	Main FPE from RD 15000-50000			
	Rosse complex RD 75850-78000			
	Adhian Complex			
	Bharial R/s			
River Jallalia	Protection works on Mutthi Masaal Bharwan & Ram Kelwan			Gurdaspur
River Ujh	FPE works U/s village Samrala Manwal			Gurdaspur

Name of river/choe/Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
	Bhakri spur & Paharipur Tash Pattan, Kajle Bhariyal			
River Chakki	Narainpur to Saili Kullian (R/s),			Gurdaspur
	Nangal Bhur to Abadgarh (L/s)			Gurdaspur
PATIALA DRAINAGE CIRCLE				
River Ghaggar		Surjan, Bheni, Honda, Bushera, Malror Shaib, Mandvi, Andana, Nawan Gaon Hotipur, Rasauli, Kangthala, Segra, Taipur, Gurunanakpura etc.		
Sirhind Choe	176000-19000 204500-221800	Dharamgarh, Sataouj, Jakhepal, Bass Jhokebas, Dhaliwalbas, Humblebas, Ghassiwala, Rattangarh, Sunam, Sheron. Tibbi etc.		
	240000-283000 294000-298000 304000-312990	Chathe Nakte Sunam, Mehlan Mard Khera, Illwal, Kheri Kularan, Balwar, Gharachon, Ghabdon, Kalaudi, Sajuma, Gaggarpur		
Baharpur Singh Wala Drain	83960-87000 94800-98500 161500-291100	Longowal Benra, Dhura, Saron, Chaunda, Amargarh, Issi etc.		
Bhagwan Pura Link Drain	2000-90000	Sharon Kaulsari, Cheema Meemsa Bhawanpura etc.		
Dhanula Drain	20000-57000	Dhanuala Drain		
Zoo bandh		Chatt Bir Zoo		Patiala
River Ghaggar	RD Village Mubarkpur	Village Mubarkpur		Patiala
	Village Bhankarpur	Village Bhankarpur		Patiala
	Village Site	Village Nanheri		Patiala
Bhagna Nadi	RD 0-10000			Patiala
Right Ghaggar Bund RD 0-40000	RD 14000-16000 RD 20000-21000 RD 28000-31750	Basma, Tepla, Rajgarh Basma, Tepla, Rajgarh Basma, Tepla, Rajgarh, Jharon, Budhanpur, Nagla	Rajpura	Patiala
Banur Drain RD 0-31000	RD 2000-3600 RD 9500-11500 RD 14000-17000 RD 19500-22500	Banur Mulka Banur Mulka Banur Mulka Banur Mulka	Rajpura	Patiala
Tangri Nadi		Khallon	Patiala	Patiala

Name of river/choe/ Nallah/drain	Vulnerable reach/site rd & name	Village likely to be affected	Tehsil	District
(Khallon Band)				
Urmla Nadi (Sarangpur Spur)		Sarangpur	Patiala	Patiala
L.M.B(Nr.Br.)	RD 300-3000 RD RD 1000-13000 RD 28000-29000	Kamakpur Kapuri Rampur Rampur	Patiala	Patiala
Dhakansu Bandh/Nallah	RD 61-87	Shamdoo, Mehtabgarh Jan, Jansui, Nepran, Rajpura City	Rajpura	Patiala
Pachisdara Nallah/Bandh	23800-56000		Rajpura	Patiala
Tangri Nadi	Left Tangri Bandh RD 38-42, 15-18, 43-52, 55-59500, RD 68130-73858	Katauli, Auhjan, RattaKhera, Khansa, Mohalgarh	Dudhansadhan	Patiala
	Right Tangri Bandh RD 13-15, 25800-28000, RD 32-35, RD 57400, RD 29000	Rurkee, Rohar, Dudhan, Adaltiwala, Alipur, Maghar, Shaib	Dudhansadhan	Patiala
Markanda	Right Markanda bandh RD 12-15, 16-20	Kharabgarh, Dodhpur, Bhipur and Budhmopur	Dudhansadhan	Patiala
Ghaggar	Left Marginal Bandh RD 57400, RD 64, RD 91900, RD 81400	Arnetu, Urlana, Parta, Majri, Dabankerli, Maru, Devigarh, Handna	Samana	Patiala
	Ring Bandh Maru, Shankargiri Colony, Devigarh, Vill Hadana			
Patiala Nadi	Ist Defence bandh RD 10-13, 17-22, 37-38, 44600	Patiala City	Patiala	Mansa
	Iind Defence Bandh RD 30500, 26 and 23-24			
	Jhamboki Bandh RD 0-5000			
Ghaggar	460 U/s of old stud near village Ahlupur	Ahlupur	Sardulgarh	Mansa
Ghaggar	418 D/s of old stud near village Ahlupur	Ahlupur	Sardulgarh	Mansa
Ghaggar	L/s Opp. Villa Dhiggana	Dhigana	Sardulgarh	Mansa
Ghaggar	Chandpur Bandh	Chandpur	Falls Haryana State	Mansa
		Gorkhnath	Bhudlada	Mansa
Sirhind Choe	U/s & D/s at V.R Bridge RD 124500	Borwal	Bhudlada	Mansa

CONTINGENCY PLAN FOR FLOODS

Each district of Punjab State has made Contingency plans for floods in which flood protection and drainage system, flood causes and intensity, flood prone areas, flood protection works, flood preparedness, etc is explained.

SEARCH AND RESCUE TEAMS

The local community in the affected neighbourhood is always the first responder after a disaster. Experience has shown that over 80 per-cent of search and rescue is carried out by the local community before the intervention of the state machinery and specialised search and rescue teams. Thus, the Department of Revenue, Rehabilitation and Disaster management, Punjab is conducting the Flood Rescue and First-Aid Trainings to the 30 volunteers in each district of Punjab, who are trained through National Disaster Response Force, Bathinda, Civil Defence Training Institute, Mohali and Indian Red Cross Society, Punjab. Those found good can be designated as District Disaster Response Force [DDRF]. The district disaster response force would be fully trained and fully equipped Teams who can serve as master trainers for communities during peace times.

PRE-FLOOD ARRANGEMENTS:

This is the most important stage of action. The collector or the emergency officer so allotted shall himself look to these arrangements in the month of July to September. The following aspects need his attention:

- Covering a meeting of the State level committee on Natural calamities in the month of July to September to review the precautionary measures taken or proposed to be taken against the possible flood.
- Functioning of the control room.
- Closure of past breaches in river and canal embankments and guarding of weak points
- Communication of gauge readings and preparation of maps and charts.
- Dissemination of weather reports and flood bulletins issued by the meteorological Centre and central flood forecasting Division at Bhubaneswar.
- Deployment of boats at strategic points.
- Use of powerboats.
- Installation of temporary police outposts, wireless stations and temporary telephones in flood prone areas.
- Arrangement for keeping telephone and telegraph lines in order.
- To estimate food reserves available (including unharvested crops)
- Storage of foodstuff in interior vulnerable strategic and key areas.

- Arrangement of dry foodstuff and other necessities of life.
- Arrangement for keeping drainage system clean to avoid blockage of water flow.
- Agricultural measures.
- Health measures.
- Selection of flood shelters.

Mock-drill for the taskforce as well as for the people in severe flood-prone area.

- Review of pre-flood arrangements.
- Look into proper and timely dissemination of flood warning.
- After receiving warning signal, quick arrangement for evacuation to a safer place.
- Crisis Management Procedure

ARRANGEMENTS DURING FLOOD:

- Relief parties for relief and rescue operations maybe sent out.
- Emergent relief and shelter to the people in distress may be provided.
- Daily reporting of the flood situation.
- To maintain law and order to prevent looting and crime this could add to the miseries of the victims and cause further damage.
- To organize and distribute food.
- Provision of tent or tarpaulin as temporary shelter.
- Accommodating groups of homeless people in community building such as schools.
- Medical assistance.
- Clearance and access - To clear roads, rail tracks etc in order to allow access for rescue and relief teams in the immediate vicinity of the disaster struck area.
- Temporary subsistence supplied such as clothing, cooking utensils etc, so as to enable victims to subsist temporarily in their own area.
- Public information- To keep the stricken community informed on what they should do, especially in terms of self-help.
- To prevent wild speculation and rumours concerning the future situation that may lead to unnecessary fear and mental stress to the people.

POST-ARRANGEMENTS OF FLOOD:

- Disposal of dead bodies and carcasses.
- Restoration of communication and power supply.
- Provision of safe drinking water.
- Making urgent repair to some buildings
- Land use control planning.
- Construction of reservoirs, dams, dykes, alternative drainage sources.
- Construction of structures over silts, elevated drainage sources.
- Assessment of damage.
- Grow plants and trees near the banks of water sources like pond, river etc.

- Encourage people to build houses on raised mounds and not on frequently submerging areas.

FLOOD LEVELS IN PUNJAB

Sr. No.	Particulars	15/08/2011	2010	Level of reservoir in comparison to last year	Remarks
1. DAMS					
(a)	Bhakra Level (Max. 1680 ft. Min 1462 ft.) Inflow (cs) Release (cs)	1656.71 51600 18000	1657.12 76344 Cs 36312 Cs	(-0.41 ft)	Low flood 0.5-1.0 lac Med. Flood 1.0-1.5 lac High Flood > 1.5 lac
(b)	Pong Level (Max. 1390 ft Min. 1260 ft.) Inflow Release	1383.00 104715 27367	1353.61 45222 Cs 752 Cs		Low flood 0.5-1.0 lac Med. Flood 1.0-1.5 lac High Flood > 1.5 lac
(c)	Ranjit Sagar Dam Level (Max. 527.91 mt Min. 487.00 mt) Inflow Release	514.44 22293 909	518.90 21017 Cs 19203 Cs	(-4.46) mt	(Permissible level 524.91 mt.)
2. HEAD WORKS					
(a)	Nangal (Sutlej) D/s Discharge	300	16180 Cs.		Low flood 0.5-1.0 lac Med. Flood 1.0-1.5 lac High Flood > 1.5 lac
(b)	Ropar (Sutlej) D/s Discharge	17696	3765 Cs.		Low flood 0.8-1.4 lac Med. Flood 1.4-2.0 lac High Flood > 2.0 lac
(c)	Harike (Sutlej) D/s Discharge	40932	4149 Cs.		Low flood 0.5-2.0 lac Med. Flood 2.0-3.0 lac High Flood > 3.0 lac
(d)	Hussainiwala (Sutlej) D/s Discharge	21369	3142 Cs.		Low flood 0.5-1.5 lac Med. Flood 1.5-2.25 lac High Flood > 2.25 lac
(e)	Madhopur (Ravi) D/s Discharge	Lkg.	3500 Cs.		Low flood 0.3-0.6 lac Med. Flood 0.6-1.0 lac High Flood > 1.0 lac
3. DISCHARGE SITES					
(i) (a)	RAVI Dharamkot	18000	14000 Cs.		
(ii) (a) (b)	BEAS Naushera Mirthal Dhilwan	19200 36000	1484 Cs. 16000 Cs.		Low flood 1.5-2.00 lac Med. Flood 2.00-3.00 lac High Flood > 3.00 lac
(iii) (a)	SUTLEJ Phillaur	8800	19500 Cs.		Low flood 1.00-1.5 lac Med. Flood 1.5-2.00 lac High Flood > 2.00 lac
(iv) (a) (b) (c)	GHAGGAR Bhankarpur Narwana Branch Xing RD 148-150 B.M.L Xing RD 460	541 NR NIL	1095 Cs. Nil 2300 Cs.		Low flood 0.21-.315 lac Med. Flood 0.315-0.42 lac High Flood > 0.42 lac

	(Khanauri)				
(v)	HARYANA				Low flood 0.10-0.15 lac
(a)	Markanda at Jhansa	NR	NR		Med. Flood 0.15-0.20 lac
(b)	Tangri at Jansui	NR	Nil		High Flood > 0.20 lac
(c)	Sirsa	515	1180 Cs.		
(d)	Swan	2226	795 Cs.		

Cs- Cusecs

NR- Not received

Lkg- Leakage

EVACUATION PLAN

Evacuation of human population and livestock is the only prescribed means to save them from the fury of floods. Evacuation of flood affected communities can be one of the most difficult response operations, especially, when it involves large population. Evacuation needs to be carried out as a precautionary measures based on warning indicators, prior to impact, in order to protect flood-threatened persons from the full effects of the disasters. Evacuation may also be necessary after the area has been flooded in order to move persons from a flood-affected area to safer and better surroundings.

TRAVELLING TIME OF WATER RELATES TO VARIOUS RIVERS BHAKRA DAM AT VARIOUS SITES

a. SUTLEJ

Sr. No.	Distance (Area)	Distance (in kms)	Time (in hours)	
1	From Bhakra Dam to Ropar Head Works	75	18	Un-canalized
2	Ropar Head Works to Phillaur	70	14	Canalized
3	Phillaur to Harike Barrage (Pattan)	74	20	Canalized
4	Harike Barrage to Suleman Head	85	28	18 km Canalized 67 km Un-canalized
5	Total distance from Bhakra Dam to Suleman Head	304	80	

b. BEAS

Beas maximum Discharge 1988 Dhilwan= 3.90 lacs cusecs

Beas maximum Discharge 16-08-08 Dhilwan= 0.87 lacs cusecs

Sr. No.	Distance (Area)	Distance (in kms)	Time (in hours)
1	Beas kund to Talwara Dam	251 kms	
2	Pong Dam to Shahnehar Barrage	5 kms	1.50 hrs
3	Shahnehar Barrage to Mirthal	32 kms	6 hrs

	(G.T. Road)		
4	Mirthal (G.T. Road to Nashahra Paattan) (Mukerian Bridge)	16 kms	3 hrs
5	Mukerian Bridge to Shri Hargobindpur	30 kms	6 hrs
6	Shri Hargobindpur Bridge to Dhilwan	24 kms	5 hrs
7	Dhilwan to Alikalan	46 kms	9.50 hrs
8	Alikalan to Harike Head Works	10 kms	4 hrs
	Total	163 kms	35 hrs

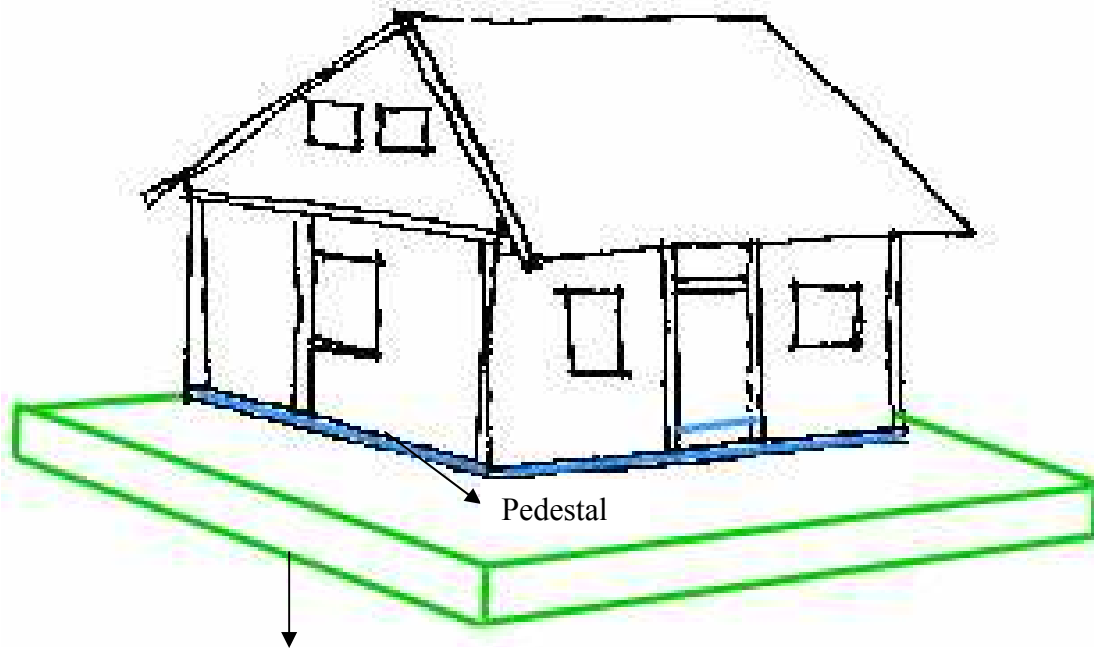
c. GHAGGAR

Sr. No.	Distance (Area)	Distance (in kms)	Time (in hours)
1	From Bhankarpur to Narwana Branch	52 kms	9 hrs
2	From Narwana Branch to Khanauri	90 kms	24 hrs
3	From Khanauri to Sardulgarh	94 kms	39 hrs
	Total	236 kms	72 hrs

d. RAVI

Sr. No.	Distance (Area)	Distance (in kms)	Time (in hours)
1	Madhopur to Border of Gurdaspur district	103 kms	21 hrs
2	Border of Gurdaspur district to Pakistan area	100 kms	20 hrs
	Total	203 kms	41 hrs

Standard Operating Procedures for emergency search and rescue, evacuation, relief, medical response and trauma counselling, debris clearance, communication, water supply, electricity, transportation and Help Lines and Information Dissemination are developed and integrated within the framework of the ICS.



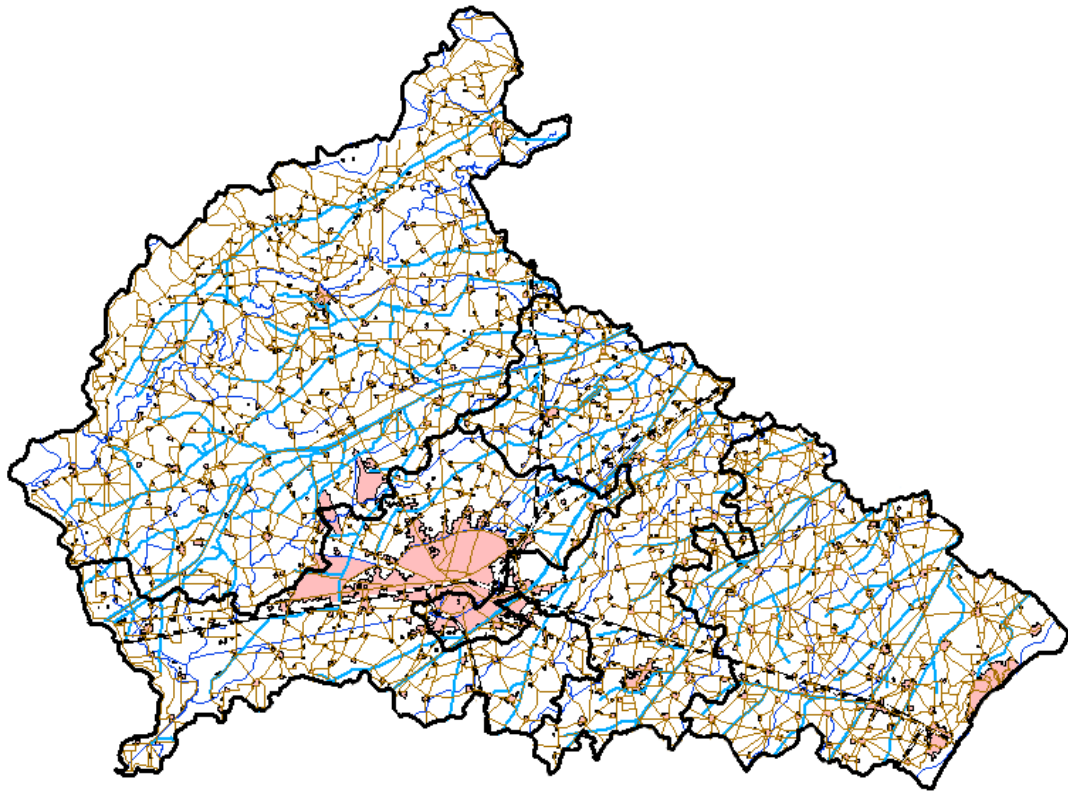
Buildings on stilts or on a platform

Construction in a flood prone area

Buildings on elevated area: The buildings in flood prone areas should be constructed on an elevated area and if necessary on stilts and platform.

Following are the evacuation maps of each district of Punjab which shows the minimum possible routes during the disasters.

DISTRICT AMRITSAR



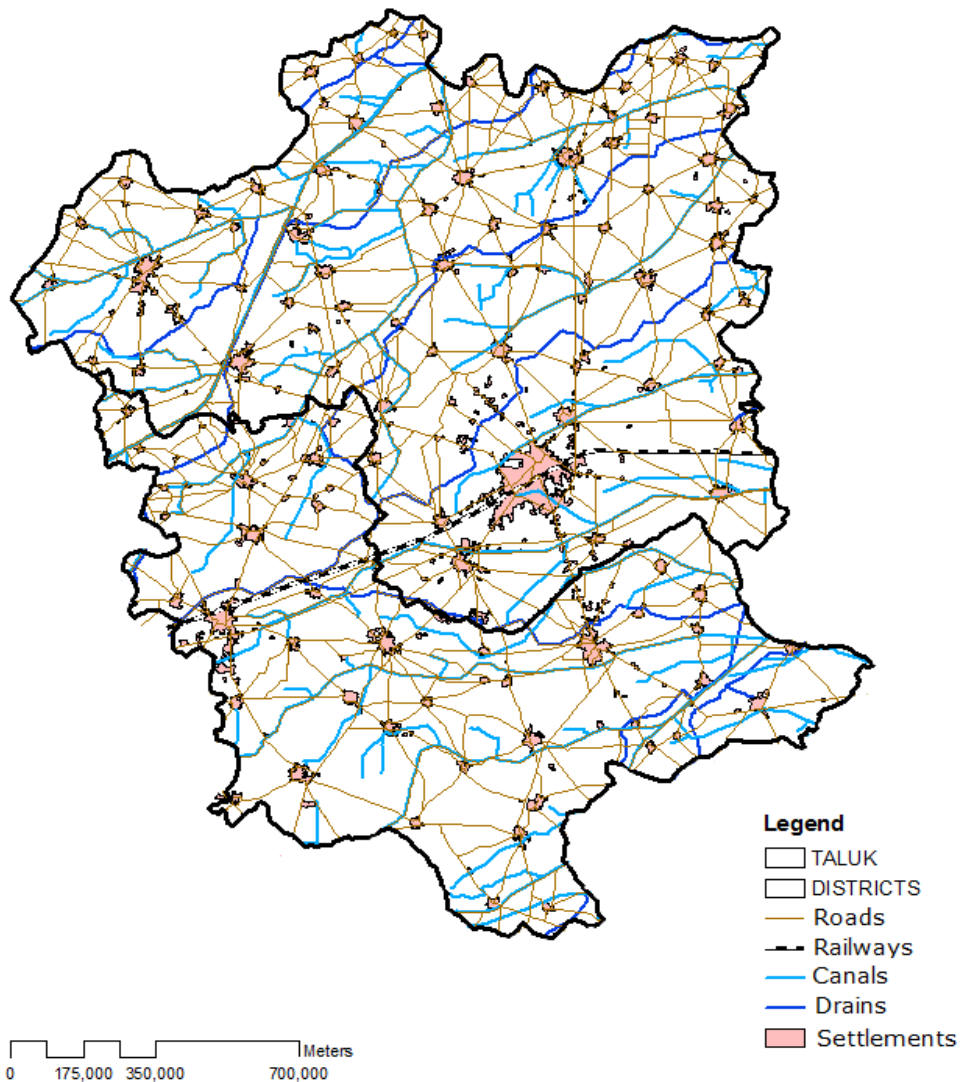
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- TALUK
- DISTRICTS
- Roads
- Railways
- Canals
- Drains
- Settlements

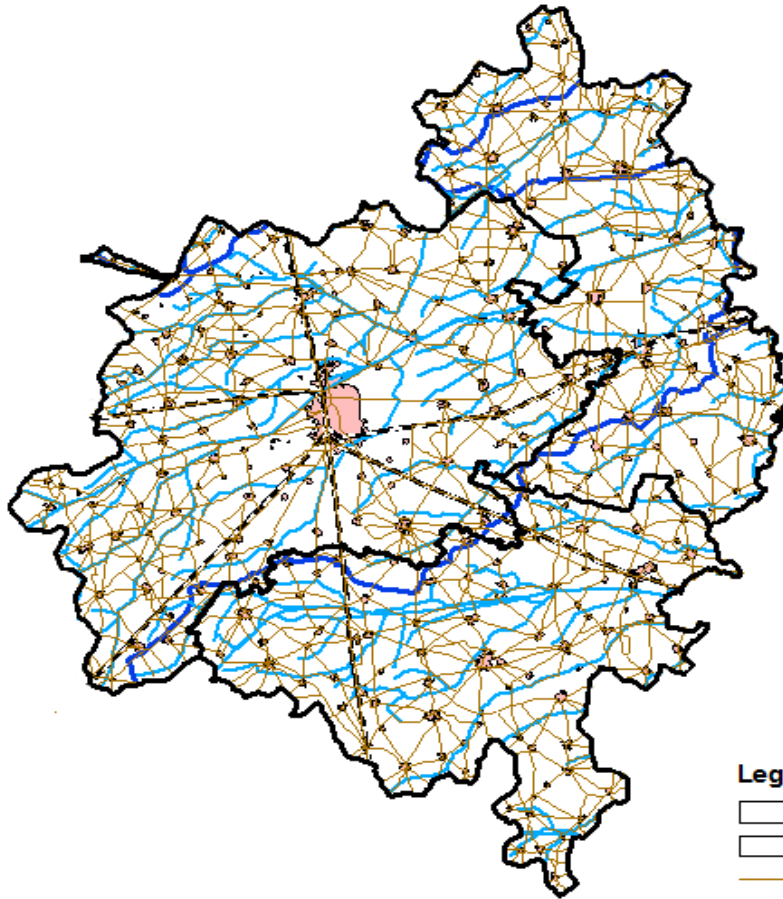
Department of Revenue, Rehabilitation and Disaster Management

DISTRICT BARNALA



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DISTRICT BATHINDA



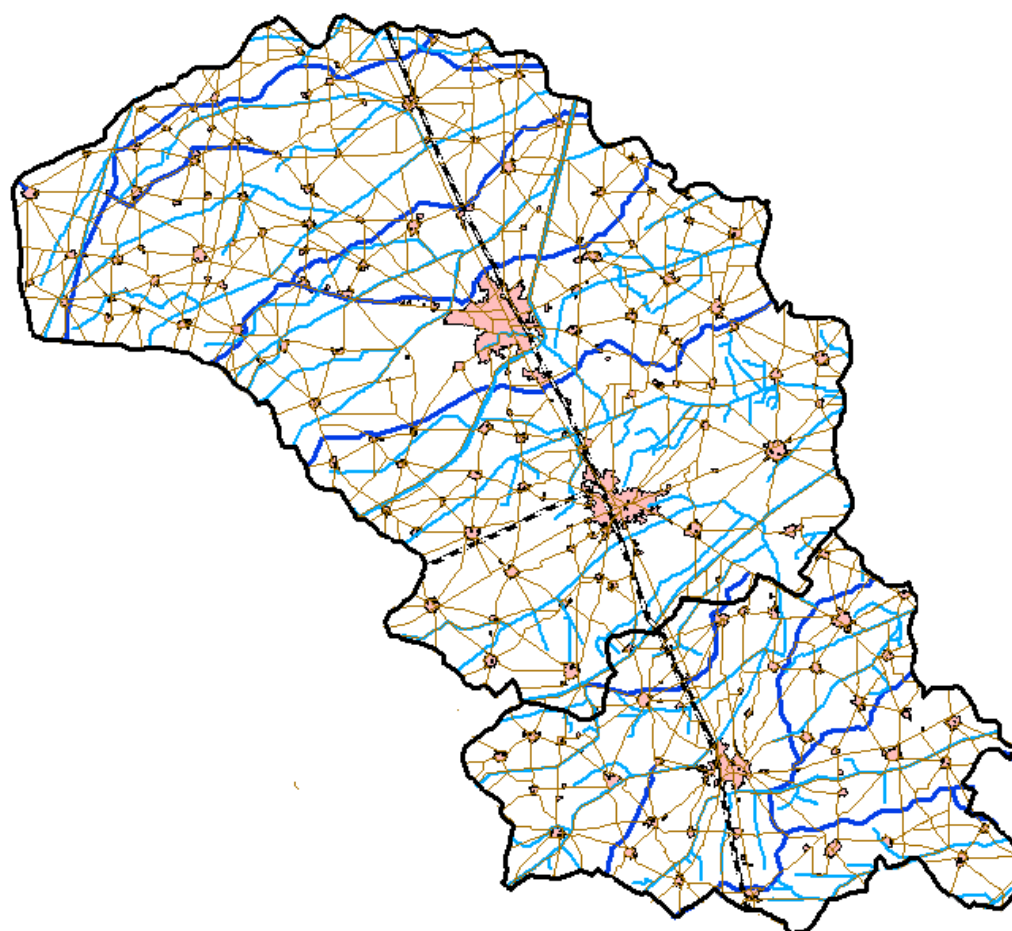
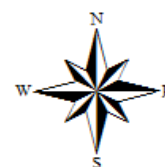
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DISTRICT FARIDKOT



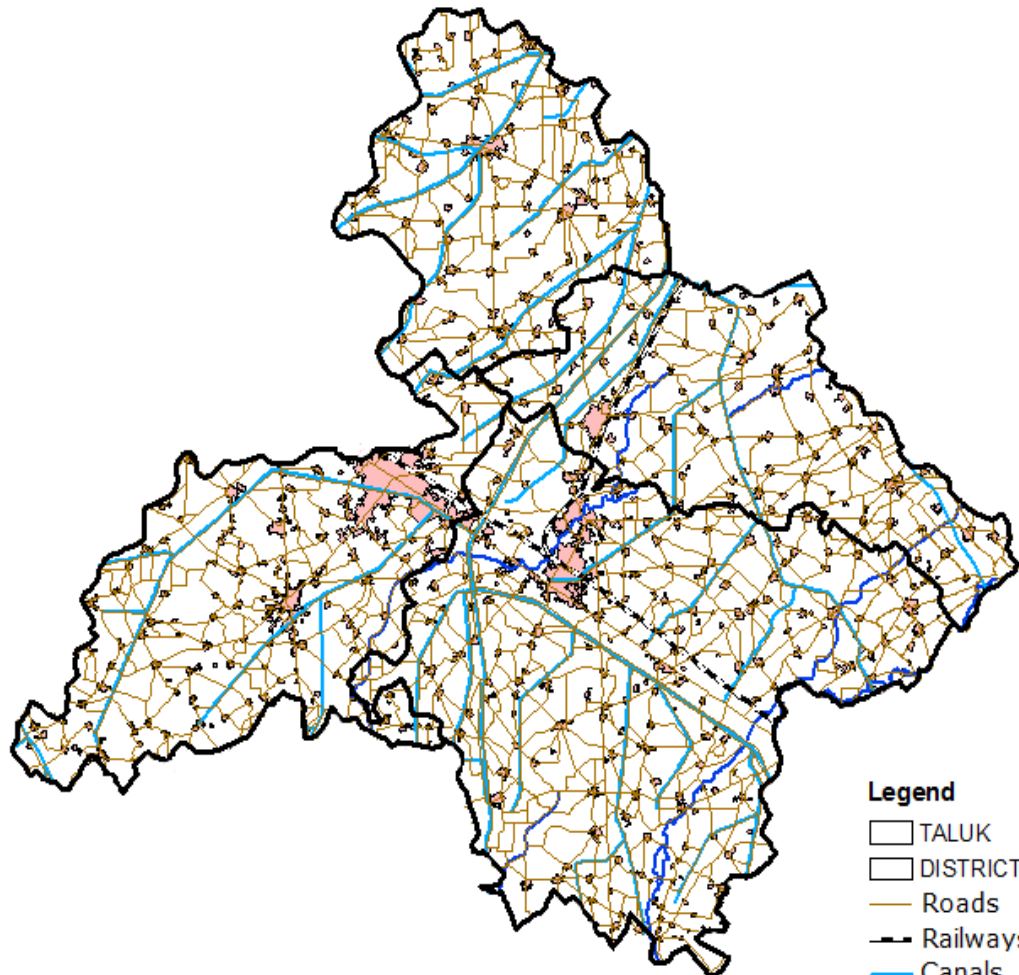
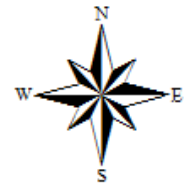
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DISTRICT FATEHGARH SAHIB



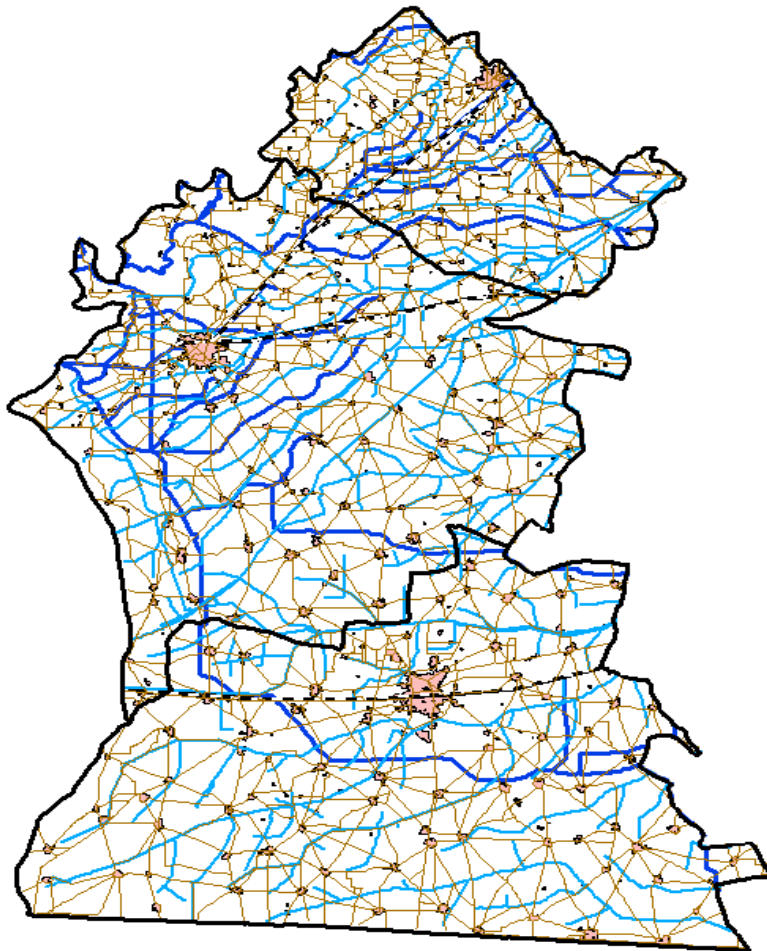
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Department of Revenue, Rehabilitation and Disaster Management

DISTRICT FAZILKA



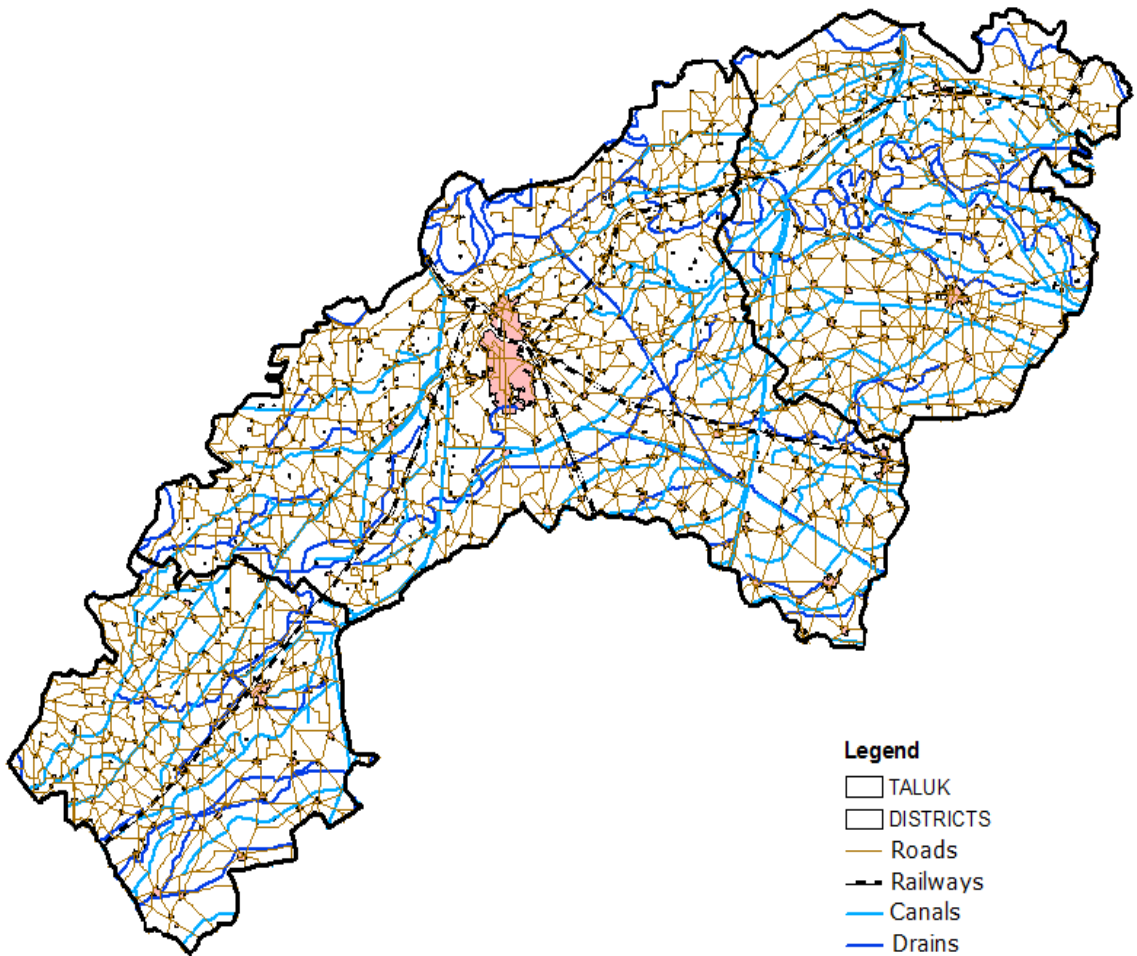
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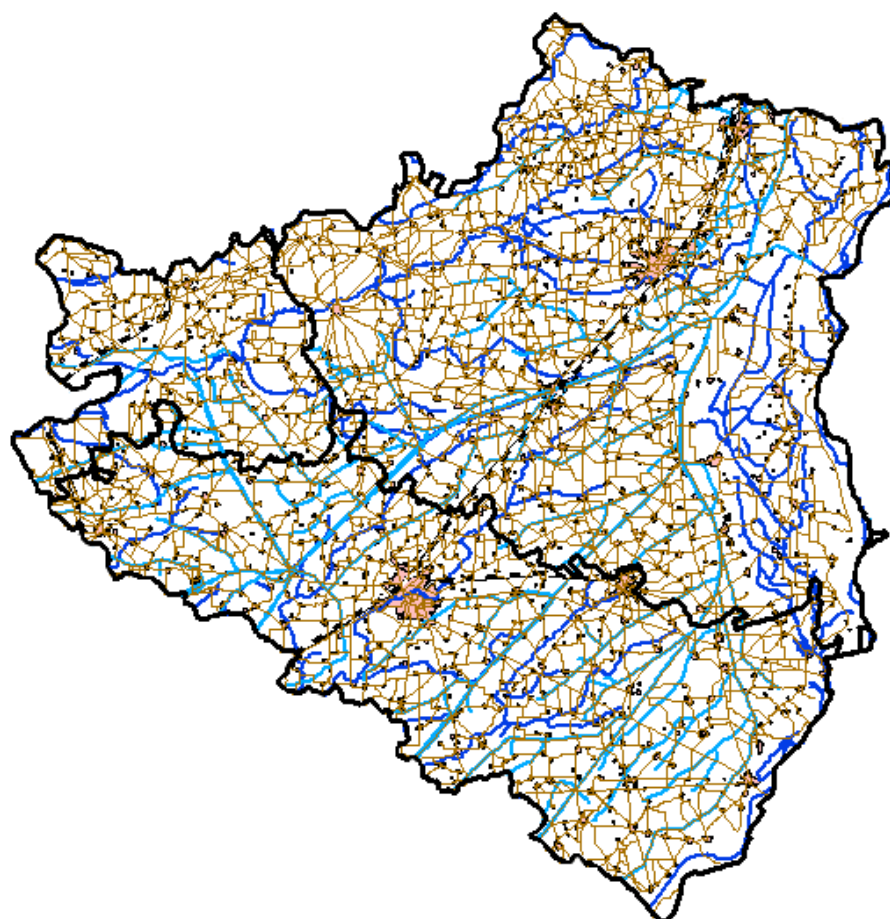
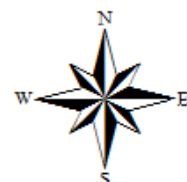
DISTRICT FEROZPUR



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DISTRICT GURDASPUR



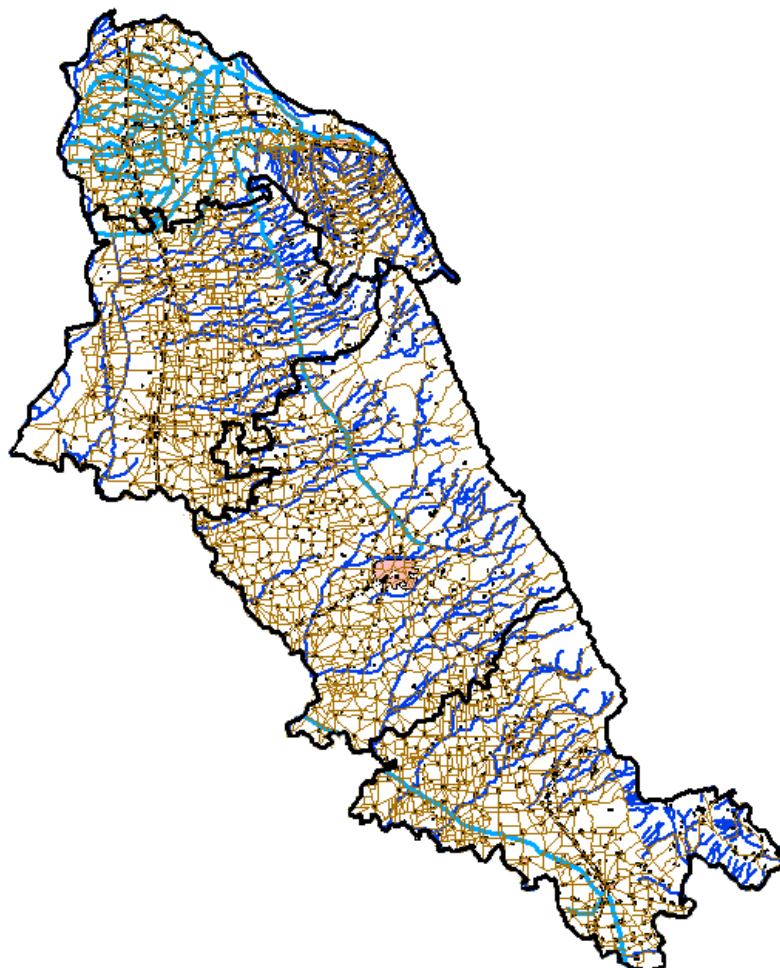
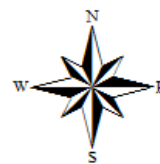
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DISTRICT HOSHIARPUR



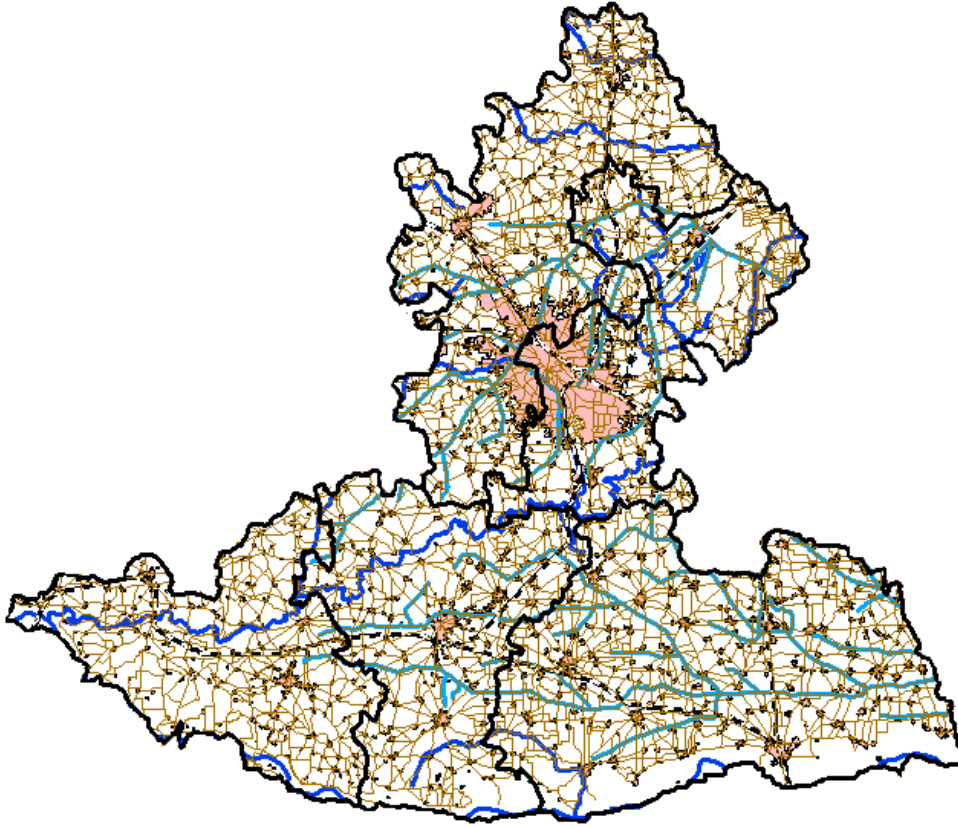
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DISTRICT JALANDHAR



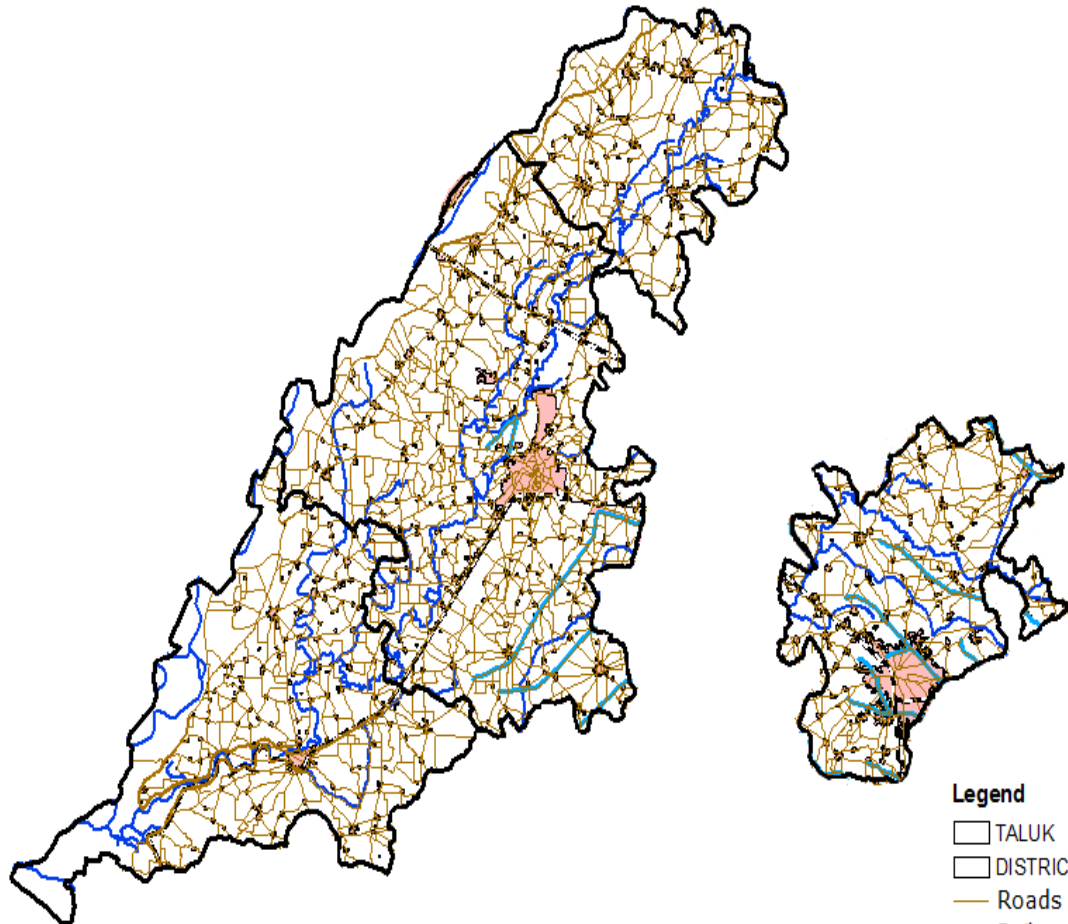
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DISTRICT KAPURTHALA

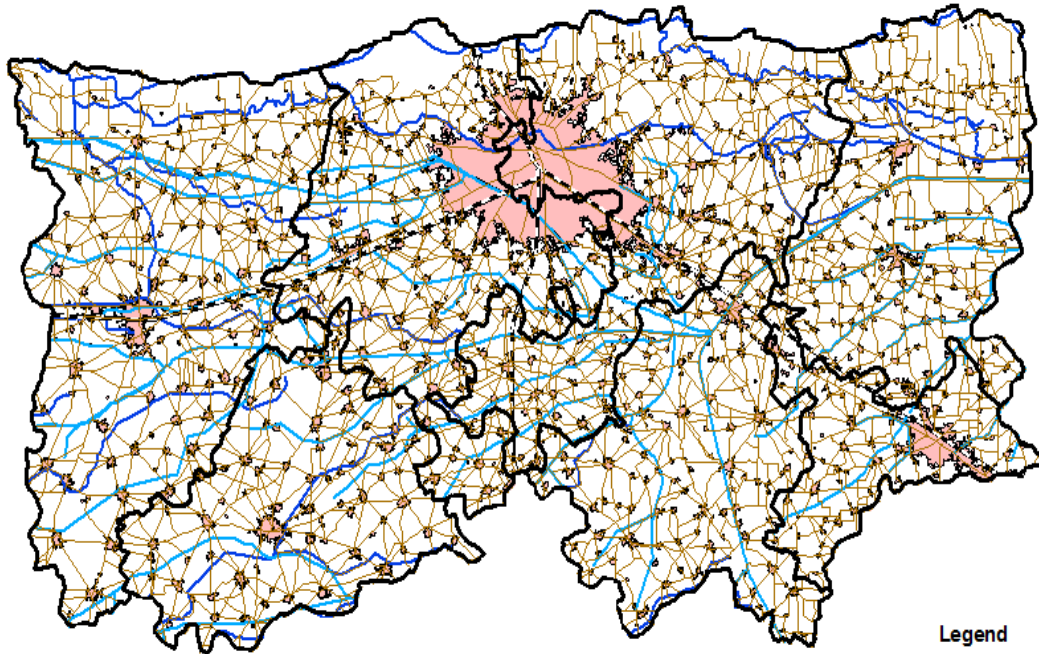


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Department of Revenue, Rehabilitation and Disaster Management

DISTRICT LUDHIANA



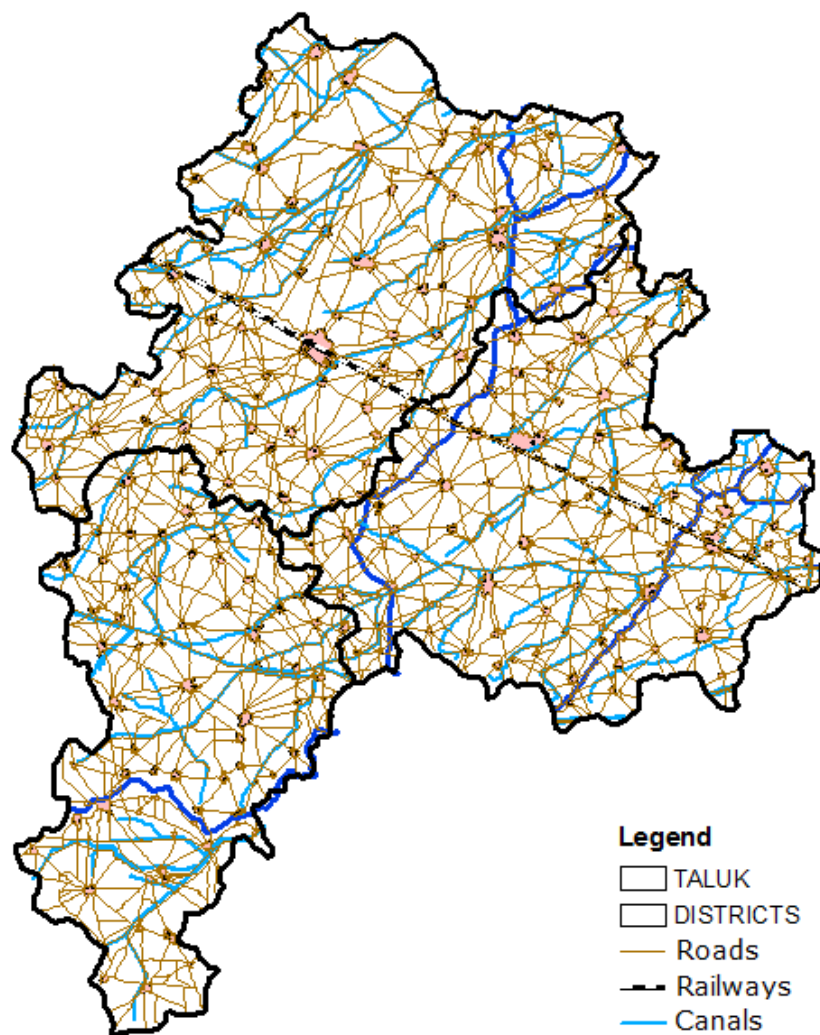
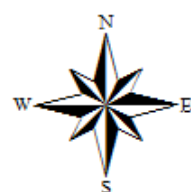
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DISTRICT MANSA



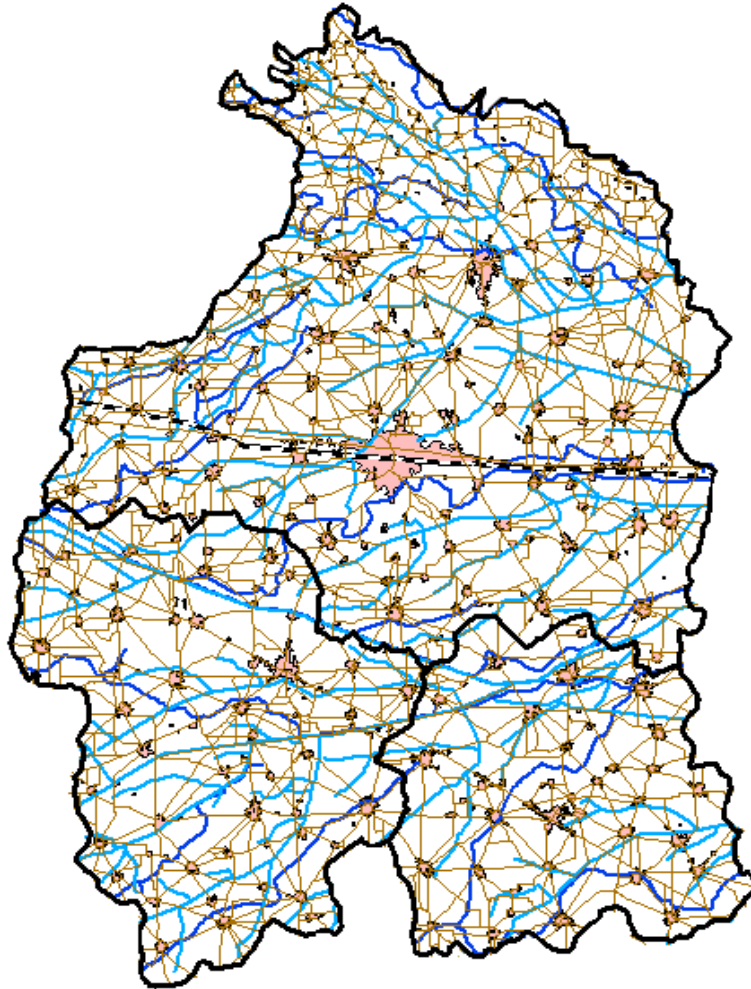
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Department of Revenue, Rehabilitation and Disaster Management

DISTRICT MOGA



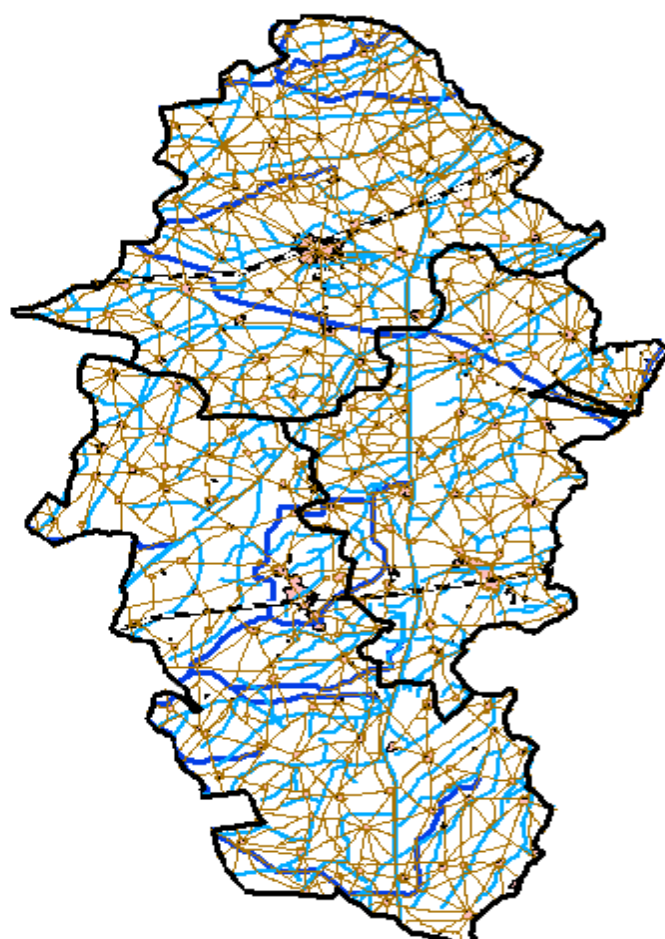
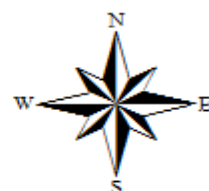
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





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DISTRICT MUKTSAR



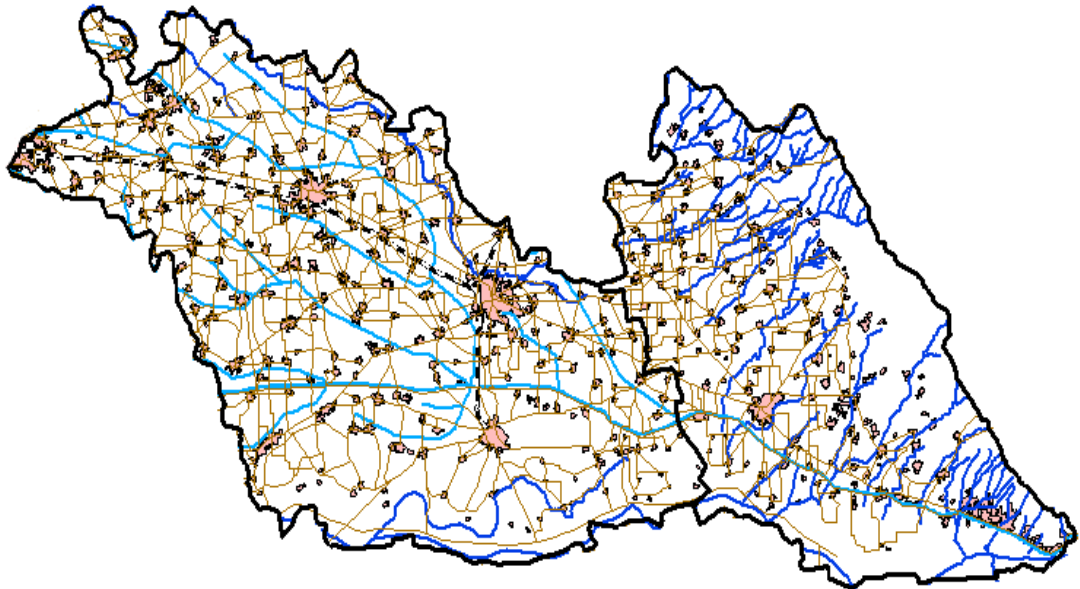
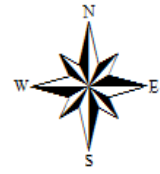
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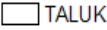
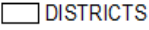
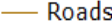
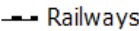
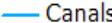
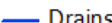
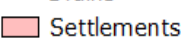
Department of Revenue, Rehabilitation and Disaster Management

DISTRICT S.B.S. NAGAR



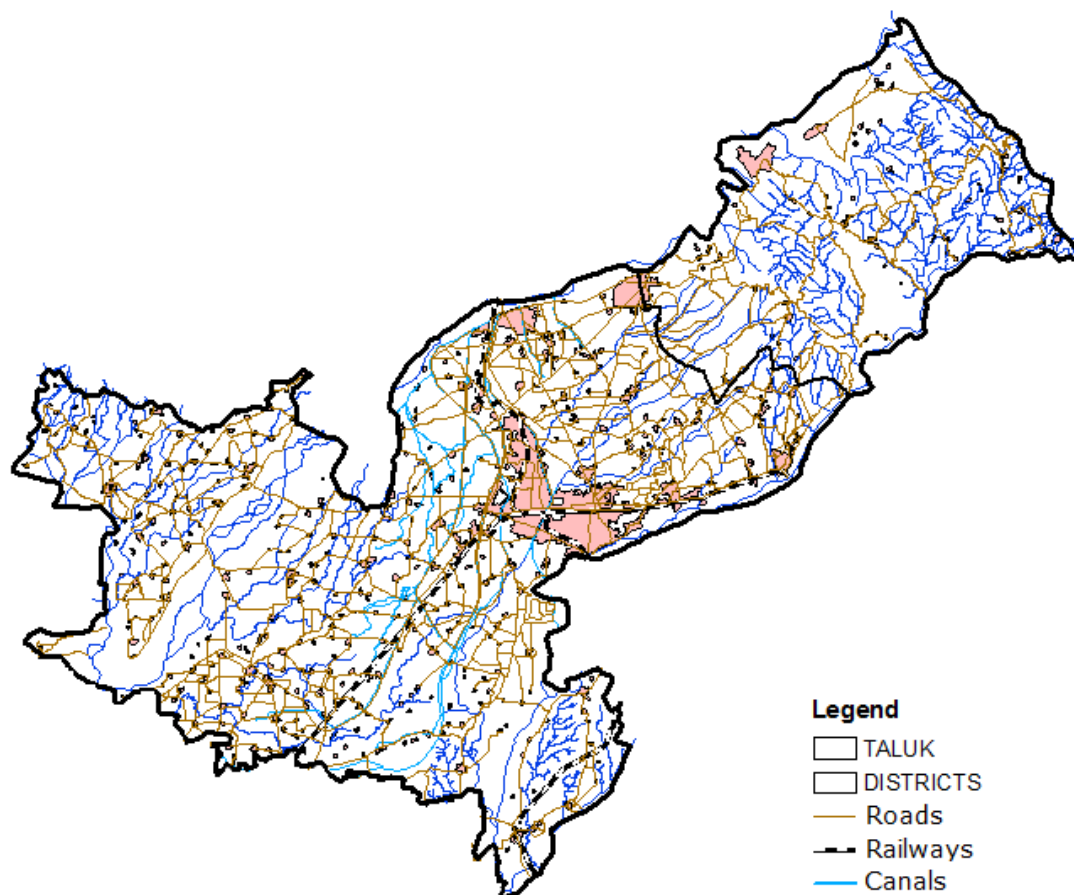
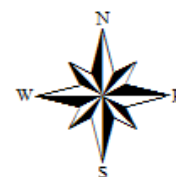
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Legend

-  TALUK
-  DISTRICTS
-  Roads
-  Railways
-  Canals
-  Drains
-  Settlements

Department of Revenue, Rehabilitation and Disaster Management

DISTRICT PATHANKOT



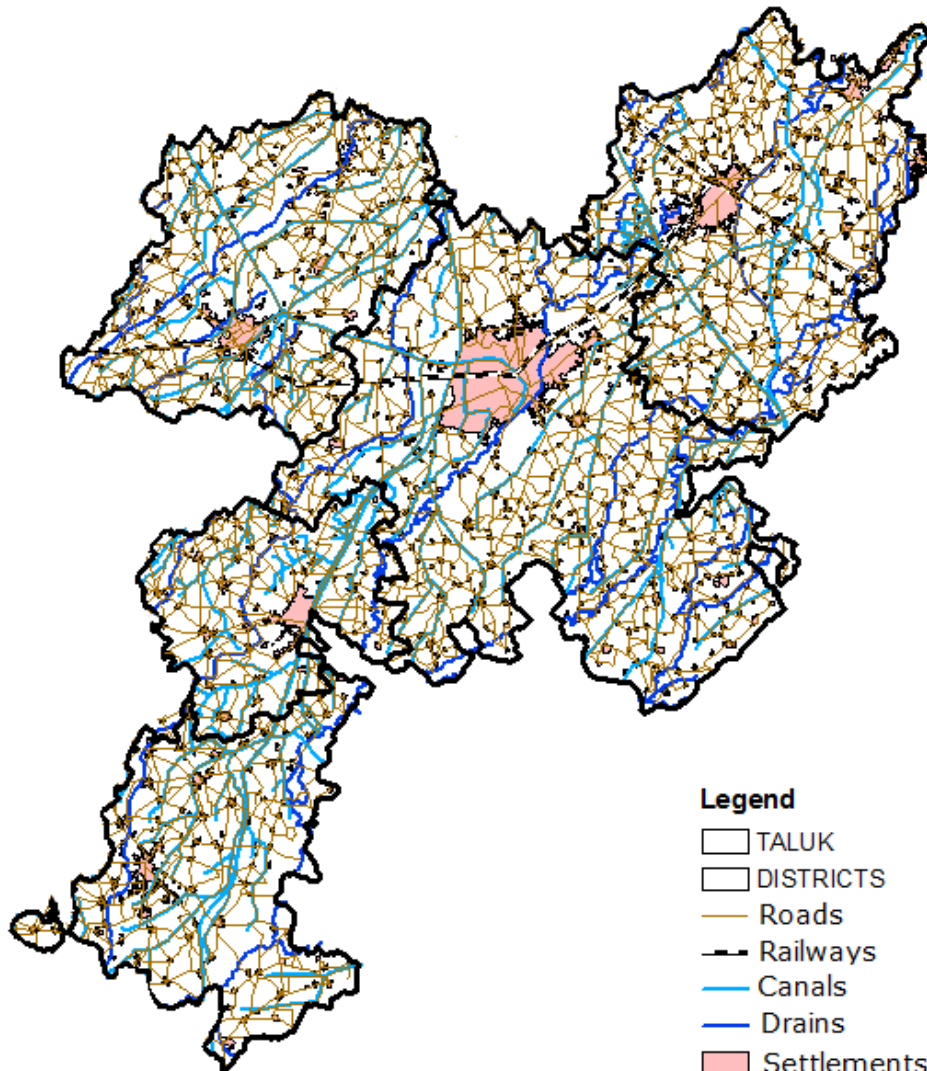
Legend

- TALUK
- DISTRICTS
- Roads
- Railways
- Canals
- Drains
- Settlements

0 175,000 350,000 700,000 Meters

Department of Revenue, Rehabilitation and Disaster Management

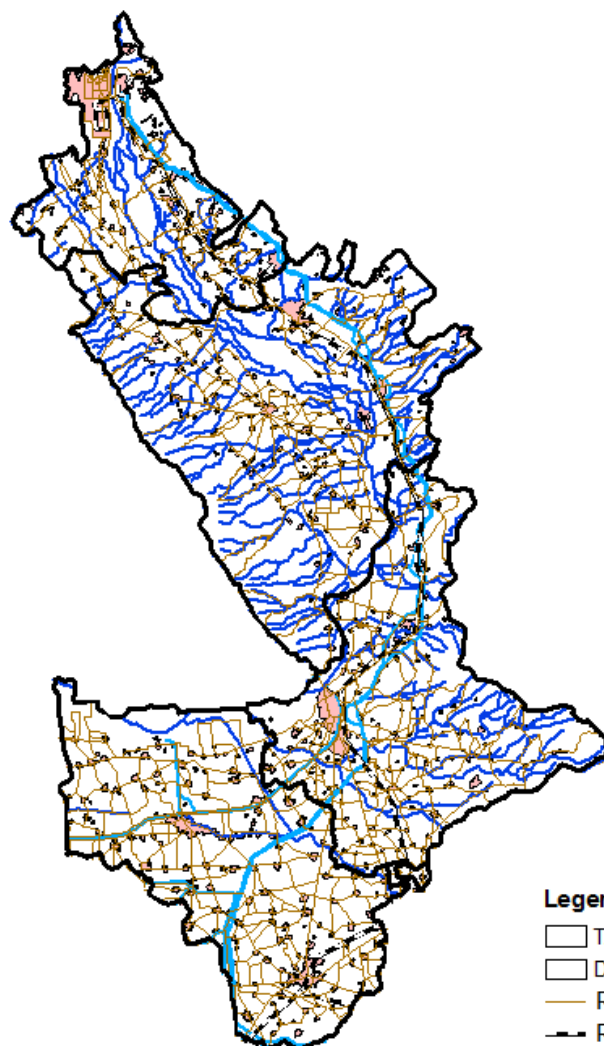
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0 175,000 350,000 700,000 Meters

Department of Revenue, Rehabilitation and Disaster Management

DISTRICT ROOPNAGAR



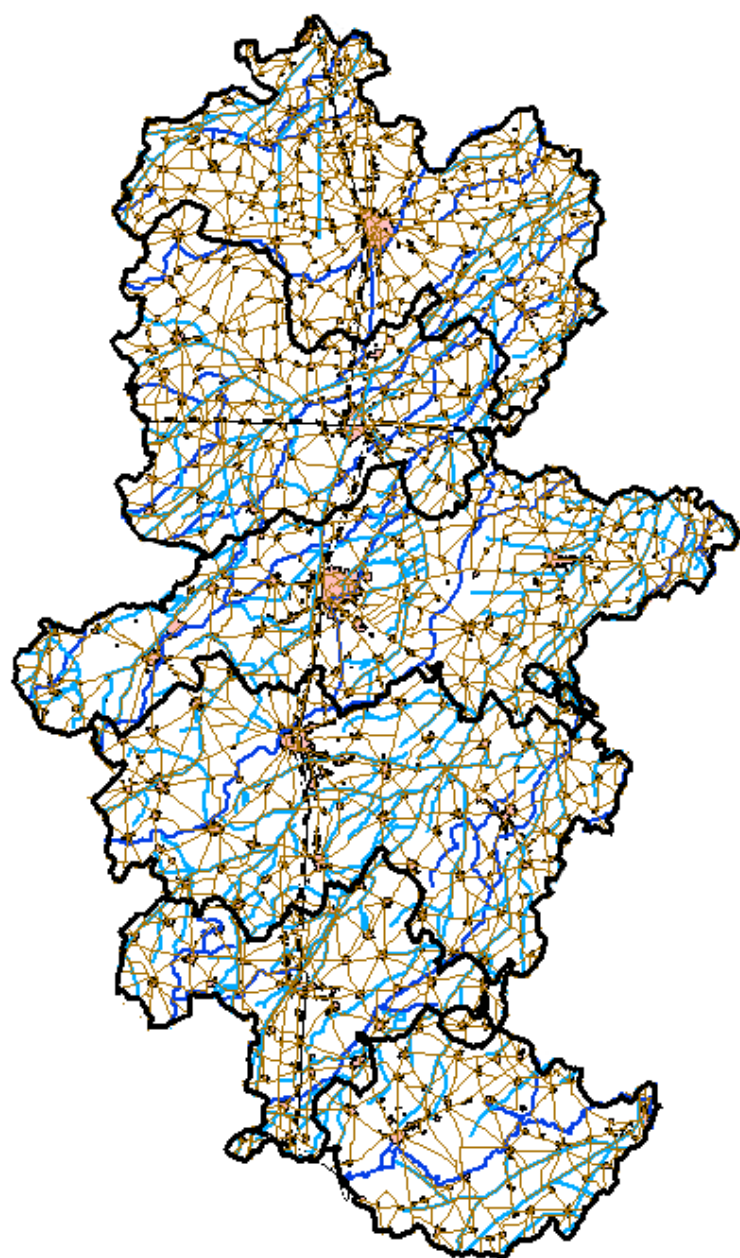
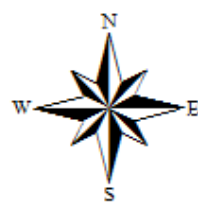
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Legend








- TALUK
- DISTRICTS
- Roads
- Railways
- Canals
- Drains
- Settlements

Department of Revenue, Rehabilitation and Disaster Management

DISTRICT SANGRUR



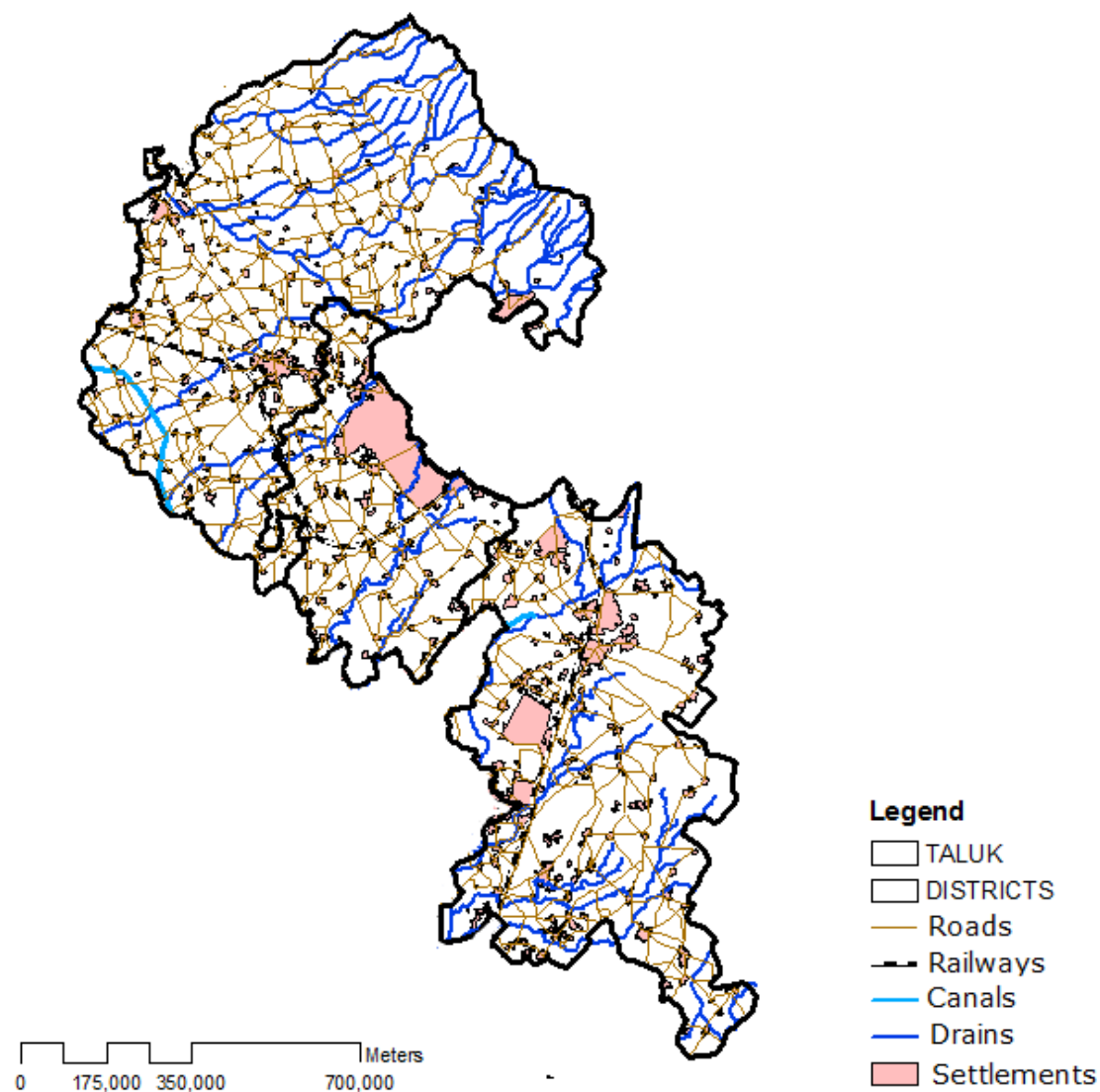
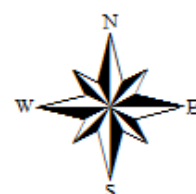
Legend

-  TALUK
-  DISTRICTS
-  Roads
-  Railways
-  Canals
-  Drains
-  Settlements

0 175,000 350,000 700,000 Meters

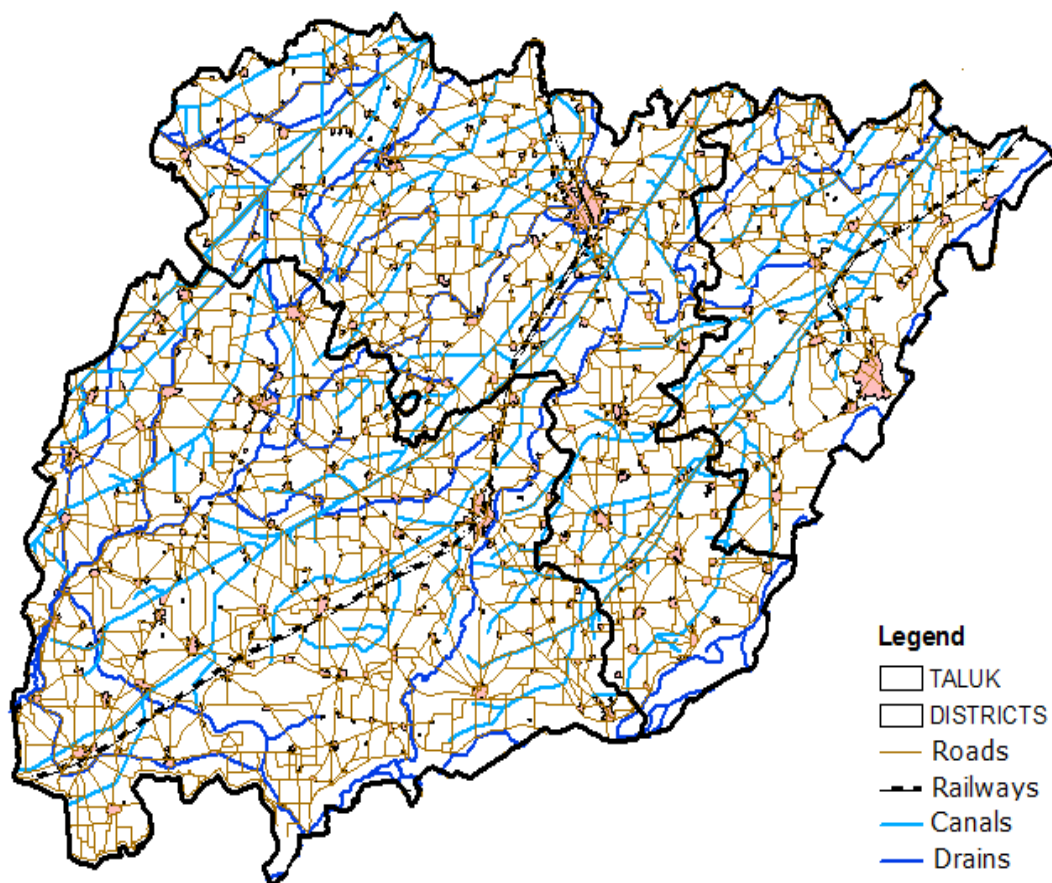
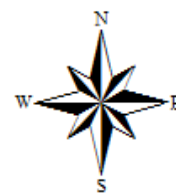
Department of Revenue, Rehabilitation and Disaster Management

DISTRICT SAS NAGAR



Department of Revenue, Rehabilitation and Disaster Management

DISTRICT TARN TARAN



Legend

- TALUK
- DISTRICTS
- Roads
- Railways
- Canals
- Drains
- Settlements

0 175,000 350,000 700,000 Meters

Department of Revenue, Rehabilitation and Disaster Management

ANNEXURE 2

ACTION PLAN FOR EARTHQUAKES

HISTORY OF EARTHQUAKES IN PUNJAB

LIST OF EARTHQUAKES FROM IMD CATALOGUE OCCURRING BETWEEN LAT.29.00 TO 33.00 DEG. N AND LONG.73.00 TO 78.00 DEG. E (COVERING PUNJAB STATE) FOR THE PERIOD UPTO JANUARY 2010

DATE	O-TIME	LAT	LONG	DEPTH	MAG
1827 9 0	0 0 .0	32.50	76.00	0.	5.5
1827 9 24	0 0 .0	31.60	74.40	0.	6.5
1842 3 5	0 0 .0	30.00	78.00	0.	5.5
1851 1 21	0 0 .0	32.00	74.00	0.	5.0
1856 4 7	0 0 .0	31.00	77.00	0.	5.0
1858 8 11	0 0 .0	31.12	77.17	0.	5.0
1875 12 12	0 0 .0	31.60	74.40	0.	5.5
1905 4 4	0 50 .0	32.30	76.25	0.	8.0
1905 9 26	1 26 9.0	29.00	74.00	0.	7.1
1906 2 28	0 0 .0	32.00	77.00	0.	7.0
1930 5 11	11 30 36.0	31.70	77.00	0.	5.5
1934 4 14	0 0 .0	29.00	75.50	0.	5.0
1945 6 22	18 0 51.0	32.60	75.90	0.	6.5
1947 7 10	10 19 20.0	32.60	75.90	0.	6.2
1950 8 12	3 59 6.0	32.60	75.90	0.	5.5
1952 12 27	18 45 37.0	31.20	74.80	0.	5.5
1962 9 15	12 35 8.0	31.90	76.20	0.	5.5
1963 4 22	0 51 9.0	31.50	74.00	0.	5.5
1965 2 21	3 25 36.7	32.79	76.90	33.	4.5
1965 5 31	2 4 42.9	32.65	77.99	28.	5.1
1965 6 1	2 28 55.0	32.40	77.30	155.	4.3
1968 11 5	2 2 44.7	32.28	76.48	33.	4.8
1969 2 4	16 30 39.5	29.10	76.70	0.	3.8
1970 1 17	18 33 2.0	32.70	76.64	22.	4.7
1970 3 5	18 34 21.2	32.32	76.61	33.	4.7
1970 3 18	2 11 55.7	29.10	76.60	0.	3.8
1972 10 26	14 5 55.5	32.05	76.35	82.	4.4
1973 12 16	9 16 12.4	32.36	76.19	18.	4.8
1974 1 17	4 34 55.4	29.30	77.60	0.	4.4
1974 6 25	4 47 40.8	31.70	73.57	86.	4.2
1975 9 16	4 20 26.0	32.34	76.25	59.	4.6
1975 10 30	14 20 54.4	32.89	75.71	75.	4.7
1975 10 30	14 36 44.4	32.97	75.96	45.	4.8
1975 11 6	0 11 30.4	29.61	77.87	0.	4.8
1975 12 10	3 26 5.6	32.95	76.10	5.	5.3
1975 12 10	5 3 47.3	32.79	75.92	76.	4.7
1975 12 10	5 8 44.8	32.91	76.06	70.	4.6
1975 12 11	10 9 50.2	33.00	76.17	42.	5.0
1976 1 7	0 24 52.9	32.97	76.12	40.	5.3
1976 1 8	22 34 25.5	32.95	76.15	43.	4.8
1976 1 9	23 50 16.4	32.78	75.98	96.	4.5
1976 2 5	12 4 30.5	31.24	77.03	5.	5.0
1976 4 10	7 9 19.0	32.65	76.39	62.	4.3

1977	1	21	14	57	46.3	32.76	75.98	51.	4.5
1978	6	14	16	12	4.8	32.24	76.61	6.	5.0
1980	3	29	2	2	53.6	32.80	73.97	18.	4.7
1980	8	23	21	36	49.0	32.96	75.75	3.	5.2
1980	8	23	21	50	1.2	32.90	75.80	12.	5.2
1980	9	4	1	48	41.7	31.28	75.68	121.	4.5
1981	3	3	8	43	29.1	31.36	73.22	47.	5.0
1981	7	12	8	45	39.2	32.73	76.08	35.	4.7
1981	7	31	5	49	1.3	30.98	75.08	0.	4.1
1981	8	10	10	58	24.4	31.10	77.82	33.	4.6
1981	9	25	2	50	41.3	30.93	74.69	33.	4.5
1982	5	7	7	44	16.1	32.62	76.01	39.	4.8
1982	7	16	4	15	26.0	30.89	77.68	67.	4.1
1982	9	4	12	33	54.0	32.59	76.14	33.	4.3
1983	5	30	8	39	49.3	32.71	75.49	41.	4.6
1984	3	23	0	33	32.4	32.94	77.14	33.	4.6
1984	10	6	10	3	58.6	30.33	73.62	10.	4.5
1984	12	15	10	54	14.0	31.27	77.61	63.	4.5
1985	3	11	14	36	10.1	31.39	77.26	41.	4.7
1985	3	22	0	48	5.0	31.00	76.60	33.	.0
1985	3	27	14	16	44.6	30.97	73.17	33.	.0
1985	12	29	21	31	.2	32.68	76.10	0.	4.9
1986	1	28	18	24	4.1	30.83	76.30	33.	.0
1986	4	22	9	29	52.0	31.85	76.95	32.	4.6
1986	4	26	7	35	16.2	32.15	76.40	33.	5.5
1986	7	16	22	3	7.0	31.05	78.00	40.	5.6
1986	11	21	17	31	1.0	32.30	76.60	40.	.0
1987	5	20	0	32	41.5	32.92	76.30	33.	4.4
1987	7	18	16	29	17.8	31.00	77.95	49.	4.7
1987	10	6	16	33	16.6	32.07	76.40	51.	4.7
1987	12	26	1	3	1.0	32.15	76.94	33.	4.4
1988	4	2	22	49	.1	31.56	73.77	33.	4.0
1988	5	26	17	32	43.0	32.60	77.00	33.	.0
1988	6	2	0	45	13.0	32.80	76.40	10.	.0
1988	6	29	7	24	53.0	31.80	78.00	145.	.0
1988	7	1	16	37	21.1	31.25	74.11	33.	4.2
1988	8	16	10	42	17.2	31.57	73.52	10.	.0
1988	11	25	0	7	7.0	32.90	75.80	80.	4.8
1988	11	27	6	4	53.0	32.80	73.41	92.	.0
1988	12	26	11	11	12.4	30.58	77.92	45.	4.3
1989	2	19	4	35	6.0	30.60	73.30	33.	.0
1989	3	13	10	35	30.8	30.12	77.16	33.	.0
1989	3	16	16	36	59.0	33.00	76.23	86.	.0
1989	4	15	23	29	56.0	32.80	75.80	33.	.0
1989	4	22	16	10	37.6	31.70	77.73	33.	.0
1989	6	4	23	56	2.0	32.90	76.10	63.	4.4
1989	7	27	5	25	26.0	30.90	75.60	33.	.0
1989	11	4	13	22	25.0	32.60	76.00	72.	4.3
1989	12	19	5	42	25.0	31.10	77.60	33.	.0
1989	12	22	13	5	32.0	32.70	75.50	130.	.0
1990	1	21	19	5	44.0	32.30	76.50	225.	.0
1990	2	7	20	42	28.0	29.20	77.10	27.	.0
1990	3	3	5	53	38.0	32.87	74.15	10.	4.3
1990	9	5	21	15	25.0	32.66	76.16	33.	4.0

1990	10	17	18	7	2.6	29.86	74.95	33.	.0
1990	11	3	20	48	44.0	29.20	76.65	82.	.0
1990	11	17	5	26	41.0	32.70	76.90	33.	.0
1990	11	30	11	57	18.9	32.60	76.70	33.	.0
1990	12	13	8	28	55.5	31.48	77.29	33.	4.7
1991	1	20	12	43	16.9	31.59	77.40	33.	4.9
1991	3	23	1	48	49.9	32.40	77.45	33.	4.0
1991	6	3	20	5	52.0	31.80	78.00	33.	.0
1991	6	22	23	3	31.0	32.30	77.04	33.	.0
1991	6	23	2	45	41.0	32.38	76.76	23.	4.6
1991	7	24	3	11	58.0	32.00	76.00	115.	.0
1991	12	8	19	9	57.0	29.20	76.81	33.	.0
1991	12	18	14	17	22.0	32.80	73.60	42.	4.2
1992	1	26	23	48	56.1	32.30	76.40	33.	4.5
1992	2	13	22	43	34.1	32.60	76.50	33.	4.6
1992	9	6	14	10	55.9	32.40	76.30	33.	4.6
1993	6	19	11	51	18.4	31.40	77.10	33.	.0
1993	7	31	19	44	22.7	30.50	76.40	15.	3.7
1993	12	13	21	10	15.5	30.10	73.70	0.	3.4
1994	5	13	9	19	53.2	32.50	75.50	33.	4.4
1995	3	24	11	52	26.0	32.60	76.00	33.	4.9
1995	9	6	7	43	55.0	31.20	78.00	33.	3.6
1995	9	5	7	44	2.7	31.30	77.30	33.	4.1
1996	1	28	11	47	27.0	29.00	76.70	33.	2.2
1996	2	2	5	30	24.0	29.30	74.10	33.	3.3
1996	4	1	8	8	2.6	31.50	73.50	33.	5.6
1996	4	13	0	1	11.7	31.50	73.50	33.	4.4
1996	5	9	8	25	45.0	32.80	76.40	0.	4.0
1996	5	23	23	51	13.6	32.70	76.50	0.	4.2
1996	7	14	0	40	6.0	32.60	76.50	0.	4.1
1996	9	14	0	22	57.2	32.80	76.40	33.	4.8
1996	11	12	4	20	58.7	29.90	77.20	54.	4.5
1996	12	23	21	52	18.0	32.40	76.90	33.	3.8
1997	1	2	3	52	31.6	30.50	77.80	33.	3.5
1997	1	19	14	38	24.7	32.80	76.18	72.	3.6
1997	4	12	9	1	13.0	31.30	74.80	100.	3.8
1997	7	29	9	43	35.8	32.83	73.68	10.	4.8
1997	7	29	18	0	18.7	31.55	76.81	33.	4.7
1997	8	13	23	10	15.0	31.21	76.69	33.	4.2
1997	11	9	1	56	54.2	32.60	76.20	33.	4.0
1997	12	19	4	28	2.0	32.70	75.30	33.	3.5
1998	1	23	16	5	32.8	29.00	77.00	10.	2.4
1998	1	29	10	58	41.2	32.80	76.00	90.	3.3
1998	2	7	8	45	11.0	29.10	78.00	33.	3.5
1998	3	16	0	53	15.0	29.10	77.40	0.	2.6
1998	3	19	17	1	32.7	31.20	77.83	33.	3.9
1998	3	19	17	33	19.6	31.03	77.64	33.	3.9
1998	3	19	23	34	27.3	32.54	76.21	70.	3.5
1998	3	20	1	3	41.5	32.63	76.19	33.	3.8
1998	3	21	2	28	45.3	32.82	76.43	43.	2.5
1998	3	24	4	25	42.9	32.46	73.90	43.	4.0
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1998	6	26	20	47	45.6	32.96	77.87	33.	3.6
1998	7	1	14	40	44.3	32.75	75.11	33.	.0

1998	7	6	10	24	8.8	32.98	75.62	83.	4.2
1998	10	16	13	25	46.3	31.60	77.10	20.	2.4
1998	10	16	13	28	9.8	30.10	77.20	33.	.0
1998	10	17	9	24	45.0	32.21	76.54	33.	4.5
1998	10	24	13	55	38.9	30.90	75.30	30.	3.6
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1999	1	11	1	30	27.3	31.69	77.12	5.	3.5
1999	1	12	0	19	17.2	32.41	76.62	10.	2.1
1999	1	12	23	1	41.1	32.41	76.08	15.	2.2
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1999	1	24	14	25	7.6	30.32	75.04	33.	.0
1999	1	26	16	34	53.0	29.11	76.80	10.	.0
1999	1	27	13	23	59.7	32.64	77.31	0.	2.6
1999	1	27	16	58	25.3	32.90	77.98	33.	2.7
1999	1	27	17	19	42.9	32.82	76.69	15.	2.5
1999	2	3	10	17	6.4	31.42	77.07	5.	3.0
1999	2	5	20	36	18.1	31.35	77.98	10.	2.7
1999	2	14	19	53	29.0	30.22	77.10	12.	2.7
1999	2	15	0	14	50.6	32.36	76.66	4.	2.7
1999	2	18	5	5	20.1	29.43	76.60	16.	2.7
1999	2	19	13	5	5.1	32.83	76.37	10.	2.6
1999	2	21	15	14	56.5	32.83	75.90	10.	2.1
1999	2	22	3	10	31.6	31.54	77.20	14.	3.2
1999	2	24	18	42	28.9	32.48	75.60	10.	1.7
1999	2	28	0	38	2.9	32.69	73.42	10.	2.7
1999	2	28	10	53	26.3	32.96	75.81	10.	2.2
1999	2	28	23	28	9.6	32.87	75.80	10.	2.1
1999	3	3	15	11	32.2	32.90	75.71	5.	2.7
1999	3	5	18	2	41.6	32.79	76.76	5.	2.7
1999	3	14	10	12	55.2	32.91	75.66	19.	.0
1999	3	14	12	29	5.2	32.88	75.57	5.	2.0
1999	3	14	12	33	2.8	32.90	75.72	5.	2.0
1999	3	16	11	24	58.2	32.47	76.44	19.	2.6
1999	3	16	11	34	16.4	32.47	77.02	5.	.0
1999	3	16	19	16	19.2	32.40	76.73	15.	2.3
1999	3	19	14	53	41.9	31.34	77.05	5.	2.3
1999	3	20	23	33	52.5	32.97	75.83	5.	2.0
1999	3	23	7	56	16.2	29.00	76.63	4.	2.1
1999	3	26	6	32	6.8	32.98	76.23	63.	.0
1999	3	26	7	52	41.5	29.10	77.24	3.	1.7
1999	3	27	9	23	29.4	32.86	76.67	8.	2.8
1999	3	27	11	49	27.2	32.59	76.60	10.	3.5
1999	4	2	22	41	27.9	32.77	76.43	15.	1.9
1999	4	2	23	8	2.6	31.81	77.95	0.	2.6
1999	4	3	10	28	38.7	31.57	77.26	4.	1.9
1999	4	4	10	39	56.1	29.05	77.19	9.	2.2
1999	4	6	7	5	.8	32.96	76.21	8.	3.0
1999	4	6	10	4	24.6	31.22	77.67	2.	.0
1999	4	6	16	22	40.3	31.28	77.96	15.	.0
1999	4	7	0	43	50.0	32.92	75.84	0.	2.9
1999	4	10	10	29	47.6	31.53	77.14	15.	1.9
1999	4	21	6	32	17.5	32.83	75.66	15.	3.4

1999	4	22	5	22	4.8	33.00	75.77	7.	3.2
1999	4	29	9	32	23.4	29.02	77.25	15.	2.2
1999	5	5	4	41	59.2	31.35	77.13	5.	2.4
1999	5	6	3	46	49.4	32.51	76.58	16.	3.1
1999	5	7	14	44	57.4	31.86	75.46	33.	3.3
1999	5	10	21	8	15.3	32.21	75.24	15.	.0
1999	5	11	13	9	3.0	31.36	77.79	5.	.0
1999	5	17	17	45	40.3	32.56	75.50	33.	2.0
1999	5	17	19	26	15.3	32.55	75.56	33.	.0
1999	5	18	19	43	32.5	32.78	75.41	33.	.0
1999	5	20	12	37	.2	29.37	76.16	33.	.0
1999	5	21	19	18	12.6	31.67	77.16	5.	3.8
1999	5	22	14	49	11.4	29.02	77.19	5.	1.6
1999	5	26	9	28	53.3	29.95	76.52	15.	.0
1999	5	30	4	49	58.5	29.01	76.73	16.	1.9
1999	6	9	10	48	50.4	32.80	75.58	0.	2.2
1999	6	9	13	22	49.6	32.62	75.52	5.	.0
1999	6	10	5	57	3.8	32.32	76.47	13.	3.1
1999	6	19	7	16	32.4	29.02	77.72	22.	1.4
1999	6	21	19	0	42.4	29.09	76.90	30.	1.7
1999	6	23	20	7	38.0	30.88	77.97	7.	2.4
1999	7	8	19	30	5.0	32.70	75.53	15.	.0
1999	7	12	17	45	21.3	31.73	77.68	15.	.0
1999	7	13	3	17	29.4	32.78	75.58	33.	3.7
1999	7	21	22	59	1.5	29.01	77.24	5.	1.9
1999	7	27	20	19	9.7	32.58	76.47	10.	3.8
1999	7	28	10	42	52.7	32.53	76.31	10.	2.5
1999	7	29	23	17	48.1	30.02	75.78	48.	.0
1999	7	30	10	7	15.3	32.78	76.77	0.	2.4
1999	7	30	18	18	25.2	32.70	76.63	15.	2.5
1999	7	31	5	11	59.1	32.71	76.75	1.	2.3
1999	7	31	12	14	31.4	32.64	76.75	5.	2.3
1999	7	31	12	36	12.7	32.93	76.79	10.	2.5
1999	7	31	14	46	.4	32.69	76.78	15.	2.2
1999	7	31	17	26	.9	32.98	76.52	46.	2.2
1999	8	1	10	17	11.3	32.90	76.69	20.	.0
1999	8	4	3	17	41.3	32.97	76.56	5.	.0
1999	8	7	20	3	6.9	32.95	76.46	10.	.0
1999	8	10	20	45	8.0	32.01	76.52	15.	.0
1999	8	23	12	19	53.9	31.48	76.98	5.	2.5
1999	8	24	5	39	18.0	32.42	73.57	17.	3.1
1999	8	25	2	19	20.0	31.61	76.76	15.	2.3
1999	9	5	13	0	28.3	32.35	77.23	4.	2.9
1999	9	8	8	30	14.5	32.35	76.11	33.	.0
1999	9	10	3	29	40.5	32.99	77.21	5.	3.1
1999	9	12	9	0	10.8	30.97	77.58	33.	4.0
1999	9	18	16	30	2.5	32.96	75.87	8.	3.8
1999	9	20	23	25	21.0	30.10	77.15	33.	.0
1999	9	26	9	22	41.7	32.23	76.60	5.	2.9
1999	9	26	14	41	20.3	32.52	77.71	5.	.0
1999	9	26	14	43	20.9	32.85	76.83	5.	2.4
1999	9	27	5	58	49.0	32.75	76.79	5.	2.5
1999	9	28	2	56	47.5	32.85	76.84	5.	2.5
1999	9	29	15	47	28.1	29.07	76.50	19.	3.3

1999	10	14	22	3	17.1	32.62	76.47	15.	3.0
1999	10	16	10	30	34.9	31.50	73.67	33.	3.4
1999	10	19	14	3	49.0	32.70	76.43	10.	3.0
1999	10	19	16	2	60.0	32.56	76.35	10.	3.0
1999	10	19	20	24	37.4	32.77	76.39	10.	.0
1999	10	20	16	5	27.0	32.72	76.34	10.	.0
1999	10	20	21	50	19.3	32.67	76.33	5.	.0
1999	10	25	3	4	40.8	30.34	76.13	10.	3.0
1999	10	25	13	28	46.0	32.71	76.35	5.	2.9
1999	10	25	18	12	17.6	32.43	75.36	15.	2.9
1999	10	27	12	22	43.1	32.84	76.13	20.	2.9
1999	10	28	20	34	32.9	32.84	76.64	15.	.0
1999	10	29	5	34	26.4	31.59	77.08	10.	.0
1999	10	30	23	58	25.3	30.08	76.40	5.	2.7
1999	10	31	18	44	57.2	30.55	76.64	35.	.0
1999	11	1	14	10	2.6	30.56	76.96	15.	.0
1999	11	1	23	29	1.2	32.95	76.18	11.	.0
1999	11	3	1	4	39.2	32.80	76.38	5.	3.4
1999	11	5	18	50	16.9	29.03	77.64	5.	1.8
1999	11	7	10	10	16.9	29.02	77.37	20.	2.2
1999	11	8	21	45	12.6	31.44	77.30	3.	4.2
1999	11	9	2	4	36.4	31.32	77.31	15.	2.8
1999	11	9	9	58	37.8	30.97	77.98	15.	2.3
1999	11	11	11	9	53.5	29.35	77.39	13.	2.8
1999	11	18	18	18	7.8	32.60	75.89	15.	.0
1999	11	19	7	37	34.6	31.80	74.98	31.	2.4
1999	11	19	19	35	44.0	30.40	77.47	10.	2.3
1999	11	22	16	21	18.4	31.70	75.07	5.	3.1
1999	11	26	3	58	46.1	29.68	77.83	15.	.0
1999	12	1	8	28	59.0	31.79	76.27	5.	.0
1999	12	3	13	40	57.7	32.56	76.32	7.	2.1
1999	12	3	15	0	33.5	31.83	75.63	15.	.0
1999	12	3	16	21	4.1	32.67	76.37	15.	.0
1999	12	5	19	35	38.0	30.31	77.37	8.	2.7
1999	12	16	13	7	6.4	29.10	76.56	2.	1.9
1999	12	18	8	28	9.9	32.64	76.86	3.	3.0
1999	12	28	8	45	4.5	32.57	76.46	2.	3.1
2000	1	11	15	25	53.3	32.58	76.95	33.	2.4
2000	1	15	4	35	15.1	32.91	76.12	5.	2.0
2000	1	15	17	30	24.5	29.04	77.36	5.	2.4
2000	1	20	23	12	4.3	29.98	76.40	15.	2.5
2000	1	21	7	38	53.2	31.47	77.09	5.	3.3
2000	1	21	22	8	.3	32.27	76.45	10.	2.8
2000	2	2	1	37	48.2	31.66	74.38	33.	3.4
2000	2	7	5	21	.3	32.87	76.71	9.	2.8
2000	2	7	5	23	16.7	32.52	76.71	15.	2.3
2000	2	7	5	26	54.6	32.81	76.63	12.	2.8
2000	2	7	7	24	43.4	32.78	76.46	5.	2.8
2000	2	15	8	36	44.9	32.37	76.21	37.	2.7
2000	2	21	11	55	25.0	32.42	76.48	7.	2.3
2000	2	21	17	15	51.5	32.54	76.44	5.	2.4
2000	2	20	20	53	40.7	31.23	76.91	5.	3.2
2000	3	1	16	19	43.8	31.36	77.17	10.	2.3
2000	3	1	17	2	59.1	29.38	77.04	10.	2.3

2000	3	4	23	2	24.4	31.70	75.89	16.	2.4
2000	3	7	1	9	32.9	30.50	77.82	15.	2.6
2000	3	8	16	10	6.3	31.91	75.84	19.	2.6
2000	3	13	12	30	49.6	29.46	77.10	2.	1.9
2000	3	17	9	45	15.4	31.56	76.99	5.	2.9
2000	3	18	7	33	4.5	31.70	77.48	2.	2.8
2000	3	30	17	46	52.0	32.51	76.64	5.	2.6
2000	4	11	13	39	20.6	29.16	77.08	33.	2.5
2000	4	24	16	20	32.7	32.35	76.57	31.	2.4
2000	5	4	21	44	48.2	31.69	76.90	5.	2.5
2000	5	7	1	52	42.3	31.42	75.08	33.	2.4
2000	5	7	2	9	.9	31.42	75.21	33.	2.4
2000	5	7	4	8	49.9	31.37	75.25	33.	2.3
2000	5	14	3	34	5.4	31.26	77.46	29.	2.0
2000	5	14	17	13	31.4	32.41	76.85	22.	2.6
2000	5	17	12	27	41.5	32.72	76.09	34.	2.3
2000	5	22	18	2	15.9	31.81	77.84	6.	2.9
2000	6	2	6	34	22.7	31.22	74.12	15.	3.7
2000	6	3	22	44	29.3	29.00	77.10	38.	1.8
2000	6	6	6	15	40.4	31.55	77.85	10.	2.9
2000	6	22	20	56	44.7	31.49	73.84	33.	2.7
2000	6	29	18	32	23.6	32.41	76.67	0.	2.4
2000	7	1	6	17	58.2	31.42	77.83	5.	2.3
2000	7	4	5	30	29.4	30.49	77.45	15.	2.5
2000	7	9	11	46	38.3	32.59	76.91	12.	2.6
2000	7	11	16	33	49.1	29.05	76.89	8.	2.2
2000	7	16	2	47	48.1	31.47	76.94	5.	2.4
2000	7	22	9	8	33.3	29.18	77.22	10.	3.1
2000	7	23	20	0	33.0	32.29	76.30	11.	2.8
2000	7	23	20	46	16.7	32.08	76.41	0.	2.0
2000	7	23	23	13	40.5	32.80	75.25	33.	2.5
2000	7	24	12	53	30.2	32.14	75.89	18.	2.4
2000	7	24	13	58	51.8	32.95	76.74	3.	2.5
2000	7	26	23	30	40.8	32.41	76.60	10.	2.9
2000	7	26	23	35	17.0	32.35	76.55	7.	2.4
2000	7	27	5	44	43.0	32.08	76.04	15.	1.8
2000	7	28	9	44	57.3	32.31	76.34	15.	2.6
2000	8	10	21	55	8.5	32.95	76.33	33.	2.4
2000	8	11	3	46	44.4	32.60	75.51	47.	2.3
2000	8	11	17	50	17.3	30.40	74.92	42.	2.5
2000	8	12	8	15	48.8	31.55	77.23	0.	2.5
2000	8	13	4	57	20.4	32.73	76.43	5.	2.6
2000	8	16	18	35	58.5	30.30	77.54	0.	2.2
2000	8	20	0	1	21.7	29.05	76.71	5.	3.0
2000	8	22	3	8	30.5	31.42	76.99	16.	2.6
2000	9	3	16	1	39.9	31.48	77.01	15.	2.3
2000	9	3	23	40	58.8	31.78	75.93	10.	2.5
2000	9	11	20	2	56.7	32.24	76.80	15.	2.5
2000	9	13	14	43	27.2	31.65	77.56	5.	3.7
2000	9	14	17	39	55.7	32.89	76.21	4.	2.5
2000	9	15	0	1	31.7	29.08	76.92	15.	2.0
2000	9	19	2	18	15.1	29.12	76.78	5.	2.3
2000	9	22	8	10	2.6	31.27	77.52	5.	2.4
2000	9	27	14	59	53.6	31.31	77.00	10.	2.9

2000	9	29	19	56	.8	32.86	76.53	8.	2.5
2000	10	9	5	9	37.3	32.54	76.11	28.	2.0
2000	10	13	2	38	48.2	32.71	76.08	33.	3.9
2000	10	19	1	49	45.1	31.70	73.90	33.	4.7
2000	10	21	14	43	30.4	29.86	76.69	33.	2.8
2000	10	28	16	47	1.9	32.60	74.91	34.	2.4
2000	10	28	23	53	13.1	32.90	75.17	32.	2.6
2000	10	29	20	4	3.0	31.55	76.97	33.	2.3
2000	11	10	21	27	45.1	31.97	77.04	23.	2.6
2000	11	16	13	10	41.7	32.88	76.39	15.	2.6
2000	11	16	14	59	56.5	32.81	76.15	4.	2.3
2000	11	16	17	55	48.1	32.84	76.24	33.	2.9
2000	11	16	22	2	37.1	32.76	77.21	38.	2.4
2000	11	17	15	8	55.5	32.96	77.65	33.	2.3
2000	11	22	8	40	32.5	31.07	77.93	5.	4.0
2000	11	23	12	13	19.7	29.08	76.62	11.	3.4
2000	11	27	3	28	2.6	32.47	76.54	5.	2.7
2000	11	27	17	43	59.3	31.44	77.14	1.	2.1
2000	11	28	4	7	30.2	32.96	76.57	5.	3.0
2000	12	1	8	13	48.6	30.96	77.82	17.	2.2
2000	12	5	21	7	.0	32.40	76.55	9.	2.5
2000	12	10	14	37	12.0	32.37	76.47	8.	2.4
2000	12	15	10	41	4.2	32.03	77.55	33.	2.3
2000	12	19	14	15	45.5	29.09	76.62	8.	1.8
2000	12	26	5	37	35.2	32.32	76.35	33.	3.9
2000	12	28	16	18	12.2	29.55	76.98	15.	2.2
2001	1	1	15	28	16.6	29.02	76.75	6.	2.5
2001	1	3	18	14	59.1	29.23	77.08	25.	3.0
2001	1	4	14	20	56.6	29.68	76.81	10.	2.4
2001	1	6	8	51	11.7	29.14	77.10	18.	2.0
2001	1	7	14	42	34.1	30.25	77.39	33.	2.7
2001	1	7	22	48	5.4	31.94	77.10	35.	.0
2001	1	15	16	35	20.2	31.77	75.08	33.	2.6
2001	1	16	4	35	53.9	32.72	76.64	5.	2.8
2001	1	17	1	52	6.1	31.54	77.01	33.	2.5
2001	1	24	1	24	57.9	31.32	76.97	5.	3.3
2001	1	24	1	49	38.4	31.53	77.29	5.	.0
2001	1	24	10	54	54.0	32.73	76.02	5.	2.3
2001	1	24	12	23	53.3	32.63	75.63	5.	2.7
2001	1	24	19	49	44.5	32.77	75.82	33.	2.7
2001	1	30	14	50	45.3	32.89	76.37	10.	3.0
2001	2	3	4	20	46.0	32.32	74.89	38.	.0
2001	2	4	17	51	52.6	31.59	77.94	5.	2.6
2001	2	23	15	17	14.6	29.46	77.52	15.	3.1
2001	2	23	21	12	30.0	31.02	77.99	3.	2.4
2001	2	28	20	49	36.6	32.85	76.63	8.	2.5
2001	3	1	21	29	52.1	32.42	74.92	33.	2.6
2001	3	6	17	59	39.6	32.91	74.76	28.	2.8
2001	3	17	0	50	14.9	31.09	77.41	33.	2.6
2001	3	26	9	43	41.6	29.12	76.65	15.	2.6
2001	3	27	21	31	33.9	32.99	74.80	33.	3.1
2001	4	12	14	35	3.8	31.44	77.69	5.	2.9
2001	4	13	3	25	27.1	32.74	75.05	75.	2.5
2001	4	14	11	32	56.6	31.23	77.39	33.	2.4

2001	4	18	23	32	26.5	32.62	74.82	33.	2.6
2001	4	25	18	28	52.4	32.77	76.59	15.	3.1
2001	4	25	18	33	19.9	32.88	76.82	4.	2.9
2001	4	25	18	37	1.9	32.71	76.74	8.	2.7
2001	4	25	19	9	29.3	32.96	76.80	8.	2.5
2001	4	25	21	6	23.9	32.86	76.75	15.	2.6
2001	4	26	0	29	11.2	32.78	76.79	8.	2.4
2001	4	26	3	1	2.2	32.87	76.73	15.	2.5
2001	4	26	3	47	26.9	32.93	76.67	15.	2.8
2001	4	27	23	38	49.6	32.90	76.94	15.	2.6
2001	5	8	23	5	21.4	31.58	77.32	9.	2.5
2001	5	9	2	39	42.8	32.87	76.04	33.	2.5
2001	5	23	18	6	39.3	32.73	74.92	37.	2.5
2001	6	1	19	11	37.5	31.74	77.57	10.	3.4
2001	6	8	21	1	14.5	32.29	76.46	33.	2.9
2001	6	10	6	5	35.3	30.84	77.82	10.	2.6
2001	6	13	19	49	18.8	32.70	74.88	11.	2.5
2001	6	16	21	33	10.9	31.96	76.52	17.	2.3
2001	6	23	2	33	31.6	30.27	77.53	11.	3.4
2001	6	26	10	55	45.5	31.54	75.08	20.	2.8
2001	6	28	12	55	30.6	31.62	77.32	12.	2.0
2001	6	28	23	25	9.0	32.75	74.77	10.	3.1
2001	7	8	7	14	30.0	29.01	76.93	10.	1.8
2001	7	13	14	8	42.5	32.27	76.87	15.	2.4
2001	7	13	22	30	1.9	29.09	77.38	33.	1.4
2001	7	14	0	7	18.3	31.32	73.09	33.	4.2
2001	7	17	6	35	8.3	29.04	77.47	15.	2.6
2001	7	25	13	5	11.1	31.34	77.50	15.	2.8
2001	8	11	19	24	9.3	32.86	76.25	10.	2.2
2001	8	12	9	0	46.4	29.06	77.42	22.	2.2
2001	8	20	21	12	23.2	32.44	76.49	2.	2.7
2001	8	23	18	23	20.3	29.08	76.98	9.	2.3
2001	9	11	0	54	53.3	32.96	76.20	15.	2.3
2001	9	12	15	26	21.3	32.89	75.72	15.	2.1
2001	9	13	10	19	1.0	29.24	77.29	15.	4.0
2001	9	13	23	51	18.9	31.36	77.74	5.	2.7
2001	9	14	14	31	29.9	29.22	77.23	15.	2.1
2001	9	15	23	56	36.6	32.44	75.92	33.	2.0
2001	9	18	3	18	12.7	31.36	77.04	4.	2.3
2001	9	23	6	59	4.5	29.19	77.29	18.	2.7
2001	9	30	20	59	28.6	32.88	76.19	0.	1.6
2001	10	1	18	9	34.5	32.21	76.09	33.	.0
2001	10	2	8	37	53.0	31.42	77.09	20.	2.9
2001	10	3	0	34	26.4	32.87	76.26	20.	2.0
2001	10	7	12	22	19.3	31.96	76.54	15.	.0
2001	10	9	5	11	50.5	30.24	77.42	10.	2.6
2001	10	9	8	56	23.5	29.08	76.65	7.	2.5
2001	10	9	23	18	15.5	29.17	77.37	10.	2.2
2001	10	12	20	55	13.9	32.94	75.87	20.	2.3
2001	10	14	21	14	41.0	32.52	76.01	15.	4.7
2001	10	15	16	0	17.2	32.69	75.91	20.	1.9
2001	10	20	18	16	3.7	29.24	77.40	6.	3.3
2001	10	25	17	54	23.7	31.82	77.35	33.	1.6
2001	10	27	4	51	14.8	32.90	76.08	3.	2.1

2001	10	27	12	54	6.9	29.02	76.75	10.	2.2
2001	10	28	12	17	34.1	32.92	76.01	15.	2.2
2001	11	1	1	50	16.4	30.52	76.07	18.	2.7
2001	11	2	10	21	14.3	32.43	73.18	33.	3.5
2001	11	10	5	47	13.0	32.88	76.21	2.	2.6
2001	11	15	6	40	22.4	32.86	75.97	10.	2.7
2001	11	15	11	19	27.0	32.93	76.08	15.	2.2
2001	11	20	11	57	19.9	29.16	77.34	15.	2.2
2001	12	9	1	40	6.8	29.38	77.60	10.	2.4
2001	12	25	1	16	51.8	30.03	76.30	13.	3.1
2001	12	27	15	38	47.6	32.58	76.78	14.	2.5
2002	1	4	2	38	4.3	31.93	74.15	20.	3.1
2002	1	5	17	10	23.2	32.45	76.34	10.	1.9
2002	1	6	20	55	28.6	31.93	76.63	2.	2.3
2002	1	19	17	42	17.2	32.94	76.55	15.	2.0
2002	1	21	12	42	8.0	32.91	76.04	7.	2.2
2002	1	23	21	47	28.0	32.29	76.09	15.	.0
2002	1	27	22	22	22.6	31.22	74.51	24.	4.0
2002	1	28	3	28	37.4	32.72	74.82	23.	2.8
2002	1	31	5	48	13.4	32.81	75.82	33.	2.7
2002	1	31	19	2	29.9	32.77	75.58	33.	2.7
2002	2	3	19	9	21.8	31.45	73.56	21.	3.6
2002	2	6	20	31	51.5	32.81	75.90	15.	2.5
2002	2	7	0	30	36.9	32.90	75.58	12.	2.4
2002	2	7	2	19	1.3	31.68	77.31	20.	2.3
2002	2	10	13	23	53.6	32.90	75.43	10.	2.6
2002	2	12	3	38	42.1	32.92	75.54	10.	2.7
2002	2	14	14	58	8.6	32.74	75.49	10.	2.6
2002	2	15	23	36	13.2	32.96	75.56	10.	2.9
2002	2	15	23	47	29.4	32.85	75.35	10.	2.7
2002	2	16	0	37	45.8	32.94	75.46	10.	2.5
2002	2	16	4	34	56.7	31.42	74.68	15.	2.8
2002	2	17	6	27	55.8	32.85	75.67	10.	3.1
2002	2	17	9	24	13.8	32.69	76.03	15.	2.8
2002	2	17	21	36	27.9	32.91	75.54	10.	2.4
2002	2	18	11	10	53.1	32.62	75.38	33.	2.6
2002	2	20	0	39	1.8	32.69	75.73	10.	2.2
2002	2	21	16	41	42.2	32.97	75.69	10.	3.1
2002	2	22	16	41	6.8	32.91	75.96	10.	2.9
2002	2	23	4	28	54.1	32.46	76.47	15.	2.7
2002	2	23	17	37	50.9	32.63	76.14	10.	2.6
2002	2	28	17	30	5.5	32.82	76.35	57.	2.6
2002	3	3	9	49	21.1	32.07	76.68	33.	2.7
2002	3	7	10	18	26.5	31.80	76.19	15.	2.8
2002	3	14	3	37	53.3	32.67	75.15	15.	2.4
2002	3	15	18	31	20.8	32.15	75.45	15.	3.0
2002	3	16	20	50	45.4	32.60	76.09	15.	2.9
2002	3	17	2	55	57.6	32.42	74.91	15.	2.5
2002	3	17	11	38	5.8	32.95	76.38	15.	2.4
2002	3	18	4	29	13.7	32.78	75.77	10.	4.1
2002	3	18	10	50	46.2	32.05	75.00	15.	2.5
2002	3	23	23	25	50.6	29.40	77.72	33.	2.3
2002	3	26	13	0	43.9	32.98	75.30	10.	2.7
2002	4	2	11	42	16.7	29.19	77.30	4.	2.9

2002	4	9	21	28	32.4	29.26	76.03	14.	2.3
2002	4	16	6	54	16.8	31.10	77.46	35.	2.9
2002	4	17	15	59	40.7	32.90	77.73	15.	.0
2002	4	21	15	32	1.6	32.70	77.10	15.	3.1
2002	4	26	11	37	31.1	30.08	76.57	33.	.0
2002	5	13	17	36	3.8	29.29	77.28	11.	3.1
2002	6	19	10	10	18.4	29.24	76.47	13.	3.5
2002	6	19	18	21	58.1	32.60	76.54	2.	2.5
2002	6	24	16	45	1.9	32.02	73.29	33.	2.9
2002	6	26	0	40	6.1	32.89	76.78	2.	2.4
2002	6	26	1	20	30.1	32.85	76.78	5.	2.5
2002	6	28	1	42	12.2	32.56	76.37	15.	.0
2002	7	3	9	30	19.0	29.12	77.42	16.	2.8
2002	7	3	19	58	36.5	32.41	76.82	10.	2.5
2002	7	9	22	8	11.1	29.24	76.46	10.	2.4
2002	7	11	1	36	47.1	32.03	75.55	10.	2.5
2002	7	15	12	34	45.1	29.06	76.50	15.	2.9
2002	7	22	15	57	1.2	29.77	77.35	33.	2.7
2002	7	26	19	37	51.4	32.98	76.34	10.	2.7
2002	8	4	17	22	25.6	32.92	74.77	33.	2.4
2002	8	5	2	4	43.3	31.26	77.58	13.	2.1
2002	8	12	11	18	31.0	31.11	76.83	35.	3.3
2002	8	20	4	36	40.1	32.97	76.44	8.	2.6
2002	8	28	15	40	56.8	29.09	76.68	10.	2.9
2002	9	2	20	14	15.3	33.00	75.84	33.	2.4
2002	9	4	16	11	59.2	31.51	77.97	33.	3.9
2002	9	4	21	30	37.2	31.46	77.90	33.	3.3
2002	9	7	13	15	24.9	32.58	74.81	33.	2.6
2002	9	11	17	6	43.5	29.03	76.53	33.	2.8
2002	9	12	6	57	14.6	32.82	75.31	33.	2.9
2002	9	13	22	39	44.8	31.52	77.80	19.	2.9
2002	9	17	22	56	12.9	32.53	74.80	33.	3.3
2002	9	24	4	5	20.7	32.46	76.63	10.	3.6
2002	10	3	7	23	12.2	31.37	73.68	10.	4.2
2002	10	6	3	27	56.6	29.08	76.86	6.	2.7
2002	10	8	4	48	17.9	31.55	77.11	20.	3.8
2002	10	8	17	1	5.5	32.87	75.97	12.	2.5
2002	10	11	6	13	6.8	31.86	77.42	19.	.0
2002	10	13	0	46	51.6	29.58	77.42	10.	2.5
2002	10	16	16	55	12.0	30.97	77.86	5.	2.7
2002	10	26	17	4	53.3	29.09	77.59	10.	2.4
2002	10	29	15	7	19.4	31.26	77.08	10.	2.6
2002	10	30	23	11	39.0	32.96	75.81	33.	2.4
2002	11	14	1	36	27.1	32.54	75.80	33.	2.4
2002	11	17	21	43	43.5	31.66	77.98	14.	2.9
2002	11	28	19	29	51.3	31.53	77.09	5.	2.4
2002	11	30	15	32	38.3	32.37	76.74	10.	2.5
2002	11	30	22	54	50.0	32.58	76.92	15.	3.0
2002	12	8	18	12	25.8	31.42	77.18	13.	2.8
2002	12	14	12	41	6.4	31.64	77.16	10.	2.8
2002	12	26	17	22	46.9	32.97	75.32	26.	2.5
2002	12	27	12	59	48.1	33.00	75.51	17.	2.4
2002	12	31	19	50	34.1	32.67	76.55	10.	2.6
2003	1	6	23	21	13.0	32.83	76.07	33.	2.9

2003	1	6	23	33	21.8	32.08	75.33	33.	2.8
2003	1	10	2	36	1.5	33.00	76.25	26.	3.2
2003	1	10	17	30	30.6	32.69	76.06	15.	.0
2003	1	14	0	46	9.6	32.52	73.58	100.	2.8
2003	1	17	3	36	20.2	29.19	76.93	5.	3.1
2003	1	17	19	55	12.7	29.23	77.13	10.	2.4
2003	1	19	12	0	17.3	32.27	76.81	10.	2.6
2003	1	22	20	17	21.8	33.00	76.35	10.	3.0
2003	1	22	20	24	14.2	32.76	76.60	10.	3.0
2003	2	1	6	54	46.7	31.32	73.71	10.	3.0
2003	2	1	10	56	32.3	29.84	77.12	10.	2.7
2003	2	3	23	2	23.7	31.87	76.86	12.	2.8
2003	2	5	14	35	26.0	32.80	75.91	15.	2.9
2003	2	11	15	0	31.9	30.60	77.00	4.	3.3
2003	2	15	6	37	6.1	29.30	77.22	4.	2.6
2003	2	17	2	49	26.5	31.98	75.97	128.	2.9
2003	2	17	10	21	19.6	31.87	73.02	15.	2.9
2003	3	3	10	22	7.3	31.96	77.78	33.	2.0
2003	3	6	20	32	56.1	32.66	74.68	10.	2.7
2003	3	9	17	17	5.9	29.17	77.18	12.	1.9
2003	3	11	20	19	33.9	29.06	77.59	32.	2.6
2003	4	2	19	23	20.2	29.04	76.58	12.	3.1
2003	4	10	19	56	54.9	29.03	76.62	15.	2.0
2003	4	12	18	22	30.7	30.98	77.36	6.	2.7
2003	4	15	2	30	52.8	31.48	76.82	35.	2.2
2003	4	16	12	23	29.7	31.58	77.12	5.	2.5
2003	4	17	14	34	45.1	31.75	76.13	33.	2.3
2003	4	20	15	12	4.8	32.97	75.76	17.	2.7
2003	4	21	23	50	31.8	31.42	77.70	4.	3.0
2003	4	25	17	10	1.7	32.97	76.69	24.	2.9
2003	4	27	19	17	22.3	32.72	76.78	5.	2.9
2003	4	29	0	31	35.1	30.55	77.59	16.	3.1
2003	4	29	9	35	54.7	32.90	76.73	33.	2.6
2003	5	6	11	33	49.5	31.10	77.05	169.	2.9
2003	5	10	2	23	52.9	32.88	75.89	100.	2.9
2003	5	12	3	48	29.8	31.64	77.02	10.	2.9
2003	5	26	15	3	57.7	29.09	76.68	15.	2.0
2003	5	29	8	43	29.5	29.09	77.43	22.	2.2
2003	6	4	17	38	38.0	32.28	75.96	17.	2.3
2003	6	6	2	17	11.0	32.36	77.28	6.	2.6
2003	6	15	15	2	55.3	29.11	76.87	8.	2.9
2003	6	20	22	59	12.6	29.01	76.61	5.	2.3
2003	6	24	22	35	21.5	31.15	77.73	18.	2.8
2003	7	3	1	8	16.6	31.42	77.72	13.	3.4
2003	7	5	23	53	47.7	32.94	75.91	1.	3.0
2003	7	11	2	34	13.7	31.53	74.15	33.	2.5
2003	7	12	6	8	26.4	32.77	75.95	38.	2.5
2003	7	15	18	15	38.9	31.50	77.39	100.	2.7
2003	7	23	22	7	12.2	29.32	77.12	2.	2.2
2003	8	7	11	27	49.3	32.94	76.37	10.	.0
2003	8	8	9	49	48.1	31.62	77.03	15.	2.7
2003	8	13	11	15	18.0	30.80	77.62	33.	2.0
2003	8	15	12	19	5.9	30.51	76.83	20.	.0
2003	8	18	20	46	32.6	29.06	77.87	15.	2.2

2003	8	19	20	1	10.4	32.59	76.70	15.	2.8
2003	8	27	9	8	14.4	31.36	77.97	20.	2.3
2003	8	28	12	5	44.0	31.44	77.07	14.	2.1
2003	8	28	13	1	55.7	29.04	76.70	15.	3.5
2003	8	30	15	8	41.9	29.08	76.69	12.	2.0
2003	8	30	23	56	16.7	31.60	77.70	10.	.0
2003	9	1	0	40	13.0	32.35	77.77	33.	3.1
2003	9	6	7	40	11.0	31.38	77.71	33.	2.7
2003	9	6	7	43	4.4	31.36	77.66	33.	2.8
2003	9	8	15	53	32.4	32.93	76.08	33.	2.5
2003	9	13	14	26	12.0	29.01	76.31	20.	2.0
2003	9	13	19	36	40.9	29.02	76.72	5.	3.4
2003	9	15	12	28	48.8	32.91	76.15	33.	3.5
2003	9	21	10	23	50.9	29.08	76.58	12.	1.7
2003	9	27	15	40	51.1	31.54	75.65	10.	3.8
2003	9	27	16	48	48.1	31.69	75.43	33.	2.4
2003	9	28	6	12	3.8	31.60	75.83	33.	2.3
2003	9	28	18	23	40.7	31.60	75.78	33.	2.8
2003	9	30	9	8	53.2	32.90	77.21	10.	3.2
2003	9	30	23	14	52.4	32.06	76.34	7.	2.7
2003	10	4	0	11	4.7	31.21	77.83	10.	2.5
2003	10	19	4	49	37.5	31.29	73.72	10.	3.3
2003	10	24	5	44	25.9	32.67	75.55	10.	3.2
2003	10	31	12	9	44.5	29.21	76.43	10.	2.1
2003	11	2	0	6	24.9	29.16	76.39	10.	2.6
2003	11	2	4	9	17.6	29.10	76.11	16.	1.8
2003	11	4	17	56	29.1	29.14	76.42	16.	2.6
2003	11	6	9	24	22.5	29.14	76.41	26.	2.0
2003	11	12	1	17	43.5	29.05	76.48	12.	2.7
2003	11	13	15	21	30.8	29.11	76.44	10.	2.7
2003	11	16	17	43	2.0	29.00	76.49	20.	2.2
2003	11	16	18	44	11.5	29.26	76.40	5.	2.0
2003	11	16	19	49	54.4	29.20	76.43	12.	1.7
2003	11	16	23	41	51.8	29.16	76.85	26.	2.2
2003	11	18	4	1	.4	29.08	76.41	10.	2.3
2003	11	19	23	9	46.1	32.37	76.34	15.	2.8
2003	11	24	22	47	21.1	32.55	76.51	19.	3.6
2003	11	24	22	56	28.2	32.42	76.38	10.	2.1
2003	11	27	2	28	54.9	32.44	76.57	10.	2.8
2003	11	27	21	9	39.5	32.72	76.72	17.	2.1
2003	11	29	14	47	30.2	29.28	76.37	15.	3.0
2003	12	2	21	57	2.7	31.64	77.90	10.	2.6
2003	12	12	2	9	49.4	29.12	76.41	5.	1.6
2003	12	12	17	34	3.1	32.83	76.11	33.	3.3
2003	12	13	22	57	44.1	31.76	77.30	46.	2.6
2003	12	21	2	14	8.1	32.45	76.43	33.	3.6
2003	12	21	2	33	56.4	32.55	76.52	10.	2.7
2003	12	22	20	19	8.2	29.24	76.40	4.	3.5
2003	12	23	0	17	32.3	29.22	76.36	5.	2.9
2003	12	23	15	52	7.7	32.08	76.65	9.	3.1
2003	12	23	19	25	50.5	29.28	77.74	28.	2.9
2003	12	25	6	35	51.0	32.95	76.18	9.	3.1
2003	12	25	8	40	45.3	29.26	76.35	5.	3.0
2003	12	26	22	26	52.8	32.01	76.66	23.	3.2

2003	12	29	7	0	45.6	29.24	76.41	5.	2.0
2003	12	31	21	58	59.3	31.75	74.36	9.	3.2
2004	1	13	10	23	11.4	29.22	76.48	5.	2.3
2004	1	14	1	30	57.6	29.17	76.49	11.	2.1
2004	1	15	22	12	18.3	29.01	77.19	10.	1.7
2004	2	1	19	40	35.1	31.58	77.23	10.	2.4
2004	2	6	13	39	17.1	31.52	77.29	1.	2.3
2004	2	14	2	55	8.9	29.01	77.28	32.	1.8
2004	2	20	2	52	48.5	32.75	76.53	10.	1.6
2004	2	22	8	23	3.5	32.49	76.09	15.	2.9
2004	2	22	10	25	10.7	29.04	76.64	10.	2.3
2004	3	6	16	54	12.1	32.62	75.96	10.	2.5
2004	3	13	5	22	18.3	32.38	76.17	28.	2.6
2004	3	21	8	53	27.9	29.32	76.38	15.	2.5
2004	3	22	18	1	5.9	31.22	77.98	6.	3.2
2004	3	26	20	2	9.0	32.93	74.49	58.	3.4
2004	3	27	4	22	25.3	31.77	75.74	96.	2.7
2004	3	29	3	41	42.5	31.82	75.38	15.	2.8
2004	3	30	9	21	29.9	29.04	76.66	16.	2.0
2004	3	30	20	54	2.8	32.84	76.12	15.	3.6
2004	4	28	12	48	40.8	29.00	76.64	15.	2.0
2004	5	3	16	55	5.7	29.25	76.47	5.	3.0
2004	5	15	3	12	53.9	29.19	76.40	13.	2.3
2004	5	15	7	32	14.5	29.15	76.37	5.	1.8
2004	5	15	17	22	2.8	29.20	77.51	26.	1.9
2004	5	15	19	31	9.4	29.18	77.19	9.	1.7
2004	5	16	7	1	36.2	29.30	77.29	11.	2.6
2004	5	17	17	40	5.4	29.00	76.68	9.	2.0
2004	5	22	14	45	55.0	29.14	76.46	18.	2.6
2004	5	29	19	47	23.0	29.06	76.71	18.	1.9
2004	6	3	10	13	50.2	29.00	76.67	14.	2.2
2004	6	26	22	45	51.8	31.56	74.47	40.	2.9
2004	6	29	13	50	13.6	29.01	76.68	15.	2.1
2004	6	29	14	41	51.5	31.72	76.96	36.	2.4
2004	6	29	19	17	36.2	29.12	76.42	15.	2.3
2004	6	29	23	20	1.0	29.24	76.44	19.	2.8
2004	7	27	12	6	4.1	29.14	76.66	10.	2.0
2004	7	31	12	21	51.0	29.03	76.68	16.	2.5
2004	8	23	2	16	9.0	32.90	75.75	10.	2.9
2004	9	12	23	25	30.7	32.35	77.72	13.	3.5
2004	9	14	4	35	2.0	29.23	76.37	3.	1.9
2004	9	18	12	53	57.1	29.51	76.75	12.	1.8
2004	10	2	13	6	7.9	32.29	75.05	4.	2.4
2004	10	3	16	0	51.0	32.74	74.53	106.	3.1
2004	10	5	17	0	29.2	29.00	76.68	2.	2.7
2004	10	9	11	34	41.5	29.23	76.43	4.	2.8
2004	10	14	5	45	6.2	29.23	76.39	8.	1.7
2004	10	15	11	23	48.5	29.10	76.66	11.	2.2
2004	11	1	4	3	52.8	31.68	77.23	15.	2.9
2004	11	8	19	45	1.2	29.16	76.41	19.	2.7
2004	11	9	0	37	29.7	29.80	76.63	5.	2.1
2004	11	11	2	13	39.2	32.53	76.52	10.	4.7
2004	11	11	2	46	50.5	32.22	76.17	15.	3.9
2004	11	26	23	53	54.3	30.65	77.13	19.	3.9

2004	11	28	17	19	48.1	29.02	76.67	14.	2.2
2004	11	30	12	58	48.2	29.26	77.72	27.	1.8
2004	12	4	20	21	36.6	29.15	77.30	38.	1.8
2004	12	9	9	10	18.9	32.51	76.71	10.	2.7
2004	12	9	16	36	.7	29.15	77.68	7.	1.9
2004	12	14	16	41	57.9	32.72	74.53	10.	2.7
2004	12	17	17	56	36.7	32.69	76.36	2.	3.0
2004	12	18	7	27	56.7	32.02	74.24	38.	2.6
2004	12	18	15	39	16.9	29.00	76.63	3.	2.6
2004	12	30	17	5	25.1	32.81	75.94	33.	4.0
2005	1	5	8	49	49.8	29.05	77.02	17.	2.3
2005	1	8	15	16	30.7	30.80	73.21	33.	3.4
2005	1	9	16	43	38.2	31.23	77.44	15.	3.1
2005	1	23	0	35	20.3	29.02	76.71	10.	2.1
2005	2	4	15	11	57.2	32.26	76.60	15.	2.7
2005	2	5	14	0	39.4	31.54	77.61	4.	3.3
2005	2	6	3	22	56.1	31.31	77.84	10.	2.5
2005	2	7	16	3	48.0	32.24	75.03	10.	3.7
2005	2	7	21	0	30.9	29.15	76.50	10.	2.5
2005	2	8	2	59	27.2	29.26	76.42	14.	2.7
2005	2	12	10	33	21.9	29.74	77.27	23.	2.5
2005	2	15	21	48	36.5	31.54	74.85	5.	3.8
2005	2	25	22	0	23.0	31.06	77.63	10.	3.0
2005	2	28	16	4	46.3	32.70	76.31	33.	4.0
2005	2	28	18	1	58.5	32.46	76.43	3.	4.9
2005	3	1	10	25	38.8	29.30	77.21	16.	2.7
2005	3	1	15	20	3.2	32.45	76.46	10.	2.2
2005	3	2	13	40	3.8	32.37	76.45	10.	2.1
2005	3	3	21	5	56.4	29.12	77.52	19.	2.0
2005	3	3	21	49	54.8	32.60	76.59	10.	2.3
2005	3	6	2	3	30.1	32.48	76.52	17.	2.5
2005	3	7	12	30	34.6	31.77	77.91	10.	2.8
2005	3	25	15	57	55.0	29.39	77.84	5.	2.2
2005	3	26	0	59	53.2	32.91	73.72	17.	3.0
2005	3	26	7	34	34.8	29.01	76.61	15.	1.5
2005	3	28	4	41	28.0	31.56	74.21	38.	2.8
2005	3	29	22	12	58.4	29.22	77.30	4.	1.9
2005	3	31	3	36	27.8	29.07	76.93	45.	2.7
2005	4	4	0	33	40.0	32.62	76.51	15.	2.2
2005	4	8	17	7	40.3	31.62	76.88	10.	3.2
2005	4	9	4	15	46.8	29.04	77.68	15.	2.2
2005	4	14	7	11	27.0	32.41	76.31	10.	4.7
2005	4	14	8	25	46.7	32.80	76.36	15.	2.5
2005	4	18	20	10	33.2	32.65	76.29	6.	4.0
2005	4	20	7	5	21.9	31.07	74.32	20.	3.3
2005	4	23	19	58	45.0	32.79	76.41	11.	2.4
2005	4	25	23	44	43.9	29.00	77.04	16.	2.3
2005	5	1	13	4	11.4	32.63	75.91	10.	3.0
2005	5	5	20	56	36.0	32.65	75.68	40.	2.7
2005	5	12	11	34	44.2	32.26	77.68	38.	2.9
2005	6	1	0	40	28.4	31.28	77.10	7.	2.2
2005	6	6	21	55	18.4	32.28	75.72	33.	2.8
2005	6	10	23	53	20.6	29.32	77.03	9.	2.6
2005	6	25	1	43	3.5	32.34	75.18	10.	2.5

2005	6	25	12	21	10.6	32.90	75.87	10.	2.2
2005	7	4	19	44	6.3	32.65	76.44	10.	4.3
2005	7	9	19	9	48.7	31.96	73.21	10.	2.8
2005	7	16	2	46	15.4	29.08	76.40	13.	2.8
2005	7	17	11	20	13.2	32.17	73.22	37.	2.8
2005	7	25	19	8	20.1	31.18	77.80	6.	2.3
2005	7	28	9	48	11.5	29.40	76.97	17.	2.3
2005	7	30	21	51	47.3	29.30	77.96	33.	1.9
2005	7	31	11	45	41.6	32.42	75.72	33.	2.8
2005	8	4	16	17	31.7	32.41	76.42	10.	2.6
2005	8	15	19	34	37.2	30.56	73.39	10.	2.3
2005	8	19	9	5	27.3	32.51	75.00	145.	2.7
2005	8	25	4	10	21.5	32.80	75.72	10.	2.9
2005	8	31	4	0	12.2	29.06	76.68	15.	2.4
2005	9	2	19	56	5.0	32.13	76.19	10.	2.6
2005	9	4	5	15	30.0	29.35	77.12	2.	2.5
2005	9	6	21	15	11.9	29.88	77.99	10.	2.5
2005	9	10	0	0	50.7	31.15	77.87	5.	2.8
2005	9	10	1	49	27.8	31.39	73.72	3.	3.0
2005	9	10	18	20	52.0	29.17	74.12	10.	3.2
2005	9	11	5	8	41.3	30.95	76.15	48.	2.1
2005	9	12	4	42	59.2	31.75	77.33	10.	2.7
2005	9	15	23	48	2.5	31.10	76.91	13.	2.8
2005	9	25	1	8	16.3	31.02	76.34	5.	3.6
2005	10	4	6	47	50.5	31.35	76.14	10.	2.5
2005	10	6	17	35	5.4	31.50	77.12	15.	1.3
2005	10	8	11	30	35.5	32.67	76.86	10.	4.0
2005	10	14	23	7	12.8	32.53	76.48	16.	3.9
2005	10	18	6	18	38.3	32.81	77.74	15.	3.3
2005	10	19	18	27	37.2	32.90	77.39	39.	3.2
2005	10	22	16	1	16.2	29.06	77.84	11.	2.5
2005	11	2	8	53	2.7	31.14	76.02	10.	3.0
2005	11	2	18	21	49.8	32.25	74.57	10.	2.4
2005	11	12	20	0	12.3	32.64	76.23	35.	2.8
2005	11	17	14	58	8.9	31.62	73.77	10.	3.1
2005	11	18	18	21	38.2	31.71	73.59	18.	2.8
2005	11	23	8	17	38.6	31.76	76.57	10.	1.9
2005	11	24	19	10	57.5	32.20	77.78	33.	3.6
2005	12	1	6	47	36.2	32.98	76.12	63.	2.7
2005	12	11	11	17	37.2	32.48	77.68	33.	2.6
2005	12	20	8	26	27.4	31.60	77.94	10.	3.5
2005	12	20	18	45	51.2	32.87	76.24	18.	3.1
2005	12	23	1	57	22.8	30.78	77.28	10.	2.7
2005	12	26	7	14	23.7	32.43	76.37	15.	3.0
2005	12	26	9	20	45.5	32.03	76.71	10.	1.7
2006	1	6	22	50	37.9	29.60	75.79	26.	2.1
2006	1	9	6	17	50.8	32.67	76.51	5.	2.6
2006	1	12	17	2	51.9	32.90	76.47	2.	2.7
2006	1	16	0	10	51.0	32.91	76.37	49.	2.1
2006	1	16	0	15	11.9	31.90	76.04	5.	1.7
2006	1	16	2	3	24.3	32.81	76.57	8.	2.5
2006	1	24	7	3	28.7	29.02	76.53	11.	2.5
2006	2	1	5	33	34.4	32.26	76.75	33.	2.7
2006	2	4	2	53	37.2	32.08	77.11	15.	2.5

2006	2	13	9	19	45.0	31.64	74.02	10.	2.8
2006	2	15	1	37	45.1	29.19	76.61	4.	3.4
2006	2	18	4	46	20.3	29.06	76.68	20.	1.6
2006	2	19	5	15	31.3	29.07	76.60	5.	2.0
2006	2	21	9	23	51.6	31.91	76.99	8.	2.6
2006	2	23	11	30	1.0	29.01	76.66	16.	2.1
2006	2	23	18	13	50.9	32.90	75.85	20.	2.6
2006	2	26	13	4	14.5	31.42	73.52	26.	3.2
2006	3	9	8	53	2.7	29.01	76.39	12.	1.5
2006	3	9	9	51	.1	32.87	76.55	33.	2.9
2006	3	11	12	6	41.5	32.91	73.13	41.	2.8
2006	3	19	20	45	59.0	31.55	77.29	10.	2.3
2006	3	20	7	43	14.8	29.02	76.67	14.	2.0
2006	3	27	1	47	9.4	32.97	76.44	10.	2.9
2006	3	31	1	48	44.1	29.02	76.84	15.	2.6
2006	4	10	14	11	58.7	29.12	76.64	5.	3.0
2006	4	11	23	21	8.5	29.29	76.91	39.	2.4
2006	4	21	23	20	55.4	32.60	76.60	33.	3.8
2006	5	1	18	8	45.6	29.33	76.86	38.	1.7
2006	5	1	19	33	47.3	32.29	76.57	10.	2.9
2006	5	2	2	41	40.7	29.02	76.69	14.	1.5
2006	5	2	3	26	11.8	29.02	76.64	10.	1.8
2006	5	2	22	31	5.8	32.28	76.80	5.	2.7
2006	5	9	13	30	22.0	32.64	76.56	10.	4.3
2006	5	22	12	20	59.8	30.86	77.64	6.	2.8
2006	6	13	1	39	51.0	29.11	76.84	39.	2.1
2006	6	22	21	55	35.8	31.66	75.47	10.	2.8
2006	6	22	23	21	11.3	31.78	75.46	15.	2.8
2006	6	23	16	13	40.2	32.44	76.42	13.	2.9
2006	6	24	3	12	30.0	32.37	76.60	10.	2.9
2006	6	26	2	12	45.8	31.45	77.55	5.	1.9
2006	7	7	6	49	28.2	32.61	75.66	15.	3.2
2006	7	9	3	40	54.6	32.67	76.18	4.	2.7
2006	7	16	6	51	39.6	29.06	76.73	22.	2.5
2006	7	28	20	0	21.9	30.92	77.67	7.	2.4
2006	8	2	12	52	1.0	32.13	77.78	15.	3.0
2006	8	12	7	3	11.3	30.09	76.22	22.	2.4
2006	8	29	2	15	53.7	30.99	74.65	30.	2.6
2006	9	3	16	26	50.2	29.54	76.55	38.	2.3
2006	9	11	8	52	25.0	29.28	76.63	20.	2.0
2006	9	13	4	23	6.3	32.98	76.63	33.	3.5
2006	9	17	19	40	57.2	29.03	76.95	5.	2.0
2006	9	20	10	39	1.5	29.05	76.57	5.	2.6
2006	9	24	1	31	17.4	30.54	75.14	10.	2.6
2006	9	29	8	0	32.2	31.06	76.98	37.	3.1
2006	10	21	5	12	56.0	29.28	76.66	24.	2.5
2006	10	25	10	41	8.0	31.64	77.11	25.	2.1
2006	10	29	17	32	21.0	29.09	77.03	39.	1.6
2006	11	1	20	44	28.9	31.60	76.52	10.	2.1
2006	11	10	18	55	51.6	32.09	75.86	33.	2.6
2006	11	13	6	39	48.7	30.10	76.45	10.	2.1
2006	11	17	13	28	5.8	29.03	76.65	10.	1.9
2006	11	24	13	36	53.8	32.98	75.94	14.	2.7
2006	11	25	6	16	43.0	32.04	74.76	10.	2.6

2006	11	26	14	36	5.3	32.23	76.88	33.	2.2
2006	12	4	18	41	56.4	32.15	76.56	10.	2.2
2006	12	8	3	49	14.8	30.43	73.04	33.	2.6
2006	12	9	20	13	50.9	29.01	76.70	10.	1.9
2006	12	10	8	0	39.2	31.58	77.05	10.	3.1
2006	12	10	8	19	27.7	31.50	76.93	10.	3.6
2006	12	18	4	1	6.5	32.19	75.76	33.	2.8
2006	12	21	11	47	26.3	32.76	76.61	10.	3.2
2006	12	22	4	54	11.4	32.76	76.61	10.	2.8
2006	12	22	18	18	25.4	32.94	76.53	33.	3.0
2006	12	22	18	21	28.8	32.55	76.65	10.	2.4
2006	12	22	18	46	46.9	32.82	76.66	15.	2.9
2006	12	22	18	51	54.5	32.72	76.61	10.	2.9
2006	12	23	11	28	5.4	31.39	75.78	10.	2.6
2006	12	24	19	46	18.9	30.89	76.79	42.	2.5
2006	12	24	19	50	26.7	31.42	76.85	10.	2.4
2006	12	24	20	32	.4	31.52	76.95	5.	2.6
2006	12	25	1	5	34.6	30.81	76.59	10.	3.2
2006	12	25	1	52	57.4	32.33	76.56	10.	2.6
2006	12	27	6	3	46.7	32.50	77.02	2.	3.4
2007	1	1	17	12	32.3	32.10	76.25	15.	2.7
2007	1	4	15	44	36.3	32.61	75.64	10.	2.4
2007	1	10	7	39	10.6	32.64	76.44	10.	2.7
2007	1	11	3	4	19.4	32.94	76.41	10.	2.6
2007	1	11	23	27	49.0	32.88	75.84	25.	3.0
2007	1	12	10	11	33.6	31.49	77.55	10.	2.6
2007	1	19	1	47	12.6	29.14	76.64	10.	2.6
2007	1	26	20	31	32.5	32.47	75.79	5.	2.4
2007	1	30	13	54	45.5	29.03	77.61	33.	2.2
2007	2	4	17	35	28.0	31.16	77.89	3.	2.7
2007	2	5	3	50	41.6	32.03	76.92	10.	2.5
2007	2	9	4	37	46.8	32.82	73.32	30.	3.5
2007	2	11	8	52	54.7	31.56	77.22	10.	2.6
2007	2	12	5	5	36.2	32.24	76.51	10.	2.6
2007	2	15	12	1	8.2	32.67	76.95	10.	2.8
2007	2	17	14	31	4.2	29.13	74.14	20.	2.5
2007	2	18	9	49	12.7	32.98	76.52	33.	3.1
2007	2	19	17	2	31.3	32.67	76.31	10.	2.3
2007	2	21	0	33	24.3	31.38	77.77	33.	4.0
2007	2	22	17	44	32.1	31.57	73.45	33.	4.0
2007	2	27	20	37	58.5	29.24	77.26	10.	2.5
2007	2	28	17	18	54.9	29.26	77.10	4.	1.9
2007	3	6	14	9	3.7	32.32	76.28	10.	2.3
2007	3	9	22	52	19.1	32.86	73.86	10.	3.0
2007	3	10	17	24	17.0	32.52	76.71	10.	2.5
2007	3	10	18	18	10.6	32.38	76.56	10.	2.6
2007	3	12	18	37	38.3	31.21	77.20	10.	2.2
2007	3	18	6	1	15.3	32.78	76.55	10.	3.1
2007	3	18	6	16	9.8	32.18	76.49	10.	2.9
2007	3	27	16	43	50.8	29.65	77.53	10.	2.3
2007	3	30	22	14	46.1	31.87	77.32	10.	2.7
2007	3	31	6	4	37.4	31.30	75.75	33.	2.6
2007	3	31	13	33	48.3	29.17	76.67	10.	2.0
2007	4	2	20	34	29.9	32.04	75.68	10.	2.4

2007	4	7	11	57	17.8	31.32	77.29	3.	2.1
2007	4	8	13	37	47.1	32.09	76.93	10.	2.8
2007	4	8	15	10	10.1	32.97	76.86	10.	2.3
2007	4	9	6	11	41.0	32.80	76.50	10.	2.9
2007	4	9	17	24	31.2	32.87	76.12	5.	2.4
2007	4	10	17	24	35.1	29.48	77.53	10.	2.0
2007	4	16	0	2	13.9	32.13	75.96	10.	2.1
2007	4	16	13	36	32.9	31.54	77.10	10.	2.2
2007	4	20	7	21	33.8	30.23	77.36	15.	2.1
2007	4	26	11	38	56.3	32.14	76.78	10.	2.1
2007	5	3	23	43	48.5	29.87	76.89	10.	2.3
2007	5	13	9	52	49.6	31.87	77.65	5.	2.7
2007	5	13	20	50	48.7	31.01	77.61	10.	2.5
2007	5	14	1	1	.4	31.69	77.70	10.	2.3
2007	5	16	12	4	22.9	29.27	76.73	16.	2.0
2007	5	18	22	35	20.1	31.80	76.64	10.	2.1
2007	5	19	22	20	23.8	31.04	76.54	28.	2.2
2007	5	21	21	6	55.5	32.93	75.75	10.	2.7
2007	5	26	11	48	15.8	31.13	76.86	10.	2.2
2007	5	27	22	15	51.5	32.20	74.97	10.	2.6
2007	6	3	8	9	50.2	31.41	77.74	10.	3.5
2007	6	3	16	44	56.7	32.75	76.01	15.	2.7
2007	6	9	19	6	57.9	29.96	77.87	10.	3.0
2007	6	13	17	42	56.2	31.96	76.32	33.	2.6
2007	6	14	3	37	58.9	31.87	78.00	7.	2.5
2007	6	14	19	52	40.4	32.54	76.78	10.	4.3
2007	6	14	20	8	37.4	32.50	76.66	10.	3.1
2007	6	17	23	5	12.7	31.37	76.08	36.	2.0
2007	6	18	0	0	19.7	32.88	76.77	10.	2.6
2007	6	18	6	55	37.5	31.70	76.21	10.	2.2
2007	6	18	11	20	21.7	32.49	76.53	10.	2.4
2007	6	19	1	8	59.1	30.96	73.33	15.	2.7
2007	6	27	8	37	35.1	30.89	75.53	33.	2.6
2007	7	5	9	58	19.2	32.87	75.64	10.	3.3
2007	7	7	10	17	12.6	32.13	75.79	10.	2.5
2007	7	8	23	16	55.3	32.99	75.88	10.	3.0
2007	7	10	4	51	57.1	31.41	77.13	7.	2.8
2007	7	14	23	30	31.4	31.11	76.47	23.	2.7
2007	7	22	14	11	57.0	29.14	76.55	10.	2.0
2007	7	25	9	19	52.3	32.41	76.71	10.	3.4
2007	7	29	3	44	43.1	29.28	76.60	10.	2.1
2007	8	5	15	44	27.8	29.02	76.58	10.	2.0
2007	8	10	12	42	16.2	32.39	76.40	10.	2.9
2007	8	28	13	44	32.8	30.44	76.18	16.	3.2
2007	8	31	20	0	45.0	29.83	77.35	15.	2.3
2007	9	8	8	32	5.2	32.26	75.92	33.	2.5
2007	9	12	13	9	4.8	29.33	77.68	10.	3.1
2007	9	12	18	56	12.1	31.72	77.13	10.	2.6
2007	9	14	14	34	43.7	32.74	75.96	13.	2.9
2007	9	23	0	59	2.0	31.55	76.99	10.	3.0
2007	10	4	5	14	16.5	32.63	76.05	10.	4.4
2007	10	8	16	2	2.3	32.63	76.20	33.	2.8
2007	10	14	9	14	52.9	32.69	76.69	10.	3.0
2007	10	18	6	7	34.7	29.01	76.71	15.	2.3

2007	10	21	13	34	55.3	29.09	77.19	4.	2.7
2007	10	22	19	38	25.1	30.63	77.68	10.	2.8
2007	10	29	10	53	16.6	31.43	75.53	10.	2.8
2007	10	31	2	51	9.3	32.78	76.61	10.	3.4
2007	11	1	3	23	23.5	31.38	77.75	10.	3.0
2007	11	9	14	27	41.2	32.59	75.96	24.	2.5
2007	11	27	5	32	40.7	31.57	77.43	14.	2.9
2007	11	29	9	34	9.8	32.63	73.19	10.	3.2
2007	12	5	5	31	34.1	29.13	76.51	30.	2.5
2007	12	6	4	57	20.4	32.90	76.08	10.	2.7
2007	12	6	22	1	14.7	31.90	76.80	15.	3.2
2007	12	9	10	51	37.4	29.12	77.61	10.	2.4
2007	12	13	19	21	35.7	32.33	75.99	38.	2.7
2007	12	15	8	23	33.1	29.04	76.61	10.	2.3
2007	12	18	15	0	34.4	32.69	75.42	10.	2.5
2007	12	18	15	12	34.4	32.80	75.51	10.	3.3
2007	12	20	6	59	39.4	31.39	77.79	10.	2.8
2008	1	7	4	8	35.8	31.35	77.18	10.	3.4
2008	1	14	22	15	23.7	31.43	76.25	10.	2.4
2008	1	20	7	54	22.2	32.38	76.45	10.	2.6
2008	1	24	1	23	24.6	32.35	76.69	10.	2.5
2008	1	30	8	48	6.4	29.01	77.18	10.	2.1
2008	2	14	6	38	8.2	29.05	76.67	15.	2.5
2008	2	20	2	34	19.3	29.33	77.07	10.	2.1
2008	2	24	19	7	23.9	31.36	73.77	10.	3.3
2008	3	10	0	16	14.0	29.09	76.68	15.	2.1
2008	3	15	21	44	38.5	32.33	74.69	20.	2.8
2008	3	21	20	15	17.8	31.19	77.69	10.	3.0
2008	3	21	22	31	1.1	30.99	77.80	10.	2.6
2008	3	22	2	37	4.2	31.26	77.67	10.	2.7
2008	3	24	9	48	34.3	32.73	76.08	10.	3.6
2008	4	2	22	18	60.0	32.15	76.46	10.	3.3
2008	4	8	2	8	40.8	30.69	76.43	10.	2.7
2008	4	8	21	33	40.5	31.31	73.04	10.	3.5
2008	4	9	2	8	43.6	31.52	74.46	49.	3.4
2008	4	10	10	51	57.5	29.22	76.46	15.	2.9
2008	4	11	1	0	4.3	29.26	73.46	10.	3.1
2008	4	12	21	1	44.5	29.20	76.35	10.	2.6
2008	4	13	4	0	.9	32.66	76.43	10.	2.8
2008	4	13	10	45	2.6	32.60	76.38	10.	3.5
2008	4	19	5	36	41.0	30.13	77.69	10.	2.8
2008	4	25	6	40	59.7	31.89	77.29	33.	3.5
2008	4	25	9	34	10.8	31.49	76.98	10.	2.6
2008	4	25	9	48	2.4	31.61	77.22	10.	2.8
2008	5	1	23	14	1.9	29.30	76.31	10.	2.6
2008	5	2	20	20	52.9	32.93	76.14	33.	3.6
2008	5	6	17	28	39.8	31.61	77.10	10.	3.7
2008	5	10	10	55	54.5	30.15	77.84	10.	2.3
2008	5	15	20	22	22.4	32.86	75.81	10.	3.0
2008	5	15	23	19	7.9	32.90	75.84	10.	3.3
2008	5	20	23	42	18.4	32.71	75.75	35.	3.9
2008	5	26	16	47	33.6	31.57	77.28	10.	3.1
2008	5	28	17	54	26.1	30.08	77.10	10.	2.8
2008	5	29	22	30	39.8	32.62	75.91	33.	3.6

2008	5	30	15	25	51.3	32.96	76.26	10.	3.4
2008	5	30	19	0	35.8	32.71	75.06	33.	3.5
2008	5	31	5	15	36.0	32.96	75.69	10.	3.6
2008	6	1	0	18	58.0	32.46	77.21	10.	2.3
2008	6	4	0	9	50.6	31.18	77.96	10.	2.9
2008	6	10	16	27	52.8	29.26	77.89	10.	2.4
2008	6	12	2	13	55.7	29.24	76.39	10.	2.4
2008	6	13	23	19	50.8	31.86	77.30	10.	2.6
2008	6	15	15	50	36.0	32.51	76.55	5.	2.7
2008	6	16	1	48	11.0	31.66	77.18	10.	2.6
2008	6	17	10	58	37.6	29.14	76.79	10.	2.1
2008	6	26	12	44	30.1	32.41	76.24	10.	2.4
2008	7	3	20	57	27.3	31.57	77.67	10.	1.9
2008	7	12	0	22	8.8	32.06	76.16	28.	3.0
2008	8	4	3	43	5.1	31.56	77.01	37.	2.3
2008	8	8	20	14	28.0	31.89	77.33	19.	2.6
2008	8	9	15	1	35.1	32.84	76.31	10.	2.9
2008	8	15	19	36	59.4	31.38	77.61	11.	2.9
2008	8	16	19	16	12.4	30.04	77.63	8.	3.2
2008	8	17	6	49	40.1	31.30	77.24	6.	2.7
2008	8	24	19	14	49.0	30.05	77.98	15.	2.7
2008	8	24	21	12	35.9	32.99	75.77	15.	2.9
2008	8	26	21	51	48.7	31.07	77.39	10.	2.6
2008	8	27	23	23	4.1	32.28	76.45	9.	2.5
2008	9	1	20	32	19.5	31.41	77.70	10.	2.5
2008	9	3	5	48	31.9	30.42	77.88	10.	2.4
2008	9	14	22	11	30.0	32.51	76.26	9.	3.8
2008	9	21	7	21	50.7	31.17	76.71	25.	2.1
2008	9	28	2	28	12.8	31.37	77.89	15.	2.9
2008	10	13	4	32	13.7	31.23	77.18	11.	2.1
2008	10	21	15	9	9.4	31.55	77.38	10.	4.5
2008	11	9	6	38	44.0	32.39	76.63	10.	2.8
2008	11	19	9	32	1.8	29.14	76.74	14.	2.2
2008	12	2	10	48	24.8	32.74	75.92	15.	2.9
2008	12	30	14	35	38.2	32.13	77.20	10.	2.9
2008	12	31	1	12	31.1	29.18	77.08	10.	2.4
2009	1	7	14	53	23.1	29.94	77.82	10.	2.6
2009	1	14	12	47	3.2	32.93	76.19	10.	2.8
2009	1	14	15	3	2.5	31.31	74.49	10.	2.8
2009	1	26	16	0	30.9	32.99	75.97	10.	3.2
2009	1	27	7	8	25.1	30.10	75.55	14.	2.0
2009	1	31	3	7	15.3	32.59	76.40	15.	3.8
2009	2	8	8	34	26.7	29.09	76.21	10.	2.2
2009	2	12	2	12	20.5	31.57	77.43	18.	3.2
2009	3	12	16	21	36.1	32.49	76.36	10.	3.6
2009	3	15	9	14	17.3	32.38	76.63	10.	3.8
2009	3	18	12	44	32.3	32.03	75.67	10.	3.1
2009	3	24	1	18	31.3	30.47	75.41	10.	2.4
2009	3	24	12	51	38.8	31.24	77.88	10.	2.9
2009	3	29	12	30	51.9	32.96	76.18	10.	2.9
2009	4	4	1	23	30.1	32.66	76.46	10.	2.8
2009	4	4	3	6	22.5	31.08	74.56	15.	2.9
2009	4	12	2	11	56.6	30.02	75.33	10.	2.6
2009	4	14	18	23	21.8	29.02	77.99	6.	2.2

2009	4	18	1	33	44.3	31.49	77.48	10.	3.4
2009	4	23	17	12	4.2	31.67	77.17	10.	2.3
2009	5	5	22	59	1.1	31.48	76.93	10.	2.8
2009	5	5	23	48	57.3	31.47	77.02	14.	2.1
2009	5	10	11	2	48.4	30.33	77.06	10.	3.4
2009	5	27	13	30	58.8	32.89	75.44	10.	3.8
2009	5	28	15	34	2.8	30.25	77.55	10.	3.0
2009	5	29	20	45	49.5	31.86	77.95	23.	2.9
2009	5	30	8	1	7.1	29.70	77.65	22.	2.6
2009	6	1	9	23	35.5	29.22	77.49	10.	2.5
2009	6	4	13	50	56.7	32.96	76.07	10.	3.8
2009	6	6	22	9	48.0	29.73	73.19	41.	2.6
2009	6	15	18	26	22.3	29.54	76.06	31.	2.8
2009	6	16	19	47	56.9	31.37	76.94	10.	2.6
2009	6	17	12	7	31.9	29.59	77.77	10.	3.7
2009	6	17	16	0	53.4	29.38	77.60	10.	2.4
2009	6	18	9	43	54.2	32.09	75.66	10.	2.5
2009	6	19	3	3	55.6	32.01	75.82	10.	2.4
2009	6	26	3	22	10.1	32.76	74.46	10.	2.7
2009	6	28	1	30	48.5	31.92	75.26	9.	2.9
2009	6	28	12	41	19.3	32.65	76.35	10.	2.9
2009	7	1	17	25	7.1	32.73	74.28	10.	3.2
2009	7	5	7	22	19.6	31.30	77.24	10.	2.3
2009	7	5	19	32	18.4	31.33	75.65	10.	2.1
2009	7	9	2	31	53.4	31.44	77.28	10.	2.7
2009	7	11	2	30	46.0	30.94	73.13	10.	3.4
2009	7	15	0	55	30.6	30.59	76.25	10.	2.7
2009	7	16	2	1	34.1	32.50	76.71	9.	2.3
2009	7	17	11	7	48.5	32.49	76.21	33.	4.6
2009	7	18	4	48	3.9	32.73	75.65	29.	3.3
2009	7	19	5	27	46.1	30.84	77.17	20.	2.4
2009	7	23	5	12	.3	32.11	76.29	10.	2.1
2009	7	30	3	43	40.0	31.67	77.54	15.	3.6
2009	7	30	15	42	44.8	32.25	76.67	12.	3.2
2009	8	3	20	22	47.5	32.54	73.73	15.	3.4
2009	8	3	22	51	25.5	31.37	77.30	10.	2.6
2009	8	6	19	22	1.8	32.06	76.19	10.	2.9
2009	8	7	11	25	8.2	32.33	76.42	10.	3.7
2009	8	9	11	58	31.3	31.36	77.57	33.	2.8
2009	8	16	13	23	39.7	31.38	77.12	10.	2.6
2009	8	25	17	21	12.7	32.83	76.19	10.	3.0
2009	9	7	14	59	57.0	32.93	75.65	10.	3.1
2009	9	7	15	19	52.7	32.90	75.76	10.	3.1
2009	9	9	14	4	57.5	32.86	75.75	10.	3.0
2009	9	10	3	26	58.7	31.28	76.85	10.	3.3
2009	9	11	5	56	51.0	29.99	76.99	10.	2.7
2009	9	19	23	18	8.4	29.31	75.86	10.	2.4
2009	9	23	2	45	11.0	32.93	75.77	10.	2.4
2009	9	25	22	40	7.2	32.98	75.74	10.	3.0
2009	9	30	9	35	54.3	31.53	77.15	10.	2.6
2009	10	2	2	27	44.5	29.64	77.26	10.	2.9
2009	10	3	19	44	47.2	31.03	77.06	10.	2.8
2009	10	7	2	1	5.7	31.51	77.29	10.	3.0
2009	10	10	9	12	29.9	31.62	74.37	10.	3.5

2009	10	27	20	16	17.5	30.37	76.55	10.	3.0
2009	10	28	19	4	20.3	30.45	76.23	10.	2.6
2009	10	31	15	54	26.8	31.86	76.90	10.	2.5
2009	11	10	13	55	51.6	31.09	76.79	10.	3.0
2009	11	13	21	8	53.6	32.26	73.03	10.	3.3
2009	11	23	12	38	19.0	31.23	74.47	10.	3.0
2009	12	2	1	55	18.9	30.73	77.55	10.	2.8
2009	12	5	17	0	35.4	29.00	76.95	10.	2.2
2009	12	21	15	20	32.6	31.38	77.91	10.	3.0
2009	12	23	6	3	2.5	31.47	77.18	10.	3.0
2009	12	28	0	34	1.4	32.40	76.48	10.	3.3
2010	1	11	19	42	44.6	30.89	77.88	10.	2.8
2010	1	11	23	15	13.3	31.31	73.25	10.	3.6
2010	1	18	5	58	32.0	32.83	76.68	10.	2.7
2010	1	19	20	45	54.6	32.35	76.76	10.	3.6
2010	1	29	9	41	2.4	29.17	77.01	10.	3.3
2010	1	31	0	42	54.5	32.76	76.04	10.	2.8

NO. OF EARTHQUAKES = 1194

ACTION PLAN FOR EARTHQUAKE

Action Points	EARTHQUAKE
PLANNING AND PREPARATION	Identification of earthquake prone areas
IDENTIFICATION OF PROBLEMS	<ul style="list-style-type: none"> ➤ Loss of human life ➤ Casualties buried under fallen debris ➤ Destruction and damage to buildings ➤ Disruption of communication by land, sea and air ➤ Disruption of civic amenities e.g. electricity, water, transport, medical, telephones ➤ Civil supplies etc. ➤ Large scale fires ➤ Floods in certain areas. ➤ Landslide in hilly areas. ➤ Disposal of human bodies and animals. ➤ Exposure to disease and danger of epidemics. ➤ Breakdown of law and order. ➤ Breakdown of normal Government machinery in affected areas due to Government servants themselves being affected by earthquake. ➤ Loss of morale. ➤ Movement of population.
ADVANCE PREPARATORY ACTION PLAN	<ul style="list-style-type: none"> ➤ Preparation of Plans and skeleton organization in advance. ➤ Training of personnel. ➤ Establishment of alternative means of mobile communications. ➤ Mobilization of Fire Services including auxiliary firemen.

	<ul style="list-style-type: none"> ➤ Plans of rescue of casualties trapped under-debris. ➤ Provision of hospital, medical and nursing staff. ➤ Medical plans for improvised first aid posts and emergency hospitals. ➤ Removal of Debris. ➤ Emergency sanitation, alternative supplies of water, salvage and custody of valuables, procurement, distribution accounting of gift stores, care of animals etc. ➤ Provision of welfare facilities
AFTER AN EARTHQUAKE	<ul style="list-style-type: none"> ➤ Instant reaction ➤ Establishment of Control ➤ Military Assistance ➤ Corpse Disposal ➤ Medical ➤ Epidemics ➤ Salvage ➤ Deployment of Resources ➤ Outsides Relief ➤ Camp-work and Employment ➤ Information

REHABILITATION

1. Damage Assessment.
2. Restoration of personal belongings, vehicles/other resources requisitioned etc.
3. Repair of damaged roads/bridges/buildings any other etc.
4. Control of spread diseases any epidemic.
5. Provision of safe drinking water.
6. Checking of public buildings from safety point of view.
7. Restoration of normal community functions.
8. Dispelling any rumors as to the safety of the area affected.

Annexure 3

REVISED LIST OF ITEMS AND NORMS OF ASSISTANCE FROM CALAMITY RELIEF FUND (CRF) AND NATIONAL CALAMITY CONTINGENCY FUND (NCCF) FOR THE PERIOD 2005-10 (MHA LETTER NO. 32-34/2007-NDM-I DATED THE 27th JUNE, 2007, modified vide latter No. 32-31/2009-NDM-I dated 31st July 2009)

S. No.	ITEM	NORMS OF ASSISTANCE
1.	GRATUITOUS RELIEF	
	(a) Ex-Gratia payment to the families of deceased persons	<p>Rs. 1.00 lakh per deceased</p> <ul style="list-style-type: none"> ➤ It would be necessary to obtain a Certificate of cause of death issued by an appropriate authority designated by the State Government certifying that the death has occurred due to a natural calamity notified by the Ministry of Finance in the Scheme of CRF/NCCF. ➤ In the case of a Government employee / relief worker who loses his/her life, while engaged in rescue and relief operations, in the aftermath of a notified natural calamity or during preparedness activities like mock drills etc., his/her family would be paid ex-gratia @ Rs.1.00 lakh per deceased. ➤ In the case of an Indian citizen who loses his life due to a notified natural calamity in a foreign country, his family would not be paid this relief. ➤ Similarly, in the case of a Foreign citizen who loses his life due to a notified natural calamity within the territory of India, his family would also not be paid this relief.
	(b) Ex-Gratia payment for loss of a limb or eyes	<p>(i) Rs. 35,000/- per person (when the disability is between 40% and 75% duly certified by a Government doctor or doctor from a panel approved by the Government).</p> <p>(ii) Rs. 50,000/- per person (when the disability is more than 75% duly certified by a Government doctor or doctor from a panel approved by the Government).</p>
	(c) Grievous injury requiring hospitalization	<ul style="list-style-type: none"> ➤ Rs. 7,500 per person (grievous injury requiring hospitalization for more than a week). ➤ Rs.2,500/- per person (grievous injury requiring hospitalization for less than a week).
	(d) Relief for the old, infirm and destitute children.	<ul style="list-style-type: none"> ➤ Rs. 20/- per adult, and Rs. 15/- per child per day.
	(e) Clothing and utensils/ household goods for families whose houses have been washed away/ fully damaged/ severely inundated for more than a week due to a natural calamity.	<ul style="list-style-type: none"> ➤ Rs. 1000/- for loss of clothing per family and Rs.1000/- for loss of utensils/household goods per family.
	(f) Gratuitous relief for families in dire need of immediate sustenance after a calamity. GR should only be given to those who have no food reserve, or whose food reserves have been wiped out in a calamity, and who have no other immediate means of support.	<ul style="list-style-type: none"> ➤ Rs. 20/- per adult, and Rs. 15/- per child per day.
		Period for providing gratuitous relief

		<p>(i) Natural Calamities other than drought and pest attack (locust and rodent menace only)</p> <ul style="list-style-type: none"> ➤ Upto a maximum period of 15 days. ➤ In the case of above mentioned notified natural calamities of a severe nature, relief can be provided upto 30 days with the approval of State Level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. <p>ii) Drought/ pest attack (locust and rodent menace only).</p> <ul style="list-style-type: none"> ➤ The maximum periods for which the relief can be provided is upto 60 days and in case of severe drought/pest attack upto 90 days. ➤ In case the drought/pest attack situation persists beyond 90 days, the State Level Committee shall, after a detailed review, decide the further period for which relief can be provided from CRF, on a month to month basis, co-terminus with the actual period of prevailing situation.
2.	Supplementary Nutrition.	<p>Rs. 2.00 per head per day, as per ICDS norms.</p> <p><u>Period for providing relief</u></p> <p>(i) Natural Calamities other than drought and pest attack (locust and rodent menace only).</p> <ul style="list-style-type: none"> ➤ Upto a maximum period of 30 days with the approval of State Level Committee for assistance from CRF and as per the assessment of the Central Team for assistance from NCCF. <p>(ii) Drought/ pest attack (locust and rodent menace only).</p> <ul style="list-style-type: none"> ➤ The maximum period for which the relief can be provided is upto 60 days. ➤ In case of drought pest attack (locust and rodent menace only) of a severe nature, the period for provision of relief may be extended upto a maximum period of 90 days with the approval of State Level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF.
3.	Assistance to small and marginal farmers for:-	
	a) Desilting of agricultural land	Rs. 6000/- per hectare:- (where thickness of sand/silt deposit is more than 3", to be certified by the competent authority of the State Government.)
	b) Removal of debris on agricultural land in hilly areas	Rs. 6,000/- per hectare
	c) Desilting/ Restoration/ Repair of fish farms	Rs. 6,000/- per hectare (Subject to the condition that no other assistance/subsidy has been availed of by/ is eligible to the beneficiary under any other Government Scheme)
	(d) Loss of substantial portion of land caused by landslide, avalanche, change of course of rivers.	Rs.15,000/- per hectare (Assistance will be given to only those small and marginal farmers whose ownership of the land lost is legitimate as

		<i>per the revenue records).</i>
	(e) Agriculture input subsidy where crop loss was 50% and above	
	(i) For agriculture crops, horticulture crops and annual plantation crops	<p>Rs. 2000/- per hectare in rainfed areas Rs. 4,000/- per hectare for areas under assured irrigation.</p> <p>(a) No input subsidy will be payable for agricultural land remaining unown or fallow. (b) Assistance payable to any small farmer with tiny holding may not be less than Rs.250.</p>
	(ii) Perennial crops	<p>Rs 6,000 per hectare for all types of perennial crops.</p> <p>(a) No input subsidy will be payable for agricultural land remaining unsown or fallow. (b) Assistance payable to any small farmer with tiny holding may not be less than Rs. 500/-</p>
4.	Input subsidy to farmers other than small & marginal farmers	<p>Assistance may be provided where crop loss is 50% and above, subject to a ceiling of 1 ha .per farmer and upto 2 ha per farmer in case of successive calamities irrespective of the size of his holding being large, at the following rates :-</p> <p>Rs.2,000/- per hectare in rainfed areas Rs.4,000/- per hectare for areas under assured irrigation. Rs. 6,000 per hectare for all types of perennial crops. No input subsidy will be payable for agricultural land remaining unsown or fallow.</p>
5.	Assistance to Small & Marginal sericulture farmers	<p>➤ Rs. 2000/- per ha. for Eri, Mulberry and Tussar ➤ Rs. 2500 per ha. for Muga</p>
6.	Employment Generation <i>(Only to meet additional requirements After taking into account funds available under various Plans/ Schemes with elements Of employment Generation e.g. NREGP, SGRY)</i>	<p>➤ Daily wages to be at par with minimum wage for unskilled labourers notified by the State Government concerned.</p> <p>➤ Contribution from Relief Fund to be restricted upto 8 Kgs of wheat or 5 Kgs of rice per person per day –subject to the availability of stock in the State. The cost of the foodgrains is to be worked out on the basis of “economic cost”.</p> <p>➤ The remaining part of the minimum wages will be paid in cash. The cash component should not be less than 25% of the minimum wage.</p> <p>➤ The above assistance will be for a period of 10 days in a month (15 days in a month in areas where other schemes/projects with elements of employment generation are not in operation).</p> <p>➤ State Govt. is required to lift and utilize the allocated foodgrains within 03 months from the date of issue of the order of allocation. No request for extension of the said period shall be entertained.</p> <p>➤ Work to be provided to one person from every</p>

		<p>willing rural household in the affected areas, subject to the assessment of actual demand on a case-to-case basis.</p> <p>➤ As assessed by the State Level Committee for assistance to be provided from CRF and assessed by the Central Team for assistance to be provided from NCCF.</p>
7.	<p>Animal Husbandry : Assistance to small and marginal farmers/ agricultural labourers</p> <p>(i) Replacement of draught animals, milch animals or animals used for haulage</p>	<p><u>Milch animal-</u></p> <p>i) Buffalo/ cow/camel / yak etc. @ Rs. 10,000/-</p> <p>ii) Sheep/Goat @ Rs. 1000/-</p> <p><u>Draught Animals:</u></p> <p>i) Camel/horse/ bullock, etc. @ Rs. 10,000/-</p> <p>ii) Calf, Donkey, and pony @ Rs. 5000/-</p> <p>➤ <i>The assistance may be restricted for the actual loss of economically productive animals and will be subject to a ceiling of 1 large milch animal or 4 small milch animals or 1 large draught animal or 2 small draught animals per household irrespective of whether a household has lost a larger number of animals. (The loss is to be certified by the Competent Authority designated by the State Government).</i></p> <p><u>Poultry:-</u></p> <p>➤ Poultry @ 30/- per bird subject to a ceiling of assistance of Rs.300/- per beneficiary household. The death of the poultry birds should be on account of the notified natural calamity.</p> <p><u>Note :-</u> Relief under these norms is not eligible if the assistance is available from any other Government Scheme, e.g. loss of birds due to Avian Influenza or any other diseases for which the Department of Animal Husbandry has a separate scheme for compensating the poultry owners.</p>
	(ii) Provision of fodder / feed concentrate in the cattle camps	<p>➤ Large animals- Rs. 20/ per day</p> <p>➤ Small animals- Rs. 10/- per day</p> <p><u>Period for providing assistance</u></p> <p>i) Notified Calamities other than drought</p> <p>➤ Upto a maximum period of 15 days.</p> <p>(ii) Drought</p> <p>➤ Upto 60 days and in case of severe drought upto 90 days.</p> <p>➤ In case the drought situation persists beyond 90 days, the State Level Committee shall, after a detailed review, decide the further period for which relief can be provided from NCCF, on a month to month basis, co-terminus with the actual period of scarcity /onset of rains.</p>
	(iii) Water supply in cattle camps	<p>To be assessed by the State Level Committee for assistance to be provided from CRF and by the Central Team for assistance to be provided from NCCF</p> <p><u>Period for providing assistance</u></p> <p>i) Notified Calamities other than drought</p> <p>➤ Upto a maximum period of 15 days.</p> <p>(ii) Drought</p> <p>➤ Upto 60 days and in case of severe drought</p>

		upto 90 days. ➤ In case the drought persists beyond 90 days, the State Level Committee shall, after a detailed review, decide the further period for which relief can be provided from CRF, on a month to month basis, co-terminus with the actual period of scarcity /onset of rains.
	(iv) Additional cost of medicines and vaccine (calamity related requirements)	➤ To be assessed by the State Level Committee for assistance to be provided from CRF and by the Central Team for assistance to be provided from NCCF.
	(v) Supply of fodder outside cattle camps	➤ Additional expenditure on transport of fodder from the approved fodder depot to neutralize calamity related price rise to be determined on a case-to-case basis by the State Level Committee for assistance to be provided under CRF and as per the assessment of Central Team for assistance to be provided under NCCF.
	(vi) Movement of useful cattle to other areas	➤ To be assessed by the State Level Committee for assistance to be provided from CRF and by the Central Team for assistance to be provided from NCCF.
8	Assistance to Fisherman (a) for repair / replacement of boats, nets – damaged or lost --Boat - -Dugout-Canoe--Catamaran --Nets (This assistance will not be provided if the beneficiary is eligible or has availed of any subsidy/assistance, for the instant calamity, under any other Government Scheme.)	➤ Rs.2,500/- (for repair of partially damaged traditional crafts (all types) plus net) ➤ Rs.7500/- (for replacement of fully damaged traditional crafts (all types) plus net) • Such traditional crafts are to be registered with the State Government. • Extent of damage (partial or full) to be determined/certified by a competent authority designated by the State Government.
	(b) Input subsidy for fish seed farm	Rs. 4,000/- per Hectare (This assistance will not be provided if the beneficiary is eligible for or has availed of any subsidy/assistance, for the instant calamity, under any other Government Scheme except the one time subsidy provided under the Scheme of Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture).
9	Assistance to Artisans in handicrafts/handloom Sectors by way of subsidy for repair/ replacement of damaged equipments.	
	a) For Traditional Crafts (Handicrafts)	
	(i) For replacement of damaged tools/ equipment	➤ Rs. 2,000/- per artisan ➤ Damage/ replacement to be duly certified by Competent Authority designated by the State Government
	(ii) For loss of raw material/ goods in process/ finished goods	➤ Rs. 2,000/- per artisan ➤ Damage/ Loss to be certified by Competent Authority designated by the State Government.
	b) For Handloom Weavers	
	(i) Repair/ replacement of loom equipments and accessories	For repair of loom ➤ Rs. 1000/- per loom For replacement of looms ➤ Rs. 2000/- per loom

		➤ Damage/ replacement to be certified by the competent authority designated by the Government.
	(ii) Purchase of yarn and other materials like dyes & chemicals and finished stocks.	➤ Rs. 2,000/- per loom ➤ Damage/ replacement to be certified by the competent authority designated by the Government.
10.	Assistance for repair/ restoration of damaged houses	➤ The damaged house should be an authorized construction duly certified by the Competent Authority of the State Government. ➤ The extent of damage to the house is to be certified by a technical authority authorized by the State Government.
	(a) Fully damaged/ destroyed houses	
	(i) Pucca house	Rs. 35,000/- per house
	(ii) Kutcha House	Rs.10,000/- per house
	b) Severely damaged houses	
	(i) Pucca House	Rs. 5,000/- per house
	(ii) Kutcha House	Rs. 2500/- per house
	(c) Partially Damaged Houses – both pucca/ kutcha (other than hut) (where the damage is minimum of 15 %)	Rs. 1500 /- per house
	(d) Huts: damaged / destroyed	➤ Rs. 2000/- per Hut ➤ <i>(Hut means- Temporary, make shift unit, inferior to Kutcha house, made of thatch, mud, plastic sheets etc. traditionally seen & recognized and known as Hut by the State/ District Authorities.)</i>
11	Provision of emergency supply of drinking water in rural areas and urban areas	➤ As assessed by the State Level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF.
12	Provision of medicines, disinfectants, insecticides for prevention of outbreak of epidemics	As above
13	Medical care for cattle and poultry against epidemics as a sequel to a notified natural calamity.	As above
14	Evacuation of people affected/ likely to be affected	As above
15	Hiring of boats for carrying immediate relief & saving life	As above ➤ The quantum of assistance will be limited to the actual expenditure incurred on hiring boats and essential equipment required for rescuing stranded people and thereby saving human lives during a notified natural calamity.
16	Provision for temporary accommodation, food, clothing, medical care etc. of people affected/ evacuated (operation of relief camps)	<ul style="list-style-type: none"> As assessed by the State Level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. Quantum of assistance will be limited to the actual expenditure incurred, during the specified period. <p><u>Period</u></p> <ul style="list-style-type: none"> ➤ In case of natural calamities other than drought for a maximum period upto 15 days ➤ In case of natural calamities other than drought of a severe nature for a maximum period upto 30 days <p><u>Drought</u></p>

		<ul style="list-style-type: none"> ➤ In case of drought, the maximum period for which the relief can be provided is upto 60 days and in case of severe drought upto 90 days. ➤ In case the drought situation persists beyond 90 days, the State Level Committee shall, after a detailed review, decide the further period for which relief can be provided, on a month to month basis, so-terminus with the actual period of scarcity/onset of rains.
17.	Air dropping of essential supplies	<ul style="list-style-type: none"> ➤ As assessed by the State level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. ➤ The quantum of assistance will be limited to actual amount raised in the bills by the Air Force/other aircraft providers for airdropping of essential supplied and rescue operations only.
18.	<p>Repair/ restoration of immediate nature of the damaged infrastructure in eligible sectors:</p> <ol style="list-style-type: none"> 1. Roads & bridges 2. Drinking Water Supply Works, 3. Irrigation 4. Power (only limited to immediate restoration of electricity supply in the affected areas) 5. Primary Education 6. Primary health Centres 7. Community assets owned by Panchayats <p>Sectors such as Telecommunications and Power (except immediate restoration of power supply), which generate their own revenues, and also undertake immediate repair/ restoration works from their own funds/resources, are executed.</p>	<p>Activities of immediate nature</p> <ul style="list-style-type: none"> ➤ An illustrative list of activities which may be considered as works of an immediate nature. <p>Time Period</p> <ul style="list-style-type: none"> ➤ The following time limits are indicated for undertaking works of immediate nature: <p>For Plain areas</p> <ol style="list-style-type: none"> a. 30 days in case of calamity of normal magnitude. b. 45 days in case of calamity of severe magnitude. <p>For hilly areas and North Eastern States</p> <ol style="list-style-type: none"> a. 45 days in case of calamity of normal magnitude. b. 60 days in case of calamity of severe magnitude. <p>Assessment of requirements</p> <ul style="list-style-type: none"> ➤ On the basis of assessment made by the State Level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF.
19.	Replacement of damaged medical equipment and lost medicines of Government hospitals. Health centres.	<ul style="list-style-type: none"> ➤ As assessed by the State level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. ➤ The quantum of assistance will be limited to actual amount raised in the bills by the Air Force/other aircraft providers for airdropping of essential supplied and rescue operations only.
20	Operational cost (of POL only) for ambulance Service, Medical Teams and temporary dispensaries	<ul style="list-style-type: none"> ➤ As Above ➤ The list of items, which fall under operational cost, will generally include:- <ul style="list-style-type: none"> ○ Cost of putting up temporary medical camps, temporary dispensaries. ○ Hiring of ambulance vehicles ○ Hiring of transport vehicles for mobile

		<p>medical teams only.</p> <ul style="list-style-type: none"> ○ Actual POL expenditure for ambulance and transport vehicles for mobile teams.
21.	Cost of clearance of debris	<ul style="list-style-type: none"> ➤ As assessed by the State level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. ➤ The quantum of assistance will be limited to actual expenditure incurred. ➤ Cost of clearance of debris includes removal of debris of stones, bricks, steel/iron which is restricted to inhabited areas only.
22	Draining off flood water in affected areas	<ul style="list-style-type: none"> ➤ As assessed by the State level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. ➤ The quantum of assistance will be limited to actual expenditure incurred.
23	Cost of search and rescue measures	<ul style="list-style-type: none"> ➤ As assessed by the State level Committee for assistance to be provided under CRF and as per the assessment of the Central Team for assistance to be provided under NCCF. ➤ The quantum of assistance will be limited to actual expenditure incurred.
24	Disposal of Dead bodies/carcasses	<ul style="list-style-type: none"> ➤ On actual basis, as reported by the State Government or as recommended by the central Team.
25	Training to specialist multi disciplinary groups/ teams of State personnel drawn from different cadres/services/personnel involved in management of disaster in the State.	<ul style="list-style-type: none"> ➤ Expenditure is to be incurred from CRF only (and not from NCCF), as assessed by the State Level Committee. ➤ The total expenditure on items 25 and 26 collectively should not exceed 10% of the annual allocation of the CRF.
26	Procurement of essential search, rescue and evacuation equipments including communication equipments	<ul style="list-style-type: none"> ➤ As above

Annexure 4

Role of State Government Departments / Agencies in Disaster Management

1. AGRICULTURE

Prevention Activities:

- ❖ Awareness generation regarding various plant diseases, alternate cropping practices in disaster-prone areas, Crop Insurance, provision of credit facilities, proper storage of seeds, etc.
- ❖ Hazard area mapping (identification of areas endemic to pest infections, drought, flood, and other hazards).
- ❖ Develop database village-wise, crop-wise, irrigation source wise, insurance details, credit facilities, etc.
- ❖ Regular monitoring at block level; the distribution and variation in rainfall. Prepare the farmers and department officers to adopt contingency measures and take up appropriate course of action corresponding to the different emerging conditions.
- ❖ Detail response manuals to be drawn up for advising the farmers for different types of disasters, e.g., rain failure in July or September & development of a dynamic response plan taking into account weekly rainfall patterns.
- ❖ Develop IEC materials to advise the farming communities on cropping practices and precautionary measures to be undertaken during various disasters.
- ❖ Improving irrigation facilities, watershed management, soil conservation and other soil, water and fertility management measures keeping in mind the local agro-climatic conditions and the proneness of the area to specific hazards.
- ❖ Promotion of alternative crop species and cropping patterns keeping in mind the vulnerability of areas to specific hazards.
- ❖ Surveillance for pests and crop diseases and encourage early reporting.
- ❖ Encourage promotion of agro service outlets/enterprise for common facilities, seed and agro input store and crop insurance.

Preparedness Activities before disaster seasons

- ❖ Review and update precautionary measures and procedures and especially ascertain that adequate stock of seeds and other agro inputs are available in areas prone to natural calamities.

- ❖ Review the proper functioning of rain gauge stations, have stock for immediate replacement of broken / non-functioning gadgets/equipments, record on a daily basis rainfall data, evaluate the variation from the average rainfall and match it with the rainfall needs of existing crops to ensure early prediction of droughts.

Response Activities:

- ❖ Management of control activities following crop damage, pest infestation and crop disease to minimize losses.
- ❖ Collection, laboratory testing and analysis of viruses to ensure their control and eradication.
- ❖ Pre-positioning of seeds and other agro inputs in strategic points so that stocks are readily available to replace damage caused by natural calamities.
- ❖ Rapid assessment of the extent of damage to soil, crop, plantation, irrigation systems, drainage, embankment, other water bodies and storage facilities and the requirements to salvage, re-plant, or to compensate and report the same for ensuring early supply of seeds and other agro inputs necessary for re-initiating agricultural activities where crops have been damaged.
- ❖ Establishment of public information centers with appropriate and modern means of communication, to assist farmers in providing information regarding insurance, compensation, repair of agro equipments and restarting of agricultural activities at the earliest.

Recovery Activities

- ❖ Arrange for early payment of compensation and crop insurance dues.
- ❖ Facilitate provision of seeds and other agro inputs.
- ❖ Promotion of drought and flood tolerant seed varieties.
- ❖ Review with the community, the identified vulnerabilities and risks for crops, specific species, areas, which are vulnerable to repetitive floods, droughts, other natural hazards, water logging, increase in salinity, pest attacks etc. and draw up alternative cropping plans to minimize impacts to various risks.
- ❖ Facilitate sanctioning of soft loans for farm implements.
- ❖ Establishment of a larger network of soil and water testing laboratories.
- ❖ Establishment of pests and disease monitoring system.
- ❖ Training in alternative cropping techniques, mixed cropping and other agricultural practices which will minimize crop losses during future disasters.

2. Health Department

1. Disaster Events

Prevention Activities:

- ❖ Assess preparedness levels at District, Block and village levels.
- ❖ Identification of areas endemic to epidemics and natural disasters.
- ❖ Identification of appropriate locations for testing laboratories.
- ❖ Listing and networking with private health facilities.
- ❖ Developing a network of volunteers for blood donation with blood grouping data.
- ❖ Strengthening of disease surveillance, ensuring regular reporting from the field level workers (ANMs/LHV etc) and its compilation and analysis at the PHC and block levels, on a weekly basis (daily basis in case of an epidemic or during natural disasters), forwarding the same to the District Disease Surveillance Cell and monthly feed back from the District to the block and from the block to the PHC.
- ❖ Formation of adequate number of mobile units with trained personnel, testing facilities, communication systems and emergency treatment facilities.
- ❖ Identification of locations in probable disaster sites for emergency operation camps.
- ❖ Awareness generation about various infectious diseases and their prevention.
- ❖ Training and IEC activities.
- ❖ Training of field personnel, Traditional Birth Attendants, community leaders, volunteers, NGOs and CBOs in first aid, measures to be taken to control outbreak of epidemics during and after a disaster, etc.
- ❖ Arrangement of standby generators for every hospital.
- ❖ Listing of vehicles, repair of departmental vehicles that will be requisitioned during emergencies for transport of injured.
- ❖ Action plan will be made by Civil Surgeon before the onset of monsoons.

Preparedness Activities before Disaster Seasons

- ❖ **For flood:** Assessment and stock piling of essential medicines, anti snake venom, halogen tablets, and bleaching powders. ORS tablets, Pre-positioning of mobile units at vulnerable and strategic points.

Response activities:

- ❖ Stock piling of life-saving drugs, de-toxicants, anesthesia, Halogen tablets in vulnerable areas.
- ❖ Strengthening of drug supply system with powers for local purchase during LO.
- ❖ Situational assessment and reviewing the status of response mechanisms in known vulnerable pockets.
- ❖ Ensure adequate availability of personnel in disaster sites.
- ❖ Review and update precautionary measures and procedures, and apprise the personnel who will be implementing those.
- ❖ Sanitation.
- ❖ Dispensing with post-mortem activities during L1, L2 and L3 when the relatives and/or the competent authority is satisfied about cause of death.
- ❖ Disinfections of water bodies and drinking water sources.
- ❖ Immunization against infectious diseases.
- ❖ Ensure continuous flow of information.
- ❖ Civil Surgeon, Districts will be responsible to supply all kind of medicines in the relief camps and other affected areas in the District.
- ❖ She will ensure the availability of sufficient quantity of medicines including the medicines used for the care of the snake-bite, during the flood seasons with all the medical teams constituted by her.
- ❖ She will also ensure that the medical teams will be operational and moving in the towns and village during the flood seasons and emergency team will be available in the hospital round the clock.
- ❖ The SMO posted in the Sub Divisions will submit daily progress report to the SDMs concerned.
- ❖ She will also ensure that proper arrangements for medical treatment if available in the relief camps. She will further ensure that adequate steps are taken to prevent any scope of out break of any epidermis like situation during and after the floods.

Recovery Activities

- ❖ Continuation of disease surveillance and monitoring.
- ❖ Continuation of treatment, monitoring and other epidemic control activities till the situation is brought under control and the epidemic eradicated.

- ❖ Trauma counseling.
- ❖ Treatment and socio-medical rehabilitation of injured or disabled persons.
- ❖ Immunization and nutritional surveillance.
- ❖ Long term plans to progressively reduce various factors that contribute to high level of vulnerability to diseases of population affected by disasters.

2. Epidemics

Preventive Activities:

- ❖ Supply of safe drinking water, water quality monitoring and improved sanitation.
- ❖ Vector Control programmed as a part of overall community sanitation activities.
- ❖ Promotion of personal and community latrines.
- ❖ Sanitation of sewage and drainage systems.
- ❖ Development of proper solid waste management systems.
- ❖ Surveillance and spraying of water bodies for control of malaria.
- ❖ Promoting and strengthening Primary Health Centers with network of para-professionals to improve the capacity of surveillance and control of epidemics.
- ❖ Establishing testing laboratories at appropriate locations to reduce the time taken for early diagnosis and subsequent warning.
- ❖ Establishing procedures and methods of coordination with the Health Department, other local authorities/departments and NGOs to ensure that adequate prevention and preparedness measures have been taken to prevent and / or minimize the probable outbreak of epidemics.
- ❖ Identification of areas prone to certain epidemics and assessment of requirements to control and ultimately eradicate the epidemic.
- ❖ Identification of appropriate locations and setting up of site operation camps for combating epidemics.
- ❖ Listing and identification of vehicles to be requisitioned for transport of injured animals.
- ❖ Vaccination of the animals and identification of campsites in the probable areas.
- ❖ Promotion of animal insurance.
- ❖ Tagging of animals
- ❖ Arrangement of standby generators for veterinary hospitals.
- ❖ Provision in each hospital for receiving large number of livestock at a time.
- ❖ Training of community members in carcasses disposal.

Preparedness activities before disaster seasons

- ❖ Stock piling of water and animal feed.
- ❖ Pre-arrangements for tie-up with fodder supply units.
- ❖ Stock-piling of surgical packets.
- ❖ Construction of mounds for safe shelter of animals.
- ❖ Identification of various water sources to be used by animals in case of prolonged hot and dry spells.
- ❖ Training of volunteers & creation of local units for carcass disposal.
- ❖ Municipalities/Gram Panchayats/ BDPOs to be given responsibility for removing animals likely to become health hazards.
- ❖ **Fodder And Medicines For The Live Stock**

The Deputy Director Animal Husbandry, District and Chief Agriculture Officers of Districts will ensure that the cattle in food prone village are vaccinated well in time and also maintain stock of medicine at their own level. The arrangements for fodder will also be made with the help of District Mandi Officers. The teams constituted for the purpose, are to be sent to all blocks and other flood prone areas. The Tehsildar have been specifically directed to make a survey of total number of houses and cattle in different villages prior of flood season so that bogus claims can be avoided. Such information is to be sent before 1.7.2011 positively. Dry fodder should also be kept in sufficient stock.

Response Activities:

- ❖ Eradication and control of animal diseases, treatment of injured animals ~ Protection of abandoned and lost cattle.
- ❖ Supply of medicines and fodder to affected areas.
- ❖ Ensure adequate availability of personnel and mobile team.
- ❖ Disposal of carcasses ensuring proper sanitation to avoid outbreak of epidemics.
- ❖ Establishment of public information centre with a means of communication, to assist in providing an organized source of information.
- ❖ Mobilizing community participation for carcass disposal.

Recovery Activities:

- ❖ Assess losses of animals assets and needs of persons and communities.
- ❖ Play a facilitating role for early approval of soft loans for buying animals and ensuring insurance coverage and disaster-proof

housing or alternative shelters/ mounds for animals for future emergencies.

- ❖ Establishment of animal disease surveillance system.

3. Water Supplies and Sanitation (Public Health Engineering & Rural Water Supply & Sanitation)

Prevention Activities:

- ❖ Provision of safe water to all habitats.
- ❖ Clearance of drains and sewerage systems, particularly in the urban areas.
- ❖ The XEN Public health, Districts E.O MCs of districts and secretaries in Market Committees will make all necessary arrangements ensure supply of clean and potable drinking water in relief camps in Districts.

Preparedness Activities for disaster seasons

- ❖ Prior arrangement of water tankers and other means of distribution and storage of water.
- ❖ Prior arrangement of stand-by generators.
- ❖ Adequate prior arrangements to provide water and halogen tablets at identified sites to used as relief camps or in areas with high probability to be affected by natural calamities.
- ❖ Rising of tube-well platforms, improvement in sanitation structures and other infrastructural measures to ensure least damages during future disasters.
- ❖ Riser pipes to be given to villagers.

Response Activities:

- ❖ Disinfections and continuous monitoring of water bodies.
- ❖ Ensuring provision of water to hospitals and other vital installations.
- ❖ Provision to acquire tankers and establish other temporary means of distributing water on an emergency basis.
- ❖ Arrangement and distribution of emergency tool kits for equipments required for dismantling and assembling tube wells, etc.
- ❖ Carrying out emergency repairs of damaged water supply systems.
- ❖ Disinfection of hand pumps to be done by the communities through prior awareness activities & supply of inputs.

Recovery Activities:

- ❖ Strengthening of infrastructure.
- ❖ Review and documentation.
- ❖ Sharing of experiences and lessons learnt.
- ❖ Training to staff.
- ❖ Development of checklists and contingency plans.

4. Police:

Prevention Activities:

- ❖ Keep the force in general and the NDRF (Bathinda) in particular fighting fit for search, rescue, evacuation and other emergency operations at all times through regular drills.
- ❖ Procurement and deployment of modern emergency equipments while modernizing existing infrastructure and equipments for disaster response along with regular training and drills for effective handling of these equipments.
- ❖ Focus on better training and equipments for NDRF for all types of disasters, e.g. diving equipments.
- ❖ Rotation of members of NDRF so that the force remains fighting fit.
- ❖ Ensure that all communication equipments including wireless are regularly functioning and deployment of extra wireless units in vulnerable pockets.
- ❖ Ensure interchangeability of VHF communication sets of police, if required.
- ❖ Keeping close contact with the District Administration & Emergency Officer.
- ❖ Director General of Police be made Vice Chairperson of State Disaster Management Committee.
- ❖ Involvement of the local army units in response planning activities and during the preparation of the annual contingency plans to ensure logistics and other support to armed forces during emergencies.
- ❖ In economy like floods, the police assistance can also be obtained; similarly the assistance of the border security force can also be secured. The D.G. Police can be contact for providing necessary assistance into this behalf.
- ❖ In case of grave emergency help of the defense forces is allowed for providing temporary bridges and restoring essential services,

repairing branches in the flood areas, work of dropping of air supply etc.

Response Plan:

- ❖ Security arrangements for relief materials in transit and in camps etc.
- ❖ Senior police officers to be deployed in control rooms at State & district levels during L 1 level deployment onwards.
- ❖ Deploy personnel to guard vulnerable embankments and at other risk points.
- ❖ Arrangement for the safety.
- ❖ Coordinate search, rescue and evacuation operations in coordination with the administration
- ❖ Emergency traffic management.
- ❖ Maintenance of law and order in the affected areas.
- ❖ Assist administration in taking necessary action against hoarders, black marketers etc.

5. Civil Defense

Prevention Activities

- ❖ Organize training programmes on first-aid, search, rescue and evacuation.
- ❖ Preparation and implementation of first aid, search and rescue service plans for major public events in the state.
- ❖ Remain fit and prepared through regular drills and exercises at all times.

Response Activities

- ❖ Act as Support agency for provision of first aid, search and rescue services to other emergency service agencies and the public.
- ❖ Act as support agency for movement of relief.
- ❖ Triage of casualties and provision of first aid and treatment.
- ❖ Work in co-ordination with medical assistance team.
- ❖ Help the Police for traffic management and law and order.

6. Fire Services:

Prevention Activities:

- ❖ Development/enforcement of relevant legislations and regulations to enhance adoption of fire safety measures.
- ❖ Modernization of fire-fighting equipments and strengthening infrastructure.
- ❖ Identification of pockets, industry , etc. which highly susceptible to fire accidents or areas, events which might lead to fires, building collapse, etc. and educate people to adopt safety measures. Conduct training and drills to ensure higher level of prevention and preparedness.
- ❖ Building awareness in use of various fire protection and preventive systems.
- ❖ Training the communities to handle fire emergencies more effectively.
- ❖ VHF network for fire services linked with revenue & police networks.
- ❖ Training of masons & engineers in fire-proof techniques.
- ❖ Making clearance of building plans by fire services mandatory.

Response Activities:

- ❖ Rescue of persons trapped in burning, collapsed or damaged buildings, damaged vehicles, including motor vehicles, trains and aircrafts, industries, boilers and pressure vessels, trenches and tunnels.
- ❖ Control of fires and minimizing damages due to explosions.
- ❖ Control of other dangerous or hazardous situations such as oil, gas and hazardous materials spill.
- ❖ Protection of property and the environment from fire damage.
- ❖ Support to other agencies in the response to emergencies.
- ❖ Investigation into the causes of fire and assist in damage assessment.

7. Civil Supplies:

Preventive Activities

- ❖ Construction and maintenance of storage godowns at strategic locations.
- ❖ Stock piling of food and essential commodities in anticipation of disaster.
- ❖ Take appropriate preservative methods to ensure that food and other relief stock are not damaged during storage, especially precautions against moisture, rodents and fungus infestation.

Response Activities

- ❖ Management of procurement
- ❖ Management of material movement
- ❖ Inventory management

Recovery Activities

- ❖ Conversion of stored, unutilized relief stocks automatically into other schemes like Food for Work. Wherever, it is not done leading to damage of stock, it should be viewed seriously.

8. Works/ Rural Development Departments

Prevention Activities:

- ❖ Keep a list of earth moving and clearing vehicles / equipments (available with Govt. Departments, PSUs, and private contractors, etc.) and formulate a plan to mobilize those at the earliest.
- ❖ Inspection and emergency repair of roads/ bridges, public utilities and buildings.

Response Activities

- ❖ Clearing of roads and establish connectivity. Restore roads, bridges and where necessary make alternate arrangements to open the roads to traffic at the earliest.
- ❖ Mobilization of community assistance for clearing blocked roads.
- ❖ Facilitate movement of heavy vehicles carrying equipments and materials.
- ❖ Identification and notification of alternative routes to strategic locations.
- ❖ Filling of ditches, disposal of debris, and cutting of uprooted trees along the road.
- ❖ Arrangement of emergency tool kit for every section at the divisional levels for activities like clearance (power saws), debris clearance (fork lifter) and other tools for repair and maintenance of all disaster response equipments.

Recovery Activities:

- ❖ Strengthening and restoration of infrastructure with an objective to eliminate the factor(s) which caused the damage.
- ❖ Review and documentation.
- ❖ Sharing of experiences and lessons learnt.
- ❖ Training to staff.
- ❖ Development of checklists and contingency plans.

9. Water Resources Department:**Prevention Activities:**

- ❖ Assess preparedness level.
- ❖ Annual assessment of danger levels & wide publicity of those levels.
- ❖ Identify flood prone rivers and areas and activate flood monitoring mechanisms.
- ❖ Provide water level gauge at critical points along the rivers, dams and tanks.
- ❖ Identify and maintain of materials/tool kits required for emergency response.
- ❖ Stock-pile of sand bags and other necessary items for breach closure at the Panchayat level.

Response Activities:

- ❖ Monitoring flood situation.
- ❖ Dissemination of flood warning.
- ❖ Ensure accurate dissemination of warning messages naming Gram Panchayats & Tehsil with details of flow & likely damage.
- ❖ Monitoring and protection of irrigation infrastructures.
- ❖ Inspection of bunds of dams, irrigation channels, bridges, culverts, control gates and overflow channels.
- ❖ Inspection and repair of pumps, generator, motor equipments, station buildings.
- ❖ Community mobilization in breach closure Recovery Activities:
- ❖ Strengthening of infrastructure and human resources.
- ❖ Review and documentation.
- ❖ Sharing of experiences and lessons learnt.
- ❖ Training of staff.
- ❖ Development of checklists and contingency plans.

10. Forest Department

Prevention activities

- ❖ Promotion of shelter belt plantation.
- ❖ Publishing for public knowledge details of forest cover, use of land under the forest department, the rate of depletion and its causes.
- ❖ Keep saws (both power and manual) in working conditions.
- ❖ Provision of seedling to the community and encouraging plantation activities, promoting nurseries for providing seedlings in case of destruction of trees during natural disasters.

11. Transport Department:

Prevention Activities

- ❖ Listing of vehicles which can be used for emergency operation.
- ❖ Safety accreditation, enforcement and compliance.
- ❖ Ensuring vehicles follow accepted safety standards.
- ❖ Build awareness on road safety and traffic rules through awareness campaign, use of different IEC strategies and training to school children.
- ❖ Ensure proper enforcement of safety regulations Response Activities.
- ❖ Requisition vehicles, trucks, and other means of transport to help in the emergency operations.
- ❖ Participate in post impact assessment of emergency situation.
- ❖ Support in search, rescue and first aid.
- ❖ Failure to cooperate and misappropriation of relief materials to invite disqualification from the post.

Recovery Activities

- ❖ Provision of personal support services e.g. counseling.
- ❖ Repair/restoration of infrastructure e.g. roads, bridges, public amenities.
- ❖ Supporting the G.Ps in development of storage and in playing a key role and in the coordination of management and distribution of relief and rehabilitation materials the Panchayat Samity and GP members to be trained to act as an effective interface between the community, NGOs, and other developmental organizations.
- ❖ Provide training so that the elected representatives can act as effective supportive agencies for reconstruction and recovery activities.

12. Panchayati Raj

Preventive Activities

- ❖ Develop prevention/mitigation strategies for risk reduction at community level.
- ❖ Training of elected representatives on various aspects of disaster management.
- ❖ Public awareness on various aspects of disaster management.
- ❖ Organize mock drills.
- ❖ Promote and support community-based disaster management plans.
- ❖ Support strengthening response mechanisms at the G.P. level (e.g., better communication, local storage, search & rescue equipments, etc.).
- ❖ Clean drainage channels; organize through community participation trimming of branches before cyclone season.
- ❖ Ensure alternative routes/means of communication for movement of relief materials and personnel to marooned areas or areas likely to be marooned.
- ❖ Assist all the government departments to plan and priorities prevention and preparedness activities while ensuring active community participation.

Response Activities

- ❖ Trains up the G.P. Members and Support for timely and appropriate delivery of warning to the community.
- ❖ Clearance of blocked drains and roads, including tree removal in the villages.
- ❖ Construct alternative temporary roads to restore communication to the villages.
- ❖ PRIs to be a part of the damage survey and relief distribution teams to ensure popular participation.
- ❖ Operationalize emergency relief centers and emergency shelter.
- ❖ Sanitation, drinking water and medical aid arrangements.
- ❖ IEC activities for greater awareness regarding the role of trees and forests for protection during emergencies and also to minimize environmental impact which results owing to deforestation like climate change, soil erosion, etc.
- ❖ Increasing involvement of the community, NGOs and CBOs in plantation, protection and other forest protection, rejuvenation and restoration activities.
- ❖ Plan for reducing the incidence, and minimize the impact of forest

fire.

Response Activities:

- ❖ Assist in road clearance.
- ❖ Provision of tree cutting equipments.
- ❖ Units for tree cutting and disposal to be put under the control of PSDMA, SRC, Collector during L1.
- ❖ Provision of building materials such as bamboos etc for construction of shelters.

Recovery Activities:

- ❖ Take up plantation to make good the damage caused to tree cover.

13. Information & Public Relations Department

Prevention Activities

- ❖ Creation of public awareness regarding various types of disasters through media campaigns.
- ❖ Dissemination of information to public and others concerned regarding do's and don'ts of various disasters.
- ❖ Regular liaisoning with the media.

Response Activities

- ❖ Setting up of a control room to provide authentic information to public regarding impending emergencies.
- ❖ Daily press briefings at fixed times at state
 - District levels to provide official version (during LO also).
- ❖ Media report & feedback to field officials on a daily basis from L1 onwards.
- ❖ Keep the public informed about the latest of the emergency situation (area affected, lives lost, etc).
- ❖ Keep the public informed about various post-disaster assistances and recovery programmes.

14. Revenue Department

- ❖ Co-ordination with Government of India.
- ❖ Overall control & supervision.
- ❖ Damage assessment, finalization of reports and declaration of L1/L2 disasters.
- ❖ Mobilization of finance.

15. Home Department

- ❖ Requisition, deployment and providing necessary logistic support to the armed forces.
- ❖ Provide maps for air dropping, etc.

16. National Disaster Response Force

Response

- ❖ To be trained and equipped as an elite force within the Police Department and have the capacity to immediately respond to any emergency.
- ❖ Unit to be equipped with life saving, search & rescue equipments, medical supplies, security arrangements, communication facilities and emergency rations and be self-sufficient.
- ❖ Trained in latest techniques of search, rescue and communication in collaboration with international agencies.
- ❖ Co-opt doctors into the team.

17. Municipal Corporation

1. MCs will bring debris of heavy RCC structures (having beams/columns) and put dummies beneath the debris. This will facilitate demonstration of search and rescue operations. Soon after search and rescue team leave the site, MCs will mobilize equipments for debris clearance.
2. MCs will assume main role in Equipment support, debris and road clearance, on receiving the intimation of the disaster from State Emergency Operation Centers.
3. MCs will coordinate with the supporting agency's officers to mobilize equipments from the ware houses.
4. The respective supporting agencies will contact their respective personal to move the equipments to central warehouse.
5. The equipments like JCB, concrete cutters identified as per the need will be transported to the site.
6. On receiving intimation on the intensity of the damages of structure, the nodal officer will make an assessment on of the damages of roads and structures reported at the site and surrounding areas.
7. The Supporting Agencies nodal officers will call for personal to immediately start debris clearance operation to enable movement of the affected site.
8. A review of the current situation is taken up by the nodal agency to update the support agencies, to delegate their respective personnel, to take precautionary measure, to plan de-routes for the transportation ESF's to be operational.
9. All supporting agencies will inspect the road/ rail network and structures within the disaster site and surrounding.
10. MCs will also ensure proper corpse disposal and post mortem by coordinating with ESF on medical response.

11. Assessment of damage (locations, no. of structures damaged, severity of damage).
12. Enlisting the types of equipment as compiled from resource inventory required for conducting the debris clearance.
13. Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.
14. Undertake repair of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.
15. Ensure a critical number of medical professionals to reach the site including specialists from outside the state.
16. If temporary living arrangements are being made from the affected populace, the MCs must ensure high standards of sanitation in settlements in order to prevent the multiplicity of the disaster.
17. It should also ensure the provision of medicine and other medical facilities required at the disaster site and the hospital health centers catering to disaster victims.
18. In case of orthopedic care required in disasters like earthquakes the immediate response would have to be complimented by a follow up treatment schedule for a majority of the patients in/ near their place of residence.
19. MCs will coordinate, direct, and integrate state level response to provide Equipments support, relief camps establishment, and sanitation health assistances.
20. Mobilize different modes of transportation e.g. trucks, etc to be put on stand-by.
21. Assist timely re-establishment of the critical transportation links.
22. Establish temporary electricity supplies for relief material go downs and relief camps.
23. Compile an itemized assessment of damage, from reports made by various receiving centers and sub-centers.

18. Public Works Department (PWD)

1. Assume role in Equipment support, debris and road clearance, on receiving the intimation of the disaster from State EOC/ Nodal Officer of MCs.
2. Coordinate with the MCs officers to mobilize equipments from the ware houses.
3. Contact respective personal to move the equipments to central warehouses.
4. The equipments like JCB, concrete cutters identified as per the need will be transported to the site.
5. On receiving intimation on the intensity of the damages of structures, the nodal officer will make an assessment on of the damages of roads and structures reported at the site and surrounding areas.
6. The nodal officer will call for personal to immediately start debris clearance operation to enable movement to the affected site.

7. A review of the current situation should be taken up by the nodal agency to update the support agencies to delegate their respective personnel to take precautionary measure to plan de-routes for the transportation ESF's to be operational.
 8. All supporting agencies will inspect the road/rail network and structures within the disaster site and surrounding.
 9. Ensure proper corpse disposal and post mortem by coordinating with ESF on medical response.
 10. Assessment of damage (locations, no. of structures damaged, severity of damage).
 11. Enlisting the types of equipment as compiled from resource inventory required for conducting the debris clearance.
 12. Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.
 13. Undertake repair of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.
 14. Ensure a critical number of medical professionals to reach the site including specialists from outside the state
 15. If temporary living arrangements are being made from the affected populace, the agencies must ensure high standards of sanitation in settlements in order to prevent the multiplicity of the disaster.
 16. Coordinate, direct, and integrate response equipments support, relief camps establishment, and sanitation health assistances.
 17. Mobilizes different modes of transportation e.g. Trucks, etc to be put on stand-by.
 18. Assist timely re-establishment of the critical transportation links.
 19. Establish temporary electricity supplies for relief material do downs and relief camps.
- Compile an itemized assessment of damage, from reports made by various receiving centers and sub-centers.

ANNEXURE 5

LIST OF IMPORTANT TELEPHONE NUMBERS

TELEPHONE NUMBERS OF DEPUTY COMMISSIONERS AND FLOOD CONTROL ROOMS AT DISTRICT HEAD QUARTERS

District	Name of officer	Phone Number		Flood Control Room No.
		Office	Residence	
Amritsar	Sh. Rajat Aggarwal 9501399999	0183-2223991 2226161, 2500185	2226162	2229125
Barnala	Paramjit Singh 9815131097	01679- 244360	244361	244368
Bathinda	Sh. Kamal Kishore Yadav 9417628006	0164-2210042	2212789	2219042 2221042
Faridkot	Sh. Ravi Bhagat 9478218866	01639- 251051	251000	250338
Fatehgarh Sahib	Sh. Yashvir Mahajan 9872219325	01763- 221340 232215	221341	232838
Ferozepur	Sh. S. Karuna Raju 9779943700	01632- 244008	244006	244024
Fazilka	Basant Garg 9478897773	01638-260555	261555	232153
Gurdaspur	Sh. Mohinder Singh Kainth 9815126210	01874- 247500	224501 224270	247964
Hoshiarpur	Sh. Dipinder Singh 9878401249	01882- 220301	220302	220412
Jalandhar	Smt. Shruti Singh [Ad Ch] 9915702255	0181-2224783	2459664 2221401	2224417
Kapurthala	Sh. Harkesh Singh Sidhu 9814053272	01822- 233777	233776 233393	230990
Ludhiana	Sh. Rahul Tiwari 9988113236	0161-2403100	2404055	2400150 2401358
Mansa	Sh. Ravinder Singh 9915700123	01652- 227700	232900, 232713	229082
Moga	Sh. A.K.Singla 9872428541	01636- 234400	225401	235206
Muktsar	Sh. Aamir Dahka [Ad Ch] 9878007221	01633- 263643 263808	244361	260341
Patiala	Sh. Vikas Garg 9417080002	0175-2311300 2311301	2311302 2311303	2350086

Pathankot	Sh. Sivin C 9463318138	0186-2220342		2224517
Roopnagar	Sh. Gopal Krishan Singh 9814067632	01881- 221150	221250	221154
S.A.S Nagar	Sh. Varun Roozam 9417944155	0172-2270220 3075000	2272596	5044581 5044576
Sangrur	Sh. Kumar Rahul 9876164787	01672- 234004	234042	234196
S.B.S Nagar	Smt. Shruti Singh 9915702255	01823-221301	2432511, 2440570	505824
Tarn Taran	Sh. Satwant Singh Johal 8146100016	01852- 224101	224102	224107

DRAINAGE ADMINISTRATION

Name	Designation	Office	Residence	Mobile
AMRITSAR- 0183 (Flood Control Room- 2566097)				
Gurmukh Singh	XEN/Bari Doab	2566246	Fx. 2564772	98143- 79788
Varinder Pal Singh	XEN/Amritsar	2566097		99153- 84254
S.L. Sidhu	XEN/Gurdaspur	222723	F- 223366	98144- 24624
Popinder kalia	XEN/Mechanical	2566278		98140- 92478
	Technical PA to S.E.			
JALANDHAR-0181 (Flood Control Room-2254415)				
R.L. Sandhu	XEN/Jalandhar	2254415	97799- 00300	98153- 95037
A.S. Sohal	XEN/Phagwara	2254297		98146- 01195
V.K. Gupta	XEN/Hoshiarpur	01882- 252733	97790- 44950	98156- 55835
Gurdial Singh	XEN/Ludhiana	0161- 2409043		94176- 04353
Jagdish Singh	XEN/Mech./Nangal	01887- 223434		98144- 87853
FEROZPUR- 01632 (Flood Control Room-245366)				
Prem Chand	S.E./Ferozpur	245188	245186	
Kamaljit Singh	XEN/DCD, Fzr.	244448		98723- 42775
Sanjeev Gupta	XEN/Golewala	245366		98767- 02212
Gurdeep Singh	XEN/DCD/FDK	01639- 255203		98786- 04218
Sharma	Supdtt/Fzr.			97794- 00570
PATIALA-0175 (Flood Control Room-245366)				
B.P.S. Brar	XEN/Patiala	0175-	98150-	98159-

		2228272	37827	37907
Sunil Agarwal	XEN/Sangrur	01672-234086		98787-23355
Suman Sood	XEN/Mech. Rajpura	01762-230763		98788-15810
V.K. Garg	XEN/Mansa	01652-227716		99157-00246
H.S. Bedi	XEN/Ropar	01881-222073		98143-53457
GIDDERBAHA-01637 (Flood Control Room- 230531)				
Gulshan Nag Pal	XEN/Faridkot at Gidderbaha	230394		98726-26322
Dalbir Singh	XEN/Can. Li. Muktsar	01633-262312		98146-37938
B.S. Brar	XEN/Proj. Div1DrgGid	232410		96462-53010
B.S. Dhillon	XEN/Mech. Fez.	242408		97797-00878
CMC Circle				
S.K. Baweja	XEN/WSP	2702859		98880-36024
Ravi Chohan	XEN/Store Procure.	2721353		93161-83057

**DISASTER MANAGEMENT DIVISION
(Ministry of Home Affairs)**

S. No.	Name/ Designation	Tel (Office)
1	Sh. P Chidambaram Home Minister	011-23092462 011-23092631
2	Sh. Mullappally Ramachandran Minister of State	011-23093235 011-23092595
3	Sh. Gopal K Pillai Home Secretary	011-23092989 011-23093031
4	Sh. AE Ahmad Secretary (Border Management)	011-23092440 011-24602518
5	Sh. RK Shrivastava Joint Secretary (DM)	011-24638206
6	Control room	011-23093563-66

NATIONAL DISASTER MANAGEMENT AUTHORITY (NDMA)

Sr. No.	Name	Tel (Office)
1	Sh. M Shashidhar Reddy, Vice Chairman	011-26701701
2	Dr. Noor Mohammed Secretary, NDMA	011-26701710
3	Ms Sujata Saunik, Joint Secretary (Admn & NDRF)	011-26701867
4	Sh. Amit Jha Joint Secretary (Policy & Plan)	011-26701718

5	Dr. P K Tripathi Joint Secretary (Mitigation)	011-26701816
6	Control Room	011-26105912

NATIONAL DISASTER RESPONSE FORCE (NDRF)

Sr. No	Name	Tel (Office)
1	Sh. Rajiv, DG	011-26712851, 011-24101450
2	Sh. Mukul Goel, IG	011-26160252
3	Sh. JKS Rawat, DIG	011-26105910
4	Control Room	011-26107953
5	Commandant (ITBP), Bathinda (Punjab)	0164-2246030 09417802031

INDIAN METEOROLOGICAL DEPARTMENT

Sr. No.	Name	Tel (Office)	Mobile
1	Sh. Ajit Tyagi Director General	011-24611842	09313982396
2	Sh. AK Bhatnagar ADG (M)	011-24697473	09868880134
3	Control Room- Seismology	011-24619943 011-24624588	
4	Control room- Flood	011-24631913	
5			

CENTRAL WATER COMMISSION

Sr. No.	Name	Tel (Office)	Mobile
1	Sh. C Lal (FMP)	011-26168258	09811054117
2	Control Room	011-26106523	

INTEGRATED DEFENCE STAFF

Sr. No.	Name	Tel (Office)	Mobile
1	DCIDS (Ops)	011-23013947	09868890769
2	ACIDS (Ops)	011-23011442	
3	Control Room	011-23005131, 011-23005114	

PUNJAB CHIEF SECRETARY and RELIEF COMMISSIONER

Name	Designation Officer	Telephone (O)	Mobile No.
Sh. Subodh Chandra Agarwal	Chief Secretary	0172-2740156 0172-2740860	
Sh. A.R. Talwar Financial Commissioner (Revenue)	Relief Commissioner	0172-2743854	09815722260

ANNEXURE 6

**State Resource Inventory of Floods
Available Flood Equipments in the Punjab State**

District Hoshiarpur

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	12	7
O.B.M. Engines	6	3
Paddles	22	14
Lock	18	-
Bamboo with Tents (gZsh u'yN)	16	240
Trolley for the transportation of boats	-	2
Gum Boats	9	20
Wooden Stand for Engine	2	-
Bamboo	48	50
Petrol Tank	2	-
Hammer	7	-
Umbrella	10	20
Torch	12	-
Raincoat	10	20
Search Lights	4	25
Ropes	200 Meter 1330 Feet	-
Belts	-	15
Leather Bags	-	20
Blankets	-	50
Plastic Sheets	-	50
Fire Extinguishers	1	15

District Tarn Taran

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	9	6
O.B.M. Engines	1	4
Paddles	16	4
Hooks		-
Life Jackets	35	220
Bamboo with Tents (gZsh u'yN)	54	50
Trolley for the transportation of boats	-	-
Gum boots		10
Wooden Stand for Engine	-	-
Bamboo	45	122
Petrol Tank		-
Hammer	-	-
Hooks	150	135
Torch		10
Raincoat		10
Search Lights		10
Ropes	80	-
Belts	-	15
Leather Bags	-	20
Blankets	-	50
Plastic Sheets	-	50
Fire Extinguishers	1	15

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	7	-
O.B.M. Engines	3	-
Paddles	20	-
Hooks	14	-
Life Jackets	40	-
Bamboo with Tents (gZsh u'yN)	36	-
Trolley for the transportation of boats	1	-
Nails	100	-
Wooden Stand for Engine	3	
Bamboo	100	-
Petrol Tank	-	-
Hammer	-	-
Umbrella	-	-
Torch	-	-
Raincoat	-	-
Search Lights	-	-
Ropes	-	-
Belts	-	-
Leather Bags	-	-
Blankets	-	-
Plastic Sheets	-	-
Fire Extinguishers	-	-

District Kapurthala

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	15	9
O.B.M. Engines	5	10
Paddles	26	24
Hooks	-	-
Life Jackets	83	120
Bamboo with Tents (gZsh u'yN)	30	110
Trolley for the transportation of boats	2	
Gum Boots	19	20
Wooden Stand for Engine	-	
Bamboo	18	
Petrol Tank	5	10
Loud Speaker	3	2
Umbrella	7	30
Torch	6	20
Raincoat	8	10
Tubes	8	16
Ropes	50 Feet	30
Metal Hooks	2	28
Metal Nails	8	20
Boats with Paddles	-	5
Boat Engines	-	4
Carpets	10	10

District Ludhiana

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	22	-
O.B.M. Engines	3	-
Paddles	21	-
Life Jackets	49	-
Tents	73	-
Nails	77	-
Hooks	4	-
Wooden Plank	3	-
Bamboo	116	-

District S.A.S. Nagar

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	4	-
O.B.M. Engines	-	-
Paddles	27	-
Pump Set	2	-
Life Jackets	75	-
Bamboo with Tents (gZsh u'yN)	40	-
Nails	400	-
Gum Boots	8	-
Engine	1	-
Bamboo	120	-
Nails	400	-
Plastic Sheets	8	-
Torch	10	-
Raincoat	8	-
Search Lights	6	-
Ropes	552 Feet	-

District Fatehgarh Sahib

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	8	-
O.B.M. Engines	1	-
Paddles	22	-
Trolley	1	-
Life Jackets	55	-
Bamboo with Tents (gZsh u'yN)	40	-
Hooks	24	-
Bamboo	75	-
Nails	200	-
Torch	2	-
Raincoat	2	-

District Barnala

Item/ Type/ Stock	Present Stock	Stock Needed
Steel Cot	1	
Diesel Engine	2	
Life jackets	4	
Bamboo with Tents (gZsh u'yN)	40	
Gum Boots	8	
Water Drainage Pump	3	
Bamboo	120 Feet	
Nails	320	
Umbrella	16	
Torch	8	
Raincoat	14	
Search Lights	8	
Ropes	1200 Feet	
Belts	2	
Inverter Battery	1	
Generator	1	
Plastic Sheets	20	

District Amritsar

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	10	2
O.B.M. Engines	3	3
Paddles	23	6
Life Jackets	176	-
Bamboo with Tents (gZsh u'yN)	44	20
Lamp	-	30
Bamboo	97	50
Nails	294	

District Sangrur

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	15	-
O.B.M. Engines	4 yokp jkbs ftZu	-
Paddles	15	-
Life Jackets	40	-
Bamboo with Tents (gZsh u'yN)	50	-
Lamp		-
Bamboo	121	-
Nails	425	-
Ropes	59	-
Umbrella	3	-
Hooks	6	-

District Muktsar

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	3	-
O.B.M. Engines	2	-
Engines	1	-
Trolleys (For Boats)	4	-
Life Jackets	53	-
Bamboo with Tents (gZsh u'yN)	50	-
Raincoat	15	-
Electric Motor (Pump Set)	4	-
Generator	5	-
Search Lights	4	-
Lifebuoys	15	-

District Patiala

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	25	-
Engines	7	2
Paddles	96	-
Life Jackets	432	-
Tents	81	-
Raincoat	20	10
Bamboo	522	-
Ropes	2862	-
Nails	40	-
Gum Boots	26	-
Plastic Sheets	212	10
Life buoys	4	7
Umbrella	28	10
Search Lights	20	-
Torch	10	10
Hooks	80	-
Tanks	4	-
Generators	-	2
First Aid Kit	-	80

District Mansa

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	13	
Engines	16	
Paddles	28	
Torch (Big)	2	
Gum Boots	13	
Tents	216	
Generator Set	2	
Umbrella	18	
Life Jackets	60	
Pump Set	4	
Bamboo	300	
Raincoat	7	
Tool kit	1	

District Rupnagar

Item/ Type/ Stock	Present Stock	Stock Needed
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Boats	8	-
O.B.M. Engines	3	-
Paddles	28	-
Ropes	16	-
Life Jackets	100	-
Tents	109	-
Raincoat	23	-
Search Lights	7	-

District Faridkot

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	6 w'No p'N fJziD tkbhnK	-
O.B.M. Engines	2	-
Paddles	10	-
Life Jackets	29	-
Tents	145	-
Generator Set	2	-
Search Lights		-
Pump Set	12	
P.V.C. Pipes	135	
Trolley for the transportation of boats	1	

District Bathinda

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	7	-

O.B.M. Engines		-
Paddles	10	-
Life Jackets	60	-
Tents	80	-
Torch	100	-
Plastic Sheets	100	-
Pump Set	5	

District Gurdaspur

Item/ Type/ Stock	Present Stock	Stock Needed
Boats	12	
O.B.M. Engines	8	
Paddles	51	
Hammer	5	
Nails	94	
Batteries	2	
Hooks	20	
Bamboo	55	
Accessories with Tents	3	
Life Jackets	138	

Annexure 7 List of NGOs of PUNJAB

<u>S.No</u>	<u>Name of NGO</u>	<u>Coordinator</u>	<u>Address</u>	<u>Phone/Mobile</u>	<u>Email</u>	<u>Area of Expe</u>
	Amritsar District					

1	All India Pingalwara Charitable Society (Regd.)	Dr. Inderjit Kaur (President)	G T Road, Amritsar. 143001	0183-2584586, 2584713, Fax - 0183-2584586, Mobile - 9814055166	pingal@jla.vsnl.net.in	Environment, Water/Sanitation, Agriculture, P Housing, Slur
2	All India Women's Conference (AIWC)	Mr. Narinder Sharma, Project Manager	Chowk Shantpura, G. T. Road, Amritsar - 143001	9815386326	aiwcfsw.tip.sacs@gmail.com	HIV - FSW
3	Amritsar Education Society and Research Institute	Dr. S S Chhina	72, sector 4, Amritsar.	0183-2507622, 9855170335	sarbjitchhin.a@yahoo.com	Rural Development, Alleviation
4	Amritsar Health and Family Welfare club		75/23 A, Kashmir Avenue B. O. 65 A, London House, Katra Sher Singh, Amritsar			RCH Activities, family planning and services
5	Amritsar Vikas Manch	Sh. Charanjit Singh Gumtala	253, Ajit Nagar, Amritsar 143006	0183-2582323, 9417533060, Fax: 0183-2582323	asrvikas@gmail.com	Art and Culture, Management, Environment, Human Rights, Advocacy, To and Poverty A Youth Affairs,
6	All India Women Conference	Ms. Aruna Mehera Executive Secretary	A-223, A-224, Ranjit Avenue, Amritsar - 143001	0183-2224158, Fax No. 0183-2294404		RCH Activities, family planning and services
7	All Over Awareness Party	Sh. Yash Pal Bhaskar	12, Sandhu Avenue, Near Mandir Batala Road Amritsar, Correspondence Address: First Floor Sanjeev Store Main Ghala Mala Chowk Majitha Road Amritsar - 143001	0183-5016816, 9316249426	bhaskaryas.hpal@yahoo.com	Aged/Elderly, Drinking Water, Environment, Family Welfare, Legal Awareness, Tourism, Women Empowerment
8	Ambedkar Social Justice	Sh. Lakha Singh Azad	VPO Rayya Khurd, Tehsil Baba Bakala, Distt. Amritsar.	01853-214178, 9463570178	lakhaazad007@yahoo.com	Dalit Upliftment
9	Bhai Lalo Ji Social Society	Dr. L. S. Bhullar, MBBS, NCPR (USA), Dr. Lakhbir Singh Bhullar MBBS, NCPR (USA), President	4 SCF Golden Avenue, C/o Bhullar Neonate child Care Centre, Amritsar	0183-2585244 @ , Mobile - 9356408282	ls_bhullar@yahoo.com	RCH Activities, family planning and services
10	Bodh Women and Children Welfare Society		454, Akash Avenue, Fatehgarh Churian Road, Amritsar	0183-2423570		
11	Dr. Hahnemann Social and Welfare Society		12-13, Gagan Colony, Batala Road, Amritsar	0183-279011, 275974		

12	Ganesh Das Chadha Rotary Centre	Sh. Sunil Kapur, Chairman	(A project of Rotary club Amritsar Midtown), 1442/11, Bombaywala Khoo, Amritsar	9814811424	sunilkapur26@yahoo.com	Provides medical and vocational training. Medicat: General Eye care unit, Vocational (Fashion Dress Designing).
13	Lok Kalyan Samiti	Sh. Jagmohan Singh, Chairman, Mr. Davinder Singh, Project Manager	# 456, Sham Niwas, Near Govt. Senior Secondary School. PO Chheharta, Amritsar - 143105	9872465799, 9779324620	jagmohansingh.asr@gmail.com	Organizes awareness programmes on Environment of entrepreneurs and marginal widow, SC, ST rural women etc.
14	Mata Kamalaji Welfare centre (Trust)	Bhai Guriqbal Singh Ji	Tran Tarn Road, Amritsar	0183-3294659, 3292255, 2483920, 9876525839		Provision of free wards and 22 books, uniform Welfare centre
15	Mission Aagaaz	Sh. Deepak Babbar	Opp. Khalsa College, B.Ed. Gate, GT Road, Amritsar	9815261302	mission.aagaz@gmail.com	Environment
16	Param Vaibhav Principal		Police DAV Public School Amritsar - 143001			RCH Activities family planning and services
17	Paryas Jansewa Society	Sh. Amit, Secretary	# 760, Gali No 2, Mustfabad, P. O. Khanna Nagar, Amritsar	9814299728, 0183-224750, 9876411709	vikaskundal2006@yahoo.com	To open centre and self employment Child Care Centre
18	Pariver Sewa Samiti (Regd)	Sh. Rajpal Gupta, President	Madhav sadan, Bharat Nagar, Bhatala Road, Amritsar	0183-2557857, 2274316		Education, Health families
19	Peerit Pariwar Sewa Samiti		Madhav Sadan Bharat Nagar, batala Road, Amritsar	0183-258820		
20	Society for Education, Environment and Protection of Animals	Sh. Virinder Sharma	131, Partap Nagar, Opp. Main Gurudwara, G. T. Road, Amritsar - 143001	0183-2555714, Mob. 9814455625		Awareness generation Campaigns, C implementation Environment, Biotechnology Agriculture, E
21	State Consumer Protection Corporation (Regd.)	Dr. Sarlok Singh Sidhu (Advocate)	33/Guru Teg Bhadur Nagar, PO Khalsa College, Amritsar 143002	0183-2257226		Work for Human to consumers
22	S. Diwan Singh Memorial Educational Welfare Society	Sh. Mohinder Singh Suri, President	Surya Building 10/1, Katra Ghanaya, Goal Hatti Chowk, Gali Arorian, Amritsar	0183-5099100, 9872631372		Runs two schools under National Arranges Puls medical check RCH project u Surgeon, Amr

23	SAWERA (Social Action for Women Empowerment and Rural Advancement)	Mrs. Kulbir Kaur, Director	241-E, Street No. 4, Bhalla Colony, Amritsar - 143105	9814488353	sawera.india@gmail.com	Runs a Charity Chheharta, Organizes camps, Organizes camps, Conducts training programs and making the programmes
24	Social Welfare and Public Education Charitable Society		150, Golden Avenue, Amritsar	9815335554, 0183-2583680		
25	Swami Vivekanand Medical Mission (Regd.)	Dr. Adarsh Pal Vig, Honorary Secretary, Mr. Rajan Chawla, Project Manager	12-Makan, Krishan Nagar (Islamabad), Amritsar - 143002	9417062796, 9888776543, 0183-2210429	swamivivekanandasr@yahoo.com	Runs a charity patients daily Gyne, Eye and Organizes aw AID's, Child development empowerment check up camps Educate the general types of epidemic health problem
26	Tercentenary Educational and Welfare Society	Dr. Tarvinder Singh Chahal	54, Adarsh Nagar, Ram Tirath Road, Amritsar - 143002	0183-2225460 (R), 9914122224		Social welfare research and are trying to get various organizations Chandigarh, H funding organizations
27	Aasra Welfare Society	Sh. Romesh Mehta	Near Masjid, Kikkar Bazar, Bathinda	0164-2251602 @, 9815775239	No email address	Blood Donation Free water supply unclaimed disbursement
28	Aastha Foundation (Regd.)	Sh. Jagtar Singh Brar, President	Goniana Mandi, Bathinda - 151201	9417158928	jagtarbrar@yahoo.co.in	Organizes free free ECG, ECG Provides free needy students camps, Arrangements and donate help

29	Amar Parkash Educational Development Society	Sh. Rajiv Kumar	APEDS CISS, Institute Building, Near Wadi Hospital, Goniana Road, Baltana. 151001	0164-5000155, 2235430, 9417607082	pawarindu@yahoo.com	Agriculture, A Biotechnology, Disaster Man Drinking Water Food Process Welfare, HIV/ Information a Technology, L Labour and E (SHGs), Mino Medium Enter Renewable E Raj, Right to I Rural Develop Alleviation, S research
30	Ambuja Cement Foundation	Ms. Harjinder Kaur	PO Guru Nanak Dev Thermal Plant, Malout Road, Bathinda	9465747476		HIV - Compos
31	Baba Jiwan Singh Helper Welfare Club	Sh. Jatinder Pal Singh	# 167, Kamla Nehru Colony Near Bibiwala chowk, Bhatinda	0164-2754275, 5009475, 9781040722	jatindersharma67@yahoo.co.in	Animal Husba Fisheries, Dri Literacy, Envi and Family W Women's Dev Empowermen
32	Blood Donor Council	Sh. Surinder Garg	Saheed Samark College Rampura Phul, Bathinda	0164-2251602		AID's Campai
33	Dashmesh Education and Welfare Society	Sh. R. S. Mann, Principal, Sh. Suresh Labana (Adv. Project)	VPO Chak Ruldu Singh Wala, Distt. Bhatinda	0164-2211076, 9356200783, 9356202334		RCH Activitie family plannin and services Immunization Adolescent gi
34	Diamond Welfare Society (Regd.)	Miss. V. R. Goal, President	33110, Street No. 16, Main Road, Partap Nagar, Bathinda - 151001	9217718982		Working for a students by p education ma employment t girls/ladies ev Dental care a Organizes aw feticide, Eye c

35	District Congress Sewa Dal	Sh. Jagjit Gill Patti, Chief	Mata Rani Street, Mehna Chowk, Bathinda	9814249271		Blood Donation Programme
36	Emergency Blood Club (Regd)	Sh. Salim Khan, President	C/o Khau STD PCO, Dhana Mandi Road, Bathinda	9814048903		Blood Donation Programme, 'N
37	Goodwill Society	Sh. K. K. Goyal	Paras Ram Nagar, Bathinda	0164-2225519		Blood Donation Education, H
38	Helping and Educational Society	Sh. Sham Lal	Gali No. 10, Bibi wala road, Bathinda	0164-2213289		Aid to physically educate disabled vocational training the society re
39	Indian Red Cross Society		Distt. Red Cross Branch, Red Cross Bhawan, Civil station, Bathinda			Drug-De-addi
40	Malwa Education Society		Social Intervention and Health Activities (MESSIHA), Talwandi Sabo, Bathinda			RCH Activities: family planning and services Immunization Adolescent gi
41	Malwa Education Society	Sh. Pirthi Singh, President	Social Intervention and Health Activities (MESSIHA), Opp. Post Office, Maur Mandi, Bathinda	01655-238486		RCH Activities: family planning and services Immunization Adolescent gi
42	Mahila Kalyan Samiti	Mr. Manoj Kumar, Project Manager	Rorki Road, Sardulgarh Mansa, TI Address: Gali No. 21, Partap Nagar Bathinda.	9309432068, 9214013858, 9414210396, 9780810256		HIV - Migrant
43	Red Cross Society	Sh. Ajmer Singh Mann, Secretary	Red Cross Bhawan Bathinda	0164-2212860		District welfare Doation, Drug
44	Rotary club	Sh. Ramesh Goel (President), M/S Chowdhary Motors, Opp. Bus stand Goniana	Goniana Distt. Bathinda	0164-2262085, 2262589, 9417046314		RCH Activities: family planning and services Immunization Adolescent gi
45	Sahara Welfare Club	Sh. Vijay Goyal	C/o Manoj Sweet House Bathinda	0164-2254211		Cremation of Medical aid to cases, First a water service

46	Society for Sehat Education and Welfare Activities	Dr. A. P. Grover (President)	13804, Street No 7, Ganesha Basti, Bathinda	0164-2218536, 9815718536		RCH Projects Activities for P
47	Sh. Sukhamani Sahib Sewa Society Bathinda	Sh. Avinash Singh Sodhi	C/o Devinder Oil Store, Old Bus stand Bathinda	0164-2214380		Vaccination, P handicapped of poor girls, v
48	Ujala Health and Social Welfare Society (Regd)		C/o Chandigarh Child Care Centre, Kotkapura - 151204			To organize a parents and h among new b physically and Prevention of camps with th Faridkot.
49	United Welfare Society	Sh. Vijay Bhatt	C/o Mohan Di Hatti, Mehna Chowk, Bathinda	9814607128		Blood Donati Help to needy family plannin
50	Young Blood Club (Regd.)	Sh. Gopal Rana, President	C/o Mehna Chowk, Bathinda	9815557821		Blood Donati programmes, programme
51	Baba Ganda Singh De-Addiction Centre	Mohant Piara Singh	Khudi Kalan Barnala	01679-230991		Free De-Addi Medicine
52	Bhagat Mohal Lal Sewa Samit	Sh. Hari Parkash Dharani	Barnala	01679-230627		Free Medical activities.
53	Barnala Consumer Council	Sh. B B Goyal	Near ICICI Bank College Road, Barnala	9814574565	goyalbb@yahoo.com	Civic Issues, Human Rights Communication Awareness an and Advocacy
54	Dera Baba Thaman Singh	Mohant Gurdev Singh	Pharwahi, Barnala	01679-235301, 233407		Free Eye Can
55	Happy Club Tapa Sewa samit	Sh. Surinder Mittal	Barnala	01679-273617		Free Ambulan road mishaps
56	Jan Kalyan Samiti	Sh Ramesh Kumar	Gali No. 3, Shahid Bhagat Singh Nagar, Nanaksar Road, Barnala.	9417485990		
57	Lions Club Sherpur	Dr. Darshan Singh	Distt. Barnala	01679-233807, 9515840274		Free Medical Plantation
58	Mini Sahara Club	Sh. Pawan Kumar Gupta	Tapa Distt. Barnala	01679-273525		Free Ambulan road mishaps

59	Sahara Club Bhadaur	Sh. Malkiat SNG Dr. Saleem	Distt. Barnala	9872147825		Free Medical activities.
60	Standard Combine Handiaya	Sh. Balwinder Singh	Distt. Barnala			Free Ambular Road Mishap
61	Sunil and Company	Sh. Sunil Kansal	Barnala	01679-233953		Free Ambular Road Mishap
62	The Rationalist Society Punjab (RSP)	Sh. Ravinder Kumar President, Sh. Sarjit Talwar General Secretary	B XI/2139, Chintu Road, Barnala	01679-242950		Awareness g Campaigns/a Environment,
63	Bharat Prakarsh Foundation	Ms. Neena Singh, Trustee	H. No. 1601, Sector 36-D, Chandigarh	9316032266	neenappsingh@gmail.com	Children, Edu
64	Chandigarh Acharyakul Trust (Regd.)	Sh. Devraj Tyagi, Secretary	Gandhi Smarak Bhawan, Sector 16 A, Chandigarh - 160015	9417926193		Collect used o distributes to colony of sect financial assis various gover their poverty, awareness ca dispensary

65	Developing Indigenous Resources - India (DIR-I)	Dr. William Frederick Shaw, Key Personnel	45, First Floor, Sector 8 A, Chandigarh	9815887419, (O) 0172-4660419		Has assigned each unit of 2 Slum of 9240 weigh children of low cost nu parents, exam pregnant won provide incom every month years and all costs, Organ. Runs a school nursery, nurse classes to cat childhood lea free micro-cre women are b rupees to star open school f who are eithe have never b
66	Helping Hand Foundation	Mr. Dhillon, Project Manager	H. No. 286, Sector 33 A, Chandigarh	9815518284, 9350581200		HIV - Trucker
67	Society for Service to Voluntary Agencies (North)	Sh. B. B. Mahajan, IAS (Retd.), Director	Room No. 19, FF, Karuna Sadan, Sector 11, Chandigarh	0172-2746258	asosva@sify.com	SOSVA (North Mother NGO programmes Child Develop Drug De-addi children throu Mohali district impressionab inclucate goo interest in stu in 35 hospital breast-feeding

68	Voluntary Health Association of Punjab	Sh. Manmohan Sharma, Executive Director	Voluntary Health Association of Punjab, SCF 18/1, Sector 10 D, Chandigarh	0172-5016299	vhapunjab@gmail.com	Organizes awareness programmes. Organizes free awareness camps on environment and health issues. camps on fem
69	Association for Social Health in India	Sh. Gurdial Singh, Secretary	Distt. Br. Sadiq Chowk, Red Cross Bhawan Faridkot	01639-250228, (O), Fax- 01639-250228, 251024		Family Welfare women and fa taken up for p
70	Baba Farid Centre for Special Children	Sh. Pritpal Singh	Vardaan Building, New Harindra Nagar Street No 1, Faridkot	01639-250332, 9888914657	neurovip9@gmail.com	Differently Ab Forests, Nutri
71	Distt. Child Welfare Council	Sh. Gurdial Singh, Secretary	Sadiq chowk, Red Cross Bhawan, Faridkot	01639-250228, (O), Fax- 01639-250228, 251024		Children Day to Terrorist E Training Cent
72	Elders Services Societies	Sh. Jagmohan Singh Brar, President	Faridkot	01639-251310 ®		Welfare of El about social e
73	Faridkot Technology Transfer Society	Sh. Gurdial Singh, Secretary	Red Cross Bhawan Sadiq Chowk, Faridkot	01639-250228, (O), Fax- 01639-250228, 251024		To set up buil the skill jobs.
74	Guru Nanak Bhalai Club	Sh. Jagtar Singh, President	Fetgarh Dabrikhana	01635-252236		Medical Camp
75	Guru Teg Bhadur Foundation	Sh. Sewa Singh Chawla, Principal, M.G.M. Sr. Sec. School Faridkot	5/30 West Patel Nagar, New Delhi, Local Address, C/o Sewa Singh Chawla, Principal and M.G.M. Sr. Sec. School Faridkot	01639-256257®, 9814505257		To propagate Bhadur Ji
76	Indian Red Cross Society	Sh. Gurdial Singh, Secretary	Branch Red Cross Bhawan, Sadiq Chowk, Faridkot	01639-250228(O), Fax: 01639-250228, 251024, 9872667033	redcross_fd@yahoo.co.in	The Welfare o old people, di patients

77	Kishav Gram Udyog Samiti	Ms. Gurmit Kaur, Chairman	VPO Gumti Khurd, Near Water Workes, Faridkot - 151202	9356753791, 01635-233568(O)		Provides train for promotion getting market from Phulkari Government a Provides train SHGs in Leat purse, wallet, and making o Organized 15 promotion mic enterprise for empowerment awareness ge Organizes en camps, Organ camps
78	National youth Welfare Club	Sh. Gurcharan Singh, President	Faridkot	01639-254687®		Social and Cu
79	National youth Club (Regd.)	Sh. Suresh Arora, President	55 Nehru Shopping Centre, Faridkot	01639-252870		Medical Camp Programme, Y
80	Nirog Bal Ashram Charitable Society	Dr. Deepak Goyal, secretary	Muktsar Road, Kotkapura	01639-251243, 9417438018		All round deve Bal ashram, M economically society Deshr Mandir, Sewir families of our Kadai Kendra unemployed y
81	People's Forum Society (Regd.)	Sh. Khuswant Bargari, President	Bargari, Distt. Faridkot - 151208	01635-244053, 505030, 9872989313	rajpaulsingh@gmail.com	Health Aware camps for stu education, Co government, S education imp environmental

82	Rural Development Association	Sh. M. S. Kang, Director	(Under CNRI, New Delhi), Giji Printing Press, Bishanandi Bazar, Jaitu, Faridkot - 151202	9464114731	rda_india@yahoo.com	To organize p level and exp opportunities the society, T development experimental can be replica of limited mea knowledge.
83	Sahara Service Society	Capt. Dharm Singh Gill, President	Nehru Shopping centre-IR Faridkot	01639-251892 ®, 257892 (S), (M) 01639-312877		Cremation of
84	Shaheed Bhagat Singh Welfare Club	Sh. Harnek Singh, President	Village Sarahoor, Faridkot	01639-221558® P.P		Medical Camp
85	S.K.S, Youth Club	Sh. Boota Singh, President	Village Bajakhana, Faridkot	01635-246640 ®		Social Activiti
86	Sri Guru Gobind Singh Trust	Sh. Sewa Singh Chawla, President	Hari Nau Road, Kotpapura, Faridkot	01639-256257		Library, Schoo social function
87	St. John Ambulance Association	Sh. Gurdial Singh, Secretary	Distt. Br. Red Cross Bhawan, Sadiq Chowk, Faridkot - 151203	01639-250228(O), Fax: 01639-250228, 251024		First aid and l students of co centers and p guard etc., Ar Medical team and serving th
88	Sukhmani Society for Citizens Services (Regd.)	Additional Deputy commissioner. Faridkot	Faridkot	01639-251043		To provide fa to the people
89	The Faridkot Distt. Cultural Society	Sh. Gurdial Singh, Secretary	Sadiq Chowk, Red Cross Bhawan Faridkot	01639-250228(O), Fax: 01639-250228, 251024		To promote D Advance, Initi propagate art creative arts.
90	Ujala Health and Social Welfare Society	Dr. Ravi Bansal	C/o Chandigarh Child Care Centre, Kotkapura	(M) 9814035262, Fax: 01635-501029 P.P.		Running Ujala Motherhood b death rate of
91	Youth Affairs orga.	Sh. Parminder Cheema, President	Faridkot	01639-255881 ®		Youth Activiti Tobacco Day
92	Youth Club	Sh. Sukhjinder Singh, President	Memuana, Faridkot	01639-244059 ®		Social and Cu
93	Youth Welfare Club	Sh. Jaswinder Singh, President	Gobindgarh (Dabrikhana), Distt. Faridkot	01635-252207		Social Activiti

94	Indian Red Cross Society		Distt. Branch, Fatehgarh Sabib			Drug-De-addi
95	Sirhind Consumer Protection Forum (SCPF)	Sh. Narinder Modi, President	Mohalla Modian, Sirhind City	01763-232941, Fax: 01763-224118		Consumer Ed programmes, conventions/c redressal con
96	Jaggo Society	Sh. Gurvinder S. Sohi	# 67, Ward No. 4, Dalichi Mohalla, Sirhind, Fatehgarh Sahib	9815416922		
97	All India Jeev Raksha Bishnoi Sabha		VPO Dutaranwali, Tehsil Abohar, Distt. Ferozepur 152001			Environment,
98	Bhai Daljit Singh Memorial Secretary	Sh. Mann Singh Zira	Patron Mohulla Kamboan, OLD Talwandi Road, Zira	(O) 01628-251264, ® 255877		Social project
99	Border Welfare Committee	Sh. Krishan Lal Narang	Mamdot, Ferozepur	® 01632-262188		Social project
100	Baba Lal Dass Sports Club	Sh. Beant Singh, Org. Secretary	VPO Feroke (Via. Zira), FZR	01682-252235		All Social Pro project
101	Bharat Vikas Parishad	Sh. Har Gular Dhawan	37 Gopi Nagar, Near Raja Talkies, Ferozepur City	® 01632-242525		All Social and
102	Bharat Vikas Parishad Punjab South	Prantiya Secretary	Pasricha hospital, Old grain market, Near Phuara Chowk, Talwandi Bhai, Distt. Ferozepur 142050	01632-231231	pasricha61978@rediffmail.com	Drinking Water Environment Family Welfare Water Resour
103	Baba Sarabdhass Youth Club	Sh. Jugal Kishore, Member	STD/PCO, OLD Talwandi Road, Opp. Water Punp, Zira - 142047, FZR	(O) 01682- 253104		Social Project
104	Bhai Mardana Society	Sh. Joginder Singh Master, Member	Kirti Nagar, Ferozepur City	® 01632-240436		Social Project
105	Bharat Nagar Welfare Society	Sh. Om Parkash	Sh. Om Parkash Gumber, Auditor Basti Bhatian Wali, Ferozepur City			Social Project
106	Citizen Form Punjab Government	Sh. S. K. Sachdeva Rel. Secretary	19-Kirti Nagar, Ferozepur City	® 01632-212256		All Social Pro project
107	Dr. B. L. Pasricha, Press Secretary Pasricha Hospital	Dr. B.L. Pasricha	Near Fuwara Chowk, Talwandi Bhai Ferozepur	(O)and ® 01632-231231		All Social and

108	Dr. V. P. Chauhan, Publicity Secretary Preet Nagar	Dr. V. P. Chauhan	Preet Nagar, Baba Farid Market, Ferozepur City	® 01632-223085		All Social Pro project
109	Freed Youth Club JBD, Nehru Yuvak Kander	Sh. Bobby Arora	G. No. 1192/IM.C.Street, Near Krishana Mander Jalalabad West, FZR	(O) 01638-252929, ® 237057		Freed Youth C Kander (Heal
110	Friends Club	Sh. Paramjit Singh, Member M.C.	C/o Sh. Paramjit Singh Pama, Main Bazar, Guru Har Sahai Ferozepur	(O) 01685-230303		Social Project
111	G. Gobind Singh Sports Club	Sh. Tarsem Singh Brar, General secretary	VPO Haraj (Via TWB), Ferozepur	® 01632-230684		Health aware
112	G.G. Singh, Study Circle Punjab Government	Sh. Inder Singh, Finance Secretary	194, Azad Nagar, Near Bus Stand Ferozepur City			All Social Pro project
113	Guru Nanak Sports Club	Sh. Harjinder Singh, Journalist	Youk Sewadar C/o Sh. Harjinder Singh Kalra, Member Press Reporter (Daily Ajit), Talwandi Bhai, Ferozepur	(O) 01632-230921, 230949, ® 230396		Social Project
114	Indian Welfare Society Nehru Yuvk Kendar	Sh. Varinderpal Singh, Member	Kothi No 24, Dashmesh Nagar Ferozepur	® 01632-221957		Social Project
115	Indian Social Welfare Society Punjab Government	Sh. S. N. Malhotra	10 Vikas Vihar, Ferozepur City	® 01632-222408		All Social Pro project
116	Jan Jyoti Kalyan Samiti	Mr. Narender Kumar, Project Manager	Variyam Nagar, Abohar, Opp. Kundan Ferozepur - 152116	9417438388		HIV - Compos
117	Khatri Mander Sabha	Sh. Ashok Kumar, Member Secretary	Ashoka Dry Cleaners, Bezar Durga Dass, Ferozepur City	(O) 224999, ® 243538		All Social Pro project
118	Master Dev. Raj Patron Pardan Citizen Council	Master Dev Raj	Jalalabad West, FZR			
119	Peace Mission Society	Sh. Bagat Ram Darshan	Street Kumaran, Ferozepur City	(O) 01632-224659		Social Project
120	Rtd. Teacher Association Punjab Government	Master Prem Narang, Member	Main Bazar Mamdot, Ferozepur	(O) 01632-262203, ® 262106		All Social Pro project
121	Rotary Club International	Sh. Sanjiv M. Bajaj, Gen. Secretary	Varun Vatika, Street Bassian, Mudki, Distt. Ferozepur	(O) 01632-237087, ® 237057		All Social Pro project

122	Rotary Club Makhu Indian Medical Association	Sh. Ajmer Singh	Kolta Hospital, Near bus stand Makhu, FZR	(O) 01682-270655		
123	Sadavrat Panchayati Trust	Sh. P. C. Kumar	Gali Nandulal Mehta (inside Magzani gate), Ferozepur.	0163-2227366, 9463740127		
124	Social Welfare Club	Sh. Amar Nath	M/s Amar Nath Narajan Dass cloth merchants Mallan Wala, FZR	(O) 01682-275085, ® 275658		Social project
125	Sh. Parkash Chand Kumar	Sh. Parkash Chand, Chairman	Gali Nandu Lal Mehta, I/s Magzini Gate, Ferozepur City	® 01632-227366, (M) 9814783943		Sada worat P Coordinator M
126	Smt. Paramjit Kaur Sodhi	Smt. Paramjit Kaur Sodhi	Patron Press Reporter, I/s Kasuri Gate, Ferozepur City	® 01632-224904		All Social Pro project
127	Sahara Club Nehru Yuva Kendar	Sh. Pawan Kumar	Pawan Sprts and Book Deport, Muktsar Road Guru Har Sahai	(O) 01685-230391, ® 231161		All Social Pro project
128	Sh. Ashwani Kumar (JBD)	Sh. Aswani Kumar, Sh. Krishan Lal	Member Sh. Krishan Lal M. C., Inder Nagar, Jalalabad West, Ferozepur	® 0685-253674		Social Worke
129	Social Welfare Society	Sh Ashok Kumar	Sadhu Asharam, Fazilka	® 261744		Social Project
130	Sewa Bharti All India	Sh. Harish Chander	Near Bus Stand, Fazilka	® 263201		Social Project
131	Sri Krishna Rural Educational Dev. Society	Sh. Rajesh Aggarwal, President	Abohar.	9463093917	gaurav_profession@yahoo.com	
132	Teacher Association	Mrs. Raman, Principal	HMDAV Public School, Ferozepur City			Social Project
133	A B P Yatri Welfare Association	Mr. Suresh Kumar Goel	A-5, BECO Complex, G T Road, Batala, Distt. Gurdaspur	01871-240341, 220341, 9417071341	skgoel71341@yahoo.co.in	Urban Develo Alleviation
134	All Indian Salai Kadai Kender Society	Sh. Buta Ram	House No 322/11, Prem Nagar Gurdaspur - 143521	9814299728		To open Cent and self empl and also Prom empowermen Helping the o homes

135	Baba Banda Singh Bahadur Educational Trust	Sh. Amarjit Singh Chahal	Improvement Trust Colony, Sch. No 1, Batala road, Gurdaspur 143521	01874-680444, 9646000069	gschahal@live.com	Education and
136	Batala Ganesh Lion club	Sh. Jaideep Aggarwal GT Rd. Batala	Batala	® 271000, (M) 9815154974		Helping the p
137	Batala Smile Lions Club	SDM Sahib	Batala	240579		Helping the p
138	Bhartiya Utthan Sangh	Sh. Samrendra Sharma	Gurkul Bhawan, Opp. Bakshi Timber Traders, Dhangu Road, Pathankot 145001	0186-2235922, 9814043281	ngo.bus2004@yahoo.com	Children, Civi Drinking Water Environment Family Welfare Raj, Right to Rural Develop Alleviation, Sp Training, Wor Empowermen
139	Capt. Gurdeep Singh C/o Memorial Educational Health and Socieal Welfare Society	Ms. Rupinder Kaur, Mr. Pavitar, Project Manager	NGO Address: Capt. Gurdeep Singh, C/o S Sarpanch Harbhan Singh Building Near Sangeet Palace, Bhular Road Batala (First Floor)	9915003081, 0183-6535285, 9463230212		HIV - FSW
140	Dr. Sudeep Memorial Charitable Trust (Regd.)	Dr. Vinay Sharma, General Secretary, Mr. Raj Kr. Kalia (Project Manager)	Garden Colony, Mission Raod, Pathankot, Distt. Gurdaspur - 145001	9814218709, (O) 0186-2221909, 22230068, 9814829275	sharmavinydr@yahoo.co.in	HIV - Compos
141	Guru Teg Bahadur Gharitable Health and Education Awareness Society	Sh. Jatinder Singh Athwal	Opp. Amrit Palace, Dashmesh Market, Dhariwal, Distt. Gurdaspur	01874-276564, 276574, 9814591822, 9988009135	gtbedu@yahoo.co.in	Art and Cultur
142	Isha Handicrafts Welfare Society	Sh. Ayudhya Parkash	632/13, Behrampur Road Near Mehak Hospital Gurdaspur - 143521	9855443187, 01874-243264, 510076, 98888443187	ishasociety@gmail.com	Promotion of of women, Gi Senior Citizen
143	J. K. Society for Promotion of Youth and Masses	Mr. Rahul Sharma, Project Manager	H. No. 246, Ward No. 7, New Gandhi Nagar, Refugee camp, Batala, Distt. Gurdaspur	1912604309, 9417371987, 0187-1220736		HIV - IDU

144	Julka Hospital Charitable Trust	Dr. Vinay Julka, Chairman	Julka Nagar, Batala Road, Qudian, Distt. Gurdaspur	9316273755, 01872-224275, Fax: 01872-224275	vinay.jhulka@gmail.com	Organised various DID RCH projects
145	Kandi Vikas Federation	Sh. Manohar Lal	Vill. Sukhniyal, PO Hara Pathankot, Distt. Gurdaspur	9417522156	-	
146	Lions Club Batala	Sh. Hari Krishan Trehan, President	Greater Railway Rd. Batala	(M) 9814798408, @ 242338		Helping the poor
147	Param Vaibhav	Mrs. Promilla Kamal	Sirhind Road, Hanuman Chowk Qadian, Gurdaspur	9815325400, 01872-2220340, 2252481		Cutting and Tailoring Project, Param
148	Paras Sports and Educational Society	Sh. Harinder Singh Sindhu, President	Lehal, Dhariwal, Distt. Gurdaspur	9872884546, (O) 01874-219891		Working for the poor organizing various empowerment programs the various Gurdaspur women are all
149	Rotary Club Batala	Sh. Balwinder Singh Shah, President	Bank Colony Batala	(M)9815355855, @ 241144		Helping the poor
150	Sarhadi Welfare and Development Society	Sh. Amandeep Singh, President	(Affiliated to Nehru Yuva Kendra Sangathan, GOI, Gurdaspur, Vill. Mansoor, PO Shehzada Kalan, Tehsil Dera Baba Nank, Distt. Gurdaspur	9914572816, (O) 01871-282416, 216116		Organizes All India awareness campaigns Blood donation camps in sewing and tailoring machines.
151	Shere Punjab Rural Welfare Society		Vill. PO-RAI Chak, Tehsil Dera Baba Nanak, Gurdaspur	9356479454, 9872049228		
152	Zenith Techno Soft Computer Educational Society	Sh. Sunandan Sharma, Key Personal	Shori Shah Mandi Road, New Bus Stand, Dhariwal, Distt. Gurdaspur	9855406076, (O) 01874-500516		Computer training hardware to students
153	Aprajita Charitable Trust	Sh. N K Sharma	VPO Bhater, Tehsil Mukerian, Distt. Hoshiarpur 144224	01883-218071, 9463706285	aprajitacharitabletrust@gmail.com	Education and health
154	Aryan Club	Sh. Amandeep Minhas	Hajipur, Distt. Hoshiarpur 144221	01883-272296, 9417355724	smrjeet@gmail.com	Cultural activities
155	Asha Deep Welfare Society	Sh. Paramjit Singh Sachdeva	Ashakiran Spl. School For Mentally Retarded, VPO Jahan Khelan, Distt. Hoshiarpur 146110	01882-272460, 272461, 9872968111	jssashakiranschool@gmail.com	Differently Abled

156	Baba Deep Singh Ji Shaheed Yaadgari Society	Sh. Samarjeet Singh Shammi	1680 L T3, Sector 3, Talwara Township, Distt. Hoshiarpur 144216	01883-236878, 9417355724	shammi@amarjeet.com	Art and Culture, Drinking Water, Health and Family Welfare, Human Rights, Communication, Employment, Energy, Right to Information, Advocacy, Rural Development, Poverty Alleviation, Technology, Vocational Training, etc.
157	Bharat Vikas Parishad Talwara	Prof. D.D. Sharma, President	Talwara, Distt. Hoshiarpur	01883-236876		To provide to the disabled, limbs, Preson, Children, Distt. Children
158	Bhagwan Mahavir Jain Charitable Hospital	Sh. S. B. Jain, President	Sarafan Bazar, Hoshiarpur	01882-520320		
159	Bal Vikas Parishad Regd.	Sh. S. S. Sood President, Dr. Subhash Mehta Vice President, Sh. Rajinder Sood Vice President, Sh. Kuldeep rai Gupta Gen. Secy., Sh. Madan Lal Mahajan Secy.	Udaseen asharama Dera Baba Charan Singh Bahdurpur, Hoshiarpur			To help the ne exercise book, organize gene cultural activiti centers)
160	Bhai Ghanaiya Charitable Trust		372/4, Gobind Nagar, PO Urmar, Block Tanda, Distt, Hoshiarpur	24999, 22299		
161	Eye Donation Association	Sh. J. B. Behl	Hoshiarpur, 52 L, Model Town, Hospital, Hoshiarpur	01882-222147, 309703		Donation of E to the patients blindness
162	Green Express (A Youth Association)	Dr. Sanjeev Kumar Abrol	Vikrant and Co. Chowk, Gaushala Bazar, Hoshiarpur - 146001	01882-252860		National Envi Programme, National Tech etc.
163	Jai Mata Chintpurni Society Regd.	Sh. S. P. Kurana, President, R.C. Jain General Secretary	Khanpuri Gate, Hoshiarpur	01882-520216, 312160		Proposal of o the estimated Training in on

164	Lions Club	Sh. Kashmir Singh President, Sh. Surinder Kumar Bansal Secy	Garhshankar	9814950223, 9815567339, 9815372735		Social Service
165	Mai Malan Education Trust (Regd.)	Sh. Dharampal, General Secretary	Piplanwala, Hoshiarpur - 146022	9872220173		Promotion of students in p general, Encco cleanliness, A instituted for t education, art
166	Mukerian Educational Environmental and Social Welfare Society Regd.	Prof. D. V. Sharma	Vasant Vihar, Mukerian. Postal Address, Star Public High School, Partap Nagar, Mukerian - 144211	01883-244353 (R), 244551 (O), 245851 (S)		Education, Er Social Welfar Women-Emp Human Rights
167	Mukerian Welfare Society Regd.	Raj Kumar Walia, President	Mukerian	9814334450		Eye Camps-E Marriage poo
168	Manav Sewa Samiti	Sh. Dalip Singh	Talwara	01883-236978		Help to poor p
169	Manav Sewa I.T.I.	Sh. Harbans Singh	S.J.S. Nagar, Opp. Lajwanti Tourist Comple, Hoshiarpur	01881-238276		
170	National Youth Development Centre	Mr. Vipan Kumar (Project Manager)	SCF 7D, Sector 2, Talwara Township, Distt. Hoshiarpur	01883-239888, 9876499825, 9417173827		HIV - Compos
171	Pragti B-XXIII		H.No. 296/2, Opp. Municipal Tank, Radha Swamy Nagar Distt. Hoshiarpur - 146001	01882-230694		Education / tr consultancy p Marketing in t Development
172	Punjab Women Welfare College	Sh. Balwinder Singh, Managing Director	K. No. 316, Basant Vihar Hoshiarpur	01882-220762, Fax: 01882-242750, (M) 9356449901		Awareness g training in the Income gener
173	Rotary Club	Sh. Harnandan Singh Bains, President, Dr. Harvinder Singh Bains Secy., Sh. Ashok kumar Secy.	Garhshankar	9417282813		Polio, Blood D Cremation Gr schools
174	Rotary Club	Capt. Amarjit Singh	Mukerian	01883-244148		Financial Aids
175	SAVERA (Society for Social Awareness)	Dr. Ajay Bhagga	53, Budh Ram Colony, Civil Lines, Hoshiarpur	9417852422		

176	SGN Medical Education and Social Welfare Society	Smt. Meena Gulshan Gen. Secretary	Sector 3, Near Telephone Exchange and Laxmi Narayan Temple, Talwara Township, Distt. Hoshiarpur	01883-236271®, (M) 9815967388		Reproductive (RCH) / Family planning, Counselling services for p Immunization Adolescent gi
177	Shivalik Hills Health Medical Education Society of Welfare Society	Sh. Thakar Pardeep Singh President, Sh. Umesh Chander Sharma	Talwara (Bhode Da Khu), New Petrol Pump, Talwara	01883-238963		All Social acti
178	Social Welfare Society	Sh. Santosh Sharma	Talwara	01883-272123, 272223		Free HSP Me
179	Student Book Bank	Sh. Ashok Sood, Sh. Ravinder Sood	Kotwali Bazar, Hoshiarpur	01882-223501, 223502		To provide fre education fiel
180	Sewa Bharati	Sh. S. K. Khanna Advocate	Hoshiarpur	01882-282173, 282035		Social Activiti
181	Sh. Ram Chrit Manis Parchar Mandal (Regd.)	Sh. Harish Saini President	Shakti Mandir Nai Abadi, Hoshiarpur	221933, 223535, 9417134759		Social and Re Hoshiarpur, A of cost from lo ground
182	Swaran Handicraft Welfare Society		16, Industrial Development Colony (Block 1), Jalandhar Road, Hoshiarpur	01882-25475®, 50375(O)		
183	Youth Services Club (Regd.)	Dr. Shailendera Gupta	Lata Kunj, Gali No. 1, Partap Nagar, Naloyian, Hoshiarpur.	9463440176		Science popu Environmental management, Vermi compo
184		Sh. C. B. Jain. G. Sectt.		01882-232657		
185	Aashray	Mr. Sanjiv Khanna	62, Vasant Avenue, PO Model Town, 144003	0181-5016303, 9814064303	kaysanjiv@yahoo.com	Environment
186	Bhagwan Valmiki Sikiya Parsar and Vikas Kameti	Sh. Gurmail Chand	Vill. Natt, Post office Sidhwan Station, Tehsil Phillaur, Distt. Jalandhar 144044	0181-2799858	bvspvc@yahoo.co.in	Dalit Upliftme
187	Doaba Street Guru Singh Sabha Gurudwara Diwan Asthan		Central Town Jalandhar 144001			Health / Nutri

188	Guru Nanak Mission Sewa society Lasara	Sh. Parminder Singh President	Tehsil Phillaur Distt. Jalandhar	01826-259334		Community D children welfa sections and
189	Jalandhar Welfare Society	Sh. Surinder Saini Hony. Secy.	7A, old Jawahar Nagar Jalandhar. 144001	0181-2456150, 5071111, (M) 9814103944, Fax: 2452029	<a href="mailto:childhelplin
ejsw@yahoo
o.com">childhelplin ejsw@yahoo o.com	Awarness gen Campaigns / Environment, issues, Health Housing / slum
190	Jandiala Lok Bhalai Manch (Regd.)	Smt. Inderjeet Kaur, General Secretary	V&PO, Jandiala Distt. Jalandhar	01826-275030		Regular (perm Mortuary with Deptt. Pb. Go Civil/Hospital
191	Mata Pushpa Gujral Nari Niketan Trust		Nakodar Road Jalandhar - 144003	0181-2207320		Awareness ge training, Voca generatin, He
192	Manav Sehyog Society (Regd.)	Dr. S. K. Sharma, President	Multani Building, Ladowali, Road Jalandhar city	9814060805, (O) 0181-2238955		Runs four cha Mobile disper the doorsteps facility of imm Diagnostic ce and dental cli Rs. 2 lakhs to students
193	Marigold International Educational Society		BX-587, Hoshiarpur Road, Distt. Jalandhar	0181-5004394, 9815597890		
194	NRI Sabha Punjab	Sh. K. K. Sharma, MD	Office Complex of Divisional Commissioner, Jalandhar	0181-2227644, ® 2458167, Fax: 2458232		To work for th interest of NR Punjab in par

195	Pahal	Sh. Lakhbir Singh, Chairman	36, New Vivekanand Park, Maqsudan Jalandhar - 144008	0181-2002784, 2672784, 9814866230, Fax: 0181-2672784	pahal@vsnl.net	Art and Culture, Differently Abled, Dalit Upliftment, Education and Forests, Health, HIV/AIDS, Human Awareness and Empolyment, Minority Issues, Enterproses, Energy/Nutrition Development, Women's Development, Empowerment
196	Shaheed Banta Singh Sanghwal Welfare Trust		C/o Janta Hospital Jalandhar			RCH Activities, family planning and services, Immunization, Adolescent gi
197	Sharan	Mr. Alok Mohan, Project Manager	F 6/8 A, Vasant Vihar (2nd floor), Near E-block market, New Delhi, TI Address: R/147, Santosh Nagar, Jalandhar	9872380094, 9915796636		HIV - IDU
198	Volunteers for Social Justice (VS-J)	Mr. Jai Singh, General Secretary	Near Mandir Passian, Near Bazar Phillaur, Distt. Jalandhar	01826-222432, Fax. 01826-225197		Awareness G, Education/training, adovocacy/advocacy, Research/survey, Development, Slavery
199	Yuva Excellence	Sh. Anuj Bhalla, President (Advocate)	57, Sat Nagar, Jalandhar - 144002	9872655888		To help police Punjab crime between police and Order, To levels, To help problems, To awareness, To women social
200	Ntional Rural Development Society (Regd.)	Sh. Gurmit Singh Palahi	Palahi, Tehsil Phagwara Distt. Kapurthala	01824-263394 ®, 228533 (O), 01824-228659 (F)		Manpower Development, Technologies, village Development

201	Phagwara Environment Association	Sh. Malkiat Singh Raghbotra, Secretary	C/o Public Eye Hospital Banga Road, Phagwara - 144401	01824-262300	gurmitpalahi@yahoo.com	Awareness g in the field of areas, Energy
202	Punjab Action Group for Rural Development (PAGRUD)	Sh. Malkiat Singh	218-Guru Hargobind Nagar Phagwara - 144401	01824-260205, Fax No. 01824-263394		Awareness g Assistance in Technology, E Management
203	Pothohar Biradari	Sh. Naveen Kumar	Jolly Complex, Near Old Sabzi Mandi, Kapurthala	01822-235573, 9417332249		
204	Society for Service to Voluntary Agencies (North)	Mr. Amarveer	TI Address. 205. Shaheed Bhagat Singh Nagar, Hoshiarpur Road, Near Shaheedan da Gurdwara, Phagwara, Distt. Kapurthala	9815492628		HIV - Compos
205	Aagaz Charitable Foundation	Ms. Preeti Kansal	655, Gurdev Nagar Pakhowal Road, Ludhiana - 141001	0161-2440288, 9914692800	info@aagaz.org	Children, Edu and Family W Awareness an (SHGs), Wom Empowermen
206	All India Ashadeep Educational and Social Welfare Society	Sh. Gurpreet Singh	H.No. 845/1, Near Grain Market, Malerkotla road, Raikot, Distt. Ludhiana - 141109	9872433234		Running TB c collaboration punjab under Provide couns Organizes HI programmes, children at vill free books an Provides free and students
207	Baba Sain Bhagat Welfare Society		Near The Slum Dispensory, Samrala Raod, W. No. 2 Khanna, Distt. Ludhiana			
208	Bhagwan ram Charitable Hospital	Sh. Prem Prashar, Chairman, Sh. K. K. Marwaha, President	Ram Lila Ground (Daresi), Ludhiana	0161-2741735, 2701920, 2708044, 9316942148		Provision of h genral public
209	Bhai Ghanyia Sewa society	Sh. Ravinder Singh President, Sh. Bikramjit Singh General Secretary	V.P.O. Rauni Tehsil Payal Distt. Ludhiana	01628-297279 @, 297765 (O), 9872727765, 01628-297757 @, (M) 9872997757		RCH Activitie needy person camps and pr poor patients,

210	BSB Welfare Society	Sh. Gursharanjit Singh	Slum Area Dispensary, Model Town, Samrala Road, Khanna, Dist. Ludhiana	9855028093		
211	Charity Medical Trust		Dr. Maheshwari Complex, Lifeline Hospital, Gill road, Ludhiana			RCH Activities family planning and services Immunization Adolescent gi institutional d high risk preg
212	Charitable Trust and Education Society Reg.			9872630488		
213	Dashmesh Naujawan Sewa Society		Mehtab House, Barewal Road, Lundhiana - 141012			
214	Dr. D. N. Kotnis Health Education centre	Dr. Inderjit Singh	(Charitable Acupuncture Hospital) Regd., Saleem Tabri, Opposite Sabzi Mandi, Ludhiana	9814087723, 0161-2783541, 2227126	kotnis4@gmail.com	HIV - IDU
215	Education Welfare Society	Mr. Varinder Kumar, Project Manager	74, Narotam Nagar, Block Khanna, Distt. Ludhiana	9855052378, 9855706200		HIV - Migrants
216	Environment and Life Scientists Association (ELSA)		711-I Block, Randhir Singh Nagar Ludhiana			Awareness g Research/sur Environment, Climate chang
217	Guru Nanak Charitable Trust (Regd)	Dr. Amarpreet Singh Deol	Ludhiana	0161-2881001, 2878034, 9855429901	gurmat_bhanwan@sify.com	Children, HIV Development Other
218	Guru Angad Dev Sewa Society	Dr. Arvinder Singh Nagpal	C/o Guru Angad Dev Ch. Hospital, Chandigarh road, Ludhiana	9815177324, 0161-651561, 300547, 2681561	gadssldh@gmail.com	Runs one Gur Hospital, Gur and Guru Ang and Jan Shik vocational tra illiterates to e life, Organize Provides voca knitting, cuttin

219	Guru Gobind Singh Study Circle	Ms. Ponam, Project Manager, Sh. Pushpinder Singh, Secretary	Model Town Extension, Baba Deep Singh Chowk FSW, TI at Ludhiana	9914329689, 0161-2450352	info@ggssc.net	HIV - FSW
220	Indian Primary Health Care Organisation		H. No. 54, BXXII, St. No. 2, Link Road, Ludhiana - 141010			
221	International Council of Ayurveda	Dr. Ashok Sharma	Sharma Hospital and Nursing Home Jagraon, Distt. Ludhiana	01624-222588, 223694		Reproductive Women and C awareness, F training, Inter for AID's awa
222	International Union for Health Promotion and Education and Family Welfare	Dr. S. C. Gupta Secretary General	Christian Medical College, Ludhiana	0161-2685535, Fax. 0161-2609958		RCH Activities family planning and services Immunization Adolescent gi institutional de high risk preg STD/RTI prot HIV/AIDS awa
223	Jagraon Citizens Welfare Council	Dr. Ashok Sharma	Jagraon Distt. Ludhiana	9888938168		Health Care P Children for h Planning, Voc Generation pr
224	Kashmir Gram Udyog Sangh		G.T. Road, Doraha, Distt. Ludhiana	01628-258240, 258640, 9915011010		
225	Ludhiana Citizen Health Council	Dr. S. C. Gupta General Secretary	C/o Deptt. of Health Education and Family Welfare, Christian Medical College, Ludhiana	0161-2685535, (M) 9417317851	profscgupta@yahoo.com	Training of Co in Reproducti of vocational women urban HIV/AIDS am Ludhiana City
226	Lions Club,	Sh. Manohar Singh Takkar, President	Jagroan, Ludhiana	01624-222502, (M) 9814027502		

227	Life Care Foundation	Dr. Harvinder Pal Singh	674, sector 39 Chandigarh road Ludhiana	9814126126		Working in the and is providing training to tea of different so universities a
228	Nishkam sewa Ashram	Sh. Sarwan Kumar, Chairman	57-R, Industrial area B vill. Daad, Pakhowal Road Ludhiana - 141001	0161-2806283, 2806296, 5085179 @, 9814697528	nishkamsewaashram@rediffmail.com	Awareness g in the field of Health/nutritio slum, Comput Old age Hom Care, Educati Computer Ed Training to gi urban areas c
229	Punjab Networking of Positive People Society	Sh. Jagjit Singh Mann	45, Guru Bagh, Co-Op. Society, Near Jeevan Nagar, PO Focal point, Chandigarh road, Ludhiana	9463140554, (O) 01823268408		Organizes leg Organizes HI Organizes dru
230	Punjab Public Relief Society		J-168, Sarabha Nagar, Ludhiana - 141010	9814507055		
231	Rameshwar Welfare Trust (Regd.)	Mr. Rajesh Kapoor Secretary	Jain Nagar, Shiv Puri, Ludhiana	0161-2746628, (M) 9815183732, 9256371085	rwtludhiana@gmail.com	Development Kapurthala sl women preve diseases, We Prevention of Aids, Develop Development
232	Rotary Club	Sh. Satish Kumar Bhalla	Raikot, Ludhiana	01624-2666456		Drug de-addic disabled pers aged, Street c of Aids / HIV,
233	SGB International Foundation	Sh. Jagdeep Singh	VPO Dham Talwandi Khurd, Tehsil Jagroan, Distt Ludhiana	74174-72223, 01624- 245988		Care of Orpha welfare of Wo education, en
234	Saheed Kartar Singh	Sh. Inderjit Singh		01624-2864808		Social and W
235	Sarbha Memorial	President		01624-2864814		

236	Sadbhavna Society (Regd.)	Dr. A. K. Banerjee M. S. President	Talwandi Road Raikot Distt. Ludhiana	01624-268158, 265551, 9417085631		Health Care, activities, Self Development Development
237	The Punjab Rural Education Promotion Council (PREP)		8-Shant Park, Near Aggar Nagar, Sector 1, Distt. Ludhiana - 141004			Awareness go Research / su Environment, Population iss Education
238	The Rural Development and Women Welfare Society		Vill., Bhattian, Block Khanna, Distt. Ludhiana	9855052378, 9855706200		
239	Universal Human Rights Organisation	Sh. B P Singh Gill, Chairman	2425, HIG, Phase 2, Urban Estate Dugri Ludhiana	9814042711	gilljus@yahoo.com	
240	Vocational Rehabilitation Training Centre Regd.	Dr. E M. Johnson, Executive Director	Haibowal Road, Opp. Kitchlu Nagar Ludhiana	0161-2301425, 231642, Fax. 0161-2301642, 9878226420	vrtc@satyam.net.in	Social, Medic Special Educa Vocational Ec Community B areas, multipu blind / disable
241	Watawaran Sambhal Society (Regd.)	Sh. Jagjit Singh Mann, Key Personal	45, Guru Bagh Co. Op. Society, Near Jeevan Nagar, PO Focal Point, chandigarh raod, Ludhiana	9463140554		Organizes en camps, Organ programmes
242	Aggarwal Sabha Regd.	President Sh. Krishan Lal Goyal Advocate Mansa	Corner Sunil Gali, Gaushala Road, Mansa	01652-233055(O), 233655 (O), 232425 ®, 9814699425 (M)		Marriage of p Education hel and girls, To n society, To er ane help the l when needed
243	Ashtha sewa Samiti Mansa	Sh. Kiran Goyal, President,	Bughi Walaiti Street, J.K. Road, Mansa	01652-222541®		Religious wor Women probl pregnant ladi
244	Apex Club, Mansa	Sh. Satish kumar, Bhamma, President,	Bhamma Street, Mansa	01652-224237 ®		Released Tel Check - up C
245	Blood Donor Council	Sh. Tarsem Goyal (Joga) President Lal Chand	MC Street, Jawaharke Road Mansa	01652-222963		Blood Donatio Drug Camps, social activitie

246	Bhatia Mahabir Dal Regd. Mansa	Sh. Varinder Tinku	Mansa	01652-233678, 9815309822		Providing duti places, Cold c Other welfare
247	District Youth Welfare Association	Mr. Gagandeep Singh, Project Manager, Laba Singh Mann, Secretary	H. O. Press Building, Dhir street, Near Bus Stand, Mansa 151505	9915009123, 9465688411, 9878166735, 9815830634	dywamansa @yahoo.co. in	HIV - Compos
248	City Club		Tailor Street, Mansa			RCH Activities family plannin and services Immunization Adolescent gi institutional d high risk preg STD/RTI prot HIV/AIDS awa
249	City Club	Sh. Kailash Garg	Mansa Rohit Kumar and Company Old Kachahri Road, Mansa	01652-233682 (S), 234985 ®		R.C.H. Project Home, Eye B
250	Distt. Youth Welfare Association Regd.	Sh. Lachhman Kumar Manga President	Press Building Dhir Street, Near Bus Stand, Mansa - 151505	01652-228798, 230035, (M) 9815830634	dywamansa @yahoo.co. in	Adult Women safety, Organ AGP Camps
251	Environment Society	Dr. Vijay Singla	Mansa	01652-225161, 229250		Awareness an
252	Friendship Yuva Club	Sh. Vijay Kumar Bansal, President, Tagore Street Near SDM Residence, Mansa	Mansa	01652-222124		Friendship Ge students Med participate in
253	Gaushala Bhawan Chritable Trust	President Sh. Makhan Lal Mehta, Mandir Wali Gali, Mansa	Mansa	01652-220239 ®		Maintained G
254	Kisan Jagariti Siksha Sanstha	Sh. Jodha Singh Mann, President	Mansa	01652-220762 (O), 226662 ®		To Strive for h as to restore t pride and to a based on utili
255	Lions Club	Sh. Kewal Jindal, President, Shop No. 219, Grain Market Mansa	Mansa (Classic)	01652-225296(O), 224067®		Blood Donati Camps

256	Lions Club	Sh. Moti Ram Goyal, President	Near Chugli Ghar, Vill. Road Mansa	01652-233859 ®		Eyes Operation Camps, Ambulance Medical Checkups
257	Lions Club	Dr. Harbans Singh Narula, Narula Clinic, Gaushala Road Mansa	Mansa City	9814822791		All the services for needy people
258	Mahiala Kalyan Samiti		Near Govt. Sr. Secondary School, Sardulgarh, Distt. Mansa			RCH Activities, family planning and services, Immunization, Adolescent girls, institutional delivery, high risk pregnancy, STD/RTI protection, HIV/AIDS awareness
259	Mahabir Jain Society	Sh. Rajiv Jain, President C/o Sh. Dharmpal Jain, Street, Mansa	Mansa	9814163311		Help poor people
260	Malwa Youth Club	Sh. Sohan Singh President	Village Akalia, Distt. Mansa	9815168926		Sports and Education
261	Mahila Kalyan Samiti	Sh. Rajinder Kumar, President	Sardulgarh, Mansa	01659-251430, 251580, 9414210396		Female Vocational Training
262	Nagar Sudhar Sabha	Sh. Kasturi Kal Garg, President Sant Ram Street, Mansa	Kustri Lal Ram Natak Club, Anaj Mandi, Mansa	01652-225478 (S), 880503 ®, 9814140080	nareshbirla@yahoo.co.in	Mobile Dustbins, Polio, Taking
263	P. Club	Sh. Parveen Singla, President	Sant Ram Street, Mansa	01652-234560		Blood Donation camp, Study, Free Medical welfare camp
264	Rotary Club	Sh. Pawan Kumar Bansal, Dev. Officer, of LIC Mansa	Mansa	9814122835		Eye camp, Adolescent Immunization
265	Rotary Club	Sh. Rajinder Garg, President Bughi Wali Street, Mansa	(Greater) Mansa	01652-223540 ®		Eye camp, Adolescent Immunization
266	Satguru Sewa Samiti	Sh. Pawan Kumar Bansal, shop No. 137, Anaj Mandi Mansa	Mansa	01652-224171 ®, 224191(S)		Religious Welfare

267	Sahara Jan Sewa Club Regd.	Chairman Sh. Suresh Nandgarhia, Jagan Nath Suresh Kumar, Kiriana Merchants, Main Bazar Mansa	Mansa	9814335077, (S) 01652-223503, ® 220503		Free Ambular patients, Med
268	Sewa Bharti Mansa	Sh. Chiman Lal President Advocate, Opp. Old post office street, Mansa	Mansa	01652-225663 ®, 224968 (O)		Stiching cente ladies, Social Medical Camp
269	Shri Sanatan Dharam Sabha	Sh. Krishan Bansal, President, SD Sabha , Dr Kuka Street Mansa	Mansa	01652-223915 (S)		Janam Astam Festival, Lang College
270	Sh. Sanyukt Sewa Dal, Baba Bhai Gurdass Committee Regd.	Sh. Surinder Lal	Baba Bhai Gurdass Committee Regd., Mansa	9815746573		Social Welfar Medical camp interest
271	Aggarwal Sabha	Sh. Mahavir	Zirakpur, Distt. Mohali	9988137527		
272	All Indian Veterans Core Group (NGO)	Brig. H. S. Ghuman, President	H. No. 1043, Sector 71, Mohali	0172-2224636		Welfare work Serving Defen
273	Bharat Vikas Parishad	Sh. R. N. Narang	Lalru, Distt. Mohali	9988950095		
274	Bharat Vikas Parishad	Sh. Rajiv Gandhi	Derabassi, Distt. Mohali	9417777722		
275	Bharat Vikas Parishad	Mr. Agnihotri	Zirakpur, Distt. Mohali			
276	Civil Hospital	Dr. Rajiv Bhalla	Derabassi, Distt. Mohali	9814801292		
277	Creative Friends Club	Dr. Savita Mittal	Derabassi, Distt. Mohali	01762-285900		
278	DAV Punlic School	Mrs. Dhar	Derabassi, Distt. Mohali	9815374928		
279	Distric Courts	Sh. Mukesh Gandhi (Lawer)	Derabassi, Distt. Mohali	9815266559		

280	Entrepreneurship Training and Rural Development Initiatives (ETRDI), Regd.	Sh. Balwinder Singh, Executive Director	1504-C/2, Ward no 5, Ranjit Nagar, Kharar, Distt. Mohali.	9417249390		Conducts three development beneficiaries on behalf of KVAFSU. Organizes awareness for the rural population in Punjab state and networking with providing inputs, motivation, PR inputs for various health, HIV, A
281	Ex-servicemen Grievances Cell	Lt. Col. S. S. Sohi	H. No. 1121, Sector 71, Mohali	0172-2229426		Welfare work Serving Defec
282	F. P. A. India - Family Planning Association of India (FPAI-Mohali-BRA)	Dr. (Mrs.) Surjit Kaur Sandhu, President	Plot No. 3, Phase 3A, Mohali	0172-2273791 @, 2602538		Awareness g training, Polic Campaigns / surveys, Tech Networking, M Development Population Iss Education, Av Drug Abuse
283	F.P.A.I. Mohali Branch	Mr. Gurdev Singh, Project Manager	(Project for IDUs), Shaheed Udham Singh Bhawan, Site No. 1-2, Sector 53, Phase 3A, Mohali	0172-2273791, 9877101910		HIV - IDU
284	F.P.A.I. Mohali Branch	Mr. Manjit Singh, Project Manager	(Project for CSW), Shaheed Udham Singh Bhawan, Site No. 1-2, Sector 53, Phase 3A, Mohali	9872846199		HIV - FSW
285	Govt. S. S. School	Mr. Nayer	Derabassi, Distt. Mohali	9814144439		
286	Hansa Tube Trust		Derabassi, Distt. Mohali			
287	Indian Society For Women Empowerment		Ind. Area Phase 8 B, Mohali			Women Empo Employment t
288	Jain Sabha	Sh. Sunil Jain	Derabassi, Distt. Mohali	9814435480		

289	Kharar Social Welfare Society (KSWS)		3028X, near Nim Wala Chowk Kharar, Distt. Mohali			Awareness g training, Cons of environmen
290	Koshish Foundation	Sh. Mohan Bindal	Derabassi	9872043877		
291	Lala Sawan Ram School	Mr. Lalit	Lalru			
292	Lions Club	Sh. Krishan Garg	Zirakpur, Distt. Mohali	9872632867		
293	Manav Kalyan Shiksha Kendra		H. No. 678, Phase X, Mohali			RCH Activities family planning and services Immunization Adolescent gi institutional de high risk preg STD/RTI prot HIV/AIDS awa
294	Manav Sudhar Sabha		Vill. PO Sialba, Majri, Ropar			Awareness g training, Cam of Environme Population iss Education, Er Projected are
295	Municipal Council	Sh. Vipin Thaman	Derabassi, Distt. Mohali	9878484025		
296	Pensioners Union	Master Maher Chand Sharma	Derabassi, Distt. Mohali	9914407541		
297	Press Club	Mr. Gandhi	Derabassi, Distt. Mohali	9815591296		
298	Ram Lila Sabha	Sh. Ravinder Vaishnav	Derabassi, Distt. Mohali	9815081448		
299	Ranbaxy Health Care Centre	Dr. Upma, Medical Officer	A-11, Phase III, Industrial Area, Mohali	0172-2271450-54		RCH Activities family planning and services Immunization Adolescent gi institutional de high risk preg STD/RTI prot HIV/AIDS awa
300	Rotary Club	Sh. Bhupinder Saini	Derabassi, Distt. Mohali	9814527303		

301	Rural Institute of Health Care Society		2380, Sector 71, Mohali	0172-690722, 691782, 9814011989		
302	SDSG Foundation	Dr. Maneel Grover	Mohan Nagar, Opp. Tehsil Office, Dearbassi, Distt. Mohali	9815969444, 01762-283162	sdsgfoundation@gmail.com, info@sdsgfoundation.com	Aged/Elderly, Biotechnology, Disaster Management, Drinking Water, Environment, Family Welfare, Small and Medium Enterprises, Renewable Energy, Access to Information, Development, Science and Technology, Training, Water Development
303	Shaheed Bhagat Singh Sports Club	Sh. Pritpal S. Baachal	Vill. Malakpur, Lalru, Distt. Mohali	9988950095		
304	Shaheed Bhagat Singh Sports Youth Club		Vill. Tanda Karor, PO Naya Gaon, Distt Mohali			
305	Shelter Charitable Trust	Dr. Daler Singh Multani	Lalru, Distt. Mohali	9814127296		
306	Swami Nursing Home	Dr. P. C. Swami	Derabassi, Distt. Mohali	9814178336		
307	The Consumer Protection and Grievances Redressal Forum Regd.	Sh. N. S. Gill, President, Col. Angad Singh (Retd.), Gen. Secretary	H. No. 831, Phase 3BI SAS Nagar, 1504 Phase, 3B2, SAS Nagar	0172-2270831, 2225254		The organization conducts camps, seminars, so on to educate
308	The House Owners Welfare Society (Regd.)	Sh. Tarsem Chand Bansal, President	Kothi No. 1914, Phase 5, sector 59, Mohali - 160059	9876200794		Runs civil dispensary and library, Organizes awareness campaigns, Fever, Female Empowerment, Donation camps, health checkup camps
309	Youth Foundation	Sh. Darshan Singh	Opp. HDFC Bank, Kharar, Distt. Mohali	9888200580, 9471023268,	dsdskharar@gmail.com	Agriculture, Entrepreneurship
310	Youth Sports Club	Sh. Tony Rana	Mubarikpur, Distt. Mohali	9316087000		
311	Youth Welfare Club	Sh. Paali Singh	Zirakpur, Distt. Mohali	9815196818		
312	Youth Welfare Seva Society	Sh. Sucha Singh Dhaliwal	Alipur, Vill Alipur, Tehsil Mohali	9914783231	sdywsspunjab@gmail.com	

313	Unnat Bharat Vikas	Mrs. Indu Bala President, Ms. Om Parkash Sharma Secretary	H. No. 59 Saini Vihar, Baltana Distt. Mohali	0172-565591, Fax. 0172-592807		RCH Activities and Homoeop Scientific Kno
314		Dr. Kaushik	Mubarikpur, Distt Mohali	9417774454		
315	Aggarwal Sabha Regd.	Sh. Manjit Kansal, President, Sh. Ashok Bansal, Secretary	Moga	01636-223116, 9815536703, 223548		Medical Camp Unity among attract the peo
316	Angheen and Samaj Bhalai Sanstha Dhudhi Ke	Sh. Ved Roop Chand, Sh. Baljeet Singh	C/o Ved Roop Chand	01636-269001, 9872069001, 269054		Eye Camps, Handicapped Accidental Ca
317	Babe Ke Educational Trust	Dr. Rohin Sachdeva	VPO Daudhar, Distt. Moga 1420001	01636-253088, 9814300440, Fax: 01636-253178	rohin.sachd eval2@gm ail.com	Aged/Elderly, and Literacy
318	Bhartiya Jagriti Manch Regd.	President Dr. Deepak Kochar	H. O. Opp. Shivala Suden, Main Bazar, Moga	01636-223393, 222775, 9417023393		Drug-De-Addi Programme, I Programme, I Programme
319	Bhai Ghania Ji Blood Donars Society	Sh. Gurnam Singh	Lovely Music Centre, Kachna Doosanji Road, Moga	9815319274		Blood Donatio
320	Baba Shaid Singh Welfare and Sports Club	Sh. Baldev Singh	Dhurkot Tehsil, Distt. Moga	01636-266400, 9814854323		Sanitation of Brilliant Studen P.M. Fund for Sports goods Seminars, Dri Tempoo Stan
321	Baba kora singh Sports Club	Sh. Gurpreet Singh, President Block Moga	Kore wala Kalan, Distt. Moga	01636-260150, 9814558558		Scholarship to Sports Tourna Plantation
322	Bharat Vikas Parishad Moga	Sh. Manoj Moonga, Sh. Suman Kantt	C/o Manoj Stationery Mart, 9 New Town Moga	227433, 9417026433, 01636-225708, 9814439540		Medical Proje Others), Help Projects, Vikla Yojna Environ (Related to H
323	Bhai Roop Chand, Sports Club Samadh Bhai	Sh. Raghbir Singh	Tehsil Baghapurana, Distt. Moga	01636-246093		Cultural Progr Streets and D
324	Baba Brahim Dass	Sh. Harvinder Singh	Vill. Khotte Block N. S. Wala, Distt. Moga	01636-286450		Sanitation, Me Immunization

325	Baba Sarwan Dass, Gaushala	Sh. Ramesh Lal, 442, New Town Moga	Near, Shamshan ghatt, Gandhi Road Moga	01636-310961		Treatment of handicapped, P
326	Citizen Welfare Society	Sh. Gurmit Singh Khokhar	Near I.T.I., Petrol Pump, Moga	01636-224517, 9814024517		Marriages of injured Persons incidents
327	Chetna Parkashan, Library Society	Sh. Gurmail Singh	Macchi ke, Distt. Moga	01636-2378972		Library Project Seminar
328	Consumer Association	Dr. Prem Sharma	Moga	01636-237100, 283620, 9815103102, 9872595815		To Educate the Consumer rights and weaker s
329	Distt. Rural Association	Sh. Mohinder Singh	Saido Ke Nihal Singh wala	01636-259366, 9817259366		Water tankies Village Street Shamshangha Marriages of Place, Relief
330	Federation of NGO's (Group of 37 NGO's of Moga City)	Sh. Rajan Aggarwal (Advocate), Chairman Sh. Jasmer Singh (President)	Moga	01636-232690, 9815077972, 01636-231147		Female Feticide and Needy Pa
331	Friends Club	Sh. Manoj Bhalla	Badhni Kalan	9814700038, 01636-250059		Medical Camp
332	Guru Gobind Singh Study Circle	Mr. Iqbal Singh, Mr. Jaswinder Singh, Project Manager	TI Address: Dusanj Road, Opp. Sangha Diary, Moga	9888038729, 9915030380, 9463425895, 0161-2450352, Fax: 0161-4610145		HIV - IDU
333	Helps India	Sh. Dyal Singh, President	V. P. O. Rjana BPA, Moga	01636-241440, 9815020233		Free Medical Programmes,
334	Help India	Sh. S. K. Bansal, President	707, Civil Lines, Moga	01636-224036, 9814606474	mr_skbansal@yahoo.com	Medical Camp
335	Khalsa Sewa Society	Sh. Gurdev Singh, S/o Sh. S. Pritam Singh, K. K. Road, Moga	Akalsar Road, Moga	01636-226966, 9814297492		Providing Free activities, Medical needy persons Providing Help people such as each-quack e case, Transport Campaign ag

336	Khosa Youth and Welfare Club	Sh. Bachan Singh, S/o Sh. Magh Singh (President), Sh. Taar Singh S/o Sh. Nirmal Singh (Secretary)	V. P. O. Khosa Randhir Distt. Moga	01682-246658, 9814262108, 246703		Medical camp Village attach drinking water
337	Khatri Sabha	Sh. Prem Bhandari, Cloth Merchants, Moga	Moga	01636-223497		Books for Children Poor girls, Un students, Khas given Stipend
338	Lions Club Mandi Nihal Singh wala	Sh. Satish Garg, Charter President	Lions Club Mandi Nihal Singh wala	01636-254230, 256030, 9814254230		Eyes Operation Family Welfare Students, ADO Distribution of
339	Lions Club International	Sh. Jagjivan Kumar Goyal	Badhni Kalan	01636-250155, 9814127355		Free Sewing Camp, Aganw Pure Drinking
340	Lions Club International	Puranchand Garg Distt. Chairman Female Feticide	Baghapurana Distt. 321 F	01636-241680, 9814147680		Eye Operation Free Medicine Tricycles to H
341	Lions Club	Sh. Amandeep Sharma	Moga City Distt. 321-F, Region IX Zone-II	01636-230011, 9417030011		Medical camp Ambulance S Projects
342	Mahant Sew Dass Welfare Sports Club	Sh. Ved Parkash Sharma, Vice President	Dhurkot Kalan	01636-266330		Cleanliness o Volleyball Tou provide Multy Submersible P Plants in Sha Drug-De-Addi
343	Manaw Sewa Society	Sh. Jaswinder Singh	Moga	9815793010		Look after the
344	People's fund Sewa Society	Sh. Vinod Kumar Rajpal, President	Moga	01636-234343		Help for the H Education, W
345	Physical Handicapped Association	Sh. Jagraj Singh, President, Dr. Harnek Singh ADO, Gen. Sec. Sant Nagar Moga	Distt. Moga, Focal Point Moga	9417390193, 9414432824, 01636-234895		Welfare of Ha Assistance an Awareness re Handicapped
346	Punjab De Shan	Sh. Vijay Kumar Dhir	Moga	9814004466		Social Service
347	Pergatishil Naujwan Sabha	Sh. Jasmer Singh	Moga	9855110822		Social Service

348	Pargati Welfare Club	Sh. Balwinder Singh Gen. Secretary	Govt. Politechnique Camps G. T. B. Garh Rodde	01636-227375		Environment
349	People Fund Sewa Society	Sh. Yoginder Sharma	Moga	01636-226572, 9814161372		Medical Aids, Camps, Marriages
350	Ranjit Memorial Club	Sh. Harjinder Singh Pardhan-Chugwan	Chugawan	01636-273374		Tournament of Brilliant Students Jaundice for 6
351	Rotary Club Moga	Dr. Ramesh Lal Goel M. D.	Central Railway Road, Moga	01636-222758		Community Sanitation
352	Sada Bahar Youth, Welfare Club	Sh. Rahul Sharma President	Moga	01636-238479		Medical Camp Awareness C
353	Senior Citizen Welfare Society Regd.	Sh. Inder Sood	756, Ram Ganj Road, Moga	01636-222570, 312059		Maintenance Work at Gosh
354	Smaj Sewa Society	Sh. Gursewak Singh Sanassi	Hira Singh Building, G. T. Road Moga	9814259448		Antrim Yatra persons during Traffic Camp, Books, swate studies etc. to
355	Shaid Bhagat Singh Club	Sh. Jasbir Singh Mit Pardhan	Dala, Distt. Moga	01636-266633, 9815971454		Honouring to fair, Fans for Fans for Govt material, Imm Camp, Earth
356	Shri Guru Gobind Singh Youth Welfare and Sports Club	Sh. Balwinder Singh Gill, President	Rauli	01636-273291, 9814372047		To establish H equipments, F donation cam quack victims Shagan sche
357	Shaid Bhagat Singh Youth Club	Sh. Harminder Singh President	Kokri, Heran	01636-273127, 9815442913		Driving License Campaign (2 Play ground, quack victims Shamshangha
358	Shahid Baba Tega Singh, Sewa society	Sh. Gurdip Singh, S/o Late Sh. Bhajan Singh, V.P.O. Chand Purana	Birdh Ashram, chand Purana	9814841305, 01636-243565, 241305		Marriages of f Monthly Ratio Provide faciliti helpless aged Trees, To Pro persons

359	Shahid Bhagat Singh Youth Club	Sh. Lakhwant singh cashier, S/o Sh. Ram Singh, Sh. Resham Singh President	V.P.O. Saffu wala Tehsil Moga	01636-265110, 9814479289		Medical Camp Traffic guide o programs eve Tournaments
360	S. Sher Bahadur Singh	Sh. Bhapinder Singh Cashier		01636-277482		Boundary wal ghatt Repair c and Tube ligh Medical eye c
361	Jung-E-Youth Welfare Club	Sh. Palwinder Singh President	Dault Pura Niwan			
362	Sun Shine Charity Trust	Sh. S. P. Gupta	Moga	01636-223360		Sewing schoo to Poor Stude Persons
363	Shakti Durga Bhajan Mandli		Chamber Road, Moga, C/o Ashwani Gupta, H. No. 167/1, st. No. 2, Jawahar Nagar, Moga	01636-220733, 9814189733		Help to Poor s Medical Aid, P
364	Sewa Bharti Moga	Sh. Rattn Lal, Chaudhary Sr. Vice President	Moga	9814823719		Social Service
365	Shaeed Bhagat Singh, Club	President Sh. Amrik Singh	Alamwala	01636-243443		Cleaning Villa Ponds Agricul Plantation
366	S.P.C.A. Moga	Honorary Sec. SPCA Moga	(Society for prevention of cruelty to animals)., Moga	01636-236257		Prevention of Treatment of Stray, Animal treatment cov
367	Sh. Vijay Madaan, Rotary Club	Sh. Vijay Madaan, President	H. No. 699, Near Lal Chand Uppal, Purana Moga	01636-226011, 9814119376		Medical camp Help to the po machines to v
368	Yuva Partap Munch, Regd.	Mr. Rajesh Kochar, President	H. O. Opp., Shivala Suden, Main Bazar, Moga	01636-223393, 94170228775, Fax. 01636-228775		Drug-De-Addi Programme, I Programme, I programme
369	Youth Welfare Sports Club	Sh. Mohinder Pal Loomba	Dosanji, Distt. Moga	01636-278073, 9814924845		Sports Tourna Kabbadi), To and hard worl multygy m fac
370	Youth Social Welfare Club Regd.	Sh. Varinder Grover	C/o Varinder Grover Nurple Gate Chownk Soodan Dharamkot	01682-220999, 9815046299, 220587		Medical Camp Welfare, Tree

371	Youth Welfare Club	Sh. Gurvir Singh Gogga	Sangla	01682-231820, 231091, 9855151054, 9417231820		Medical Camps for public health, children, Provision of N.G.O's in Malout
372	Youth Social Welfare Club	Sh. Sukhdev Singh	Langiana Nawan Baghapurana	01636-261412		Free Medical checkups for poor students
373	Akashdeep Yadgari Samaj Samiti	Social service	VPO Pind Malout, Tehsil Malout, Distt. Muktsar	01637-502120, 261899, 9814794818	akashdeep_malout@yahoo.com	Health and Family Welfare
374	Disabled Children Welfare Society	Sh. Balwinder Singh, President	Street No. 5, Ward No. 20, Patel Nagar, Malout - 152107	9417260933		Special education for children, Free Education to the poor
375	Malout Garmeen Vikas Samiti		Malout, Distt. Mukatsar	62564		
376	National Youth Project	Sh. Balwinder Singh, President	H. No. 215, Ward No. 20, Guru Nanak Nagri, Malout - 152107	9417260933		Youth leadership camps, Hiking, help to the poor, Education for girls
377	Shivalik Educational Society	Dr. Naresh Pruthi	Pruthi Clinic, Bathinda Road, Muktsar	9815378888	dr.nareshpruthi@yahoo.co.in	
378	Arya Vidayak Foundation	Mr. Varun	Mukand Bhawan Banga, Distt. Nawanshehar	01823-257226, 9855460472	vpb_dav@rediffmail.com	Education and health
379	Samudayak Health Welfare Society	Dr. Manjit Singh Mann, President	Vill. Chak Mai Dass, PO Sarhala Ranuan, Banga, Nawanshahar - 144501	01823-268408(O), 9417694741	samudayak_health@yahoo.com	Orientation workshops, Peer education, Awareness campaigns, health-care at the people level
380	Umeed Welfare Society for women, youth and children	Sh. Gurpreet Gill, C.E.O.	Nawanshehar	01823-220360		Seminars organized for awareness about drugs, domestic Violence, dowry deaths
381	Upkar Coordination Society	Sh. J. S. Gidda	B5/675, Guru Angad Nagar, street No. 4, Chandigarh Road Nawanshahar, SBS Nagar	9357022015		

382	Amrit Nasha Mukati Centre	President Uma Sharma Director Aasa Singh	Ragho Mazra Sabzi Mandi, Patiala	0175-2226206, 2309430, 2221649		Free medicine Drug Addiction
383	Amar Singh Kamboj Charitable Trust	Col. Karaminder Singh	Amar Ashram, Patiala	0175-2301819 (O), 2212929 ®	col_karaminder@hotmail.com	Free Medical Pension to widows and old age poor people
384	Amanjeet Singh Thind	Sh. Nishan Singh Kamboj	SCO 36, Gurdwara Complex, Behind Bus Stand Patran, Distt. Patiala 147105	01764-243471, 321577, 9463421156, Fax: 01764-243471	sampronwold@rediffmail.com	Aged/Elderly, Biotechnology, Disaster Management, Drinking Water, Environment, Family Welfare, Small and Medium
385	Association of Punjab Geographers	Dr. H. S. Mangat, Patron	3037, Urban Estate, Phase II, Patiala - 147002	0175-2286606 (O)		Organizes sessions for school teachers, Abhian Authority level quiz contents, environment and map reading
386	Basant Rittu Club	Mr. Rajesh President	Patiala, Affiliation Nehru Yuva Kender, Patiala	9815132787, (O) 0175-2228272, 2351714		Ration to widows poor school children
387	Baba Ala Singh Club	Sh. Jaspal Singh Dhillon	Khokhar Niwas Pheel Khanna Road Ragho majra, Patiala	9814698286		Drug-De-Addiction
388	Baba Ala Singh Club	Dr. D.S. Bhullar, MD President	H. O. Khokhar House-767/A, Top Khana Road, Patiala	0175-2219249, 9814543131		Social Activities
389	Baba Farid Memorial Society		4325-C, Urban Estate, Phase II, Distt. Patiala	0175-822701, 822730		
390	Baba Farid Kalyan Society		H. No. 149/8, Arorian Street, Near Safadi Gate, Distt. Patiala	0171-2510702, 9416008707		
391	Baba Puran Dass Youth Club		Village Gazipur, Tehsil Saman, Distt. Patiala	01764-234175, 9888378457		
392	Blood Bank Society, Payal	Sh. Kewal sekhon, Chairman	Payal, Patiala	9819096157		
393	Citizens Peace Council Amar Ashram	Col. Karaminder Singh	Lower Mall-Patiala	0175-2301819 (O), 2212929 ®	col_karaminder@hotmail.com	Maintenance of city, Tree plantation, Blood donation

394	Dedicated Brother Group	Mr. Rakesh Vermi Harpreet President Project I/C	Patiala	0175-2354054, 9414169707, 9814153040		Helping Need camps etc.
395	Democratic Youth Organisation for Development	Sh. Sukhjit Singh, Chairman, Ms. Seveya (Project Manager)	VPO Ajrawar, Block Ghanour, Tehsil Rajpura, Distt. Patiala	01762-2426174, 9855311262, 9417142782	dyod.ajrawar@gmail.com	Running Deve for SC, BC, S in computers, embroidery, C village Ajrawa Organizes aw feeding, HIV / Organizes Pu medical check
396	Distt. Red Cross Society	Sh. C. M. Bali, Secretary	Rajbaha road Patiala	0175-2215971		Training and
397	Guru Harkrishan P. S. Management Society		Chardikala Complex Old Press Road, Patiala			
398	Industrial Services intervention Regd.		Zila Parishad Market, Sirhind road, Distt. Patiala 147004			Cutting and ta
399	Janhit Samiti Punjab Regd.	Sh. O. P. Kaushish Founder	Kasushish Niwas, 105 C St. No 3, Partap Nagar Patiala Cantt. Patiala	0175-200525, 220662		Old age / wid poor student's
400	Jindal Charitable Trust		Shanti Kunj, 1 Preet Vihar, Nabha, Distt. Patiala - 1472001	01765-224907, 223992		
401	Kalyan Sewa Sanutu	Mr. Ashwani Kumar President	Tripuri road Patiala	0175-2350217, 9814927120		Free Education Coaching
402	K. G. Health Club	Sh. Kuldeep Singh President	Patiala	0175-2308525 (O), 2670393 ®		Blood Donatio camp etc.
403	Kheti Virasat	Sh. Surinder Singh	Street No. 1, Kamla Colony, Patiala Gate, Nabha - 147201	01765-2504250, 9417011250	khetivirasat@gmail.com	
404	Leprosy Patients Welfare Society	Col. Karaminder Singh	Amar Ashram, Lower Mall, Patiala	® 0175-2212929, (O) 2301819	col_karaminder@hotmail.com	Adaption of D Colony, Meet Medical aid to
405	Nav Jivini School of Special education for Mentally Handicapped	Dr. N. S. Sodhi	Sular..... Patiala	0175-2213517, 2225979, 2218477	neelsodhi@yahoo.com	Resident Serv handicapped

406	Patiala Handicraft Handloom WCIS Ltd.		Rabid Margi, Model Town, Patiala - 147001			Craft Design
407	Patiala Social Welfare	Sh. Vijay Kumar. President	18 Human Colony, Sent Nagger Patiala	0175-2212840, 2211679, (M) 0175-3119931		Uniforms to p camp medicin patiala, Work Handicapped
408	Patiala Social Welfare Society Regd.	Sh. Vijay Kumar Goyal. President	Patiala	® 0175-3093131, (S) 0175-3092601		Free Medicin camps, Traffic Foeticide Awa Free sewing m Tree Plantatio
409	Punjab Police State Apex Committee for Community Policing	Sh. Gursharanjeet Singh, Secretary	Slum Dispensory Model Town Samrala Road, Khanna, Patiala	9855028093	bsbkhanha@yahoo.in	
410	Punjabi University	Dr. B. S. Mann	Patiala	0175-2284056, (M) 9814323325		Blood Donatio awarness, Tre
411	Panchand Foundation Regd.	Mrs. Shobha (Gen. Secy.), H. No. 2451, Shawshor Singh street, Near Arna Barna Bazar, Patiala	H. No. 2451, Shamsher Singh street, Near Arna Barna, Bazar, Patiala-147001	0175-2224308		Free coaching Seminars / w Environment Indian Person Donation cam

412	Progressive Youth Forum	Sh. Major Singh Sekhon, Director	First Floor, Block No. 3, Red Cross Working Women Hostel, Jail Road, Patiala 147001	9888842697, 0175-2362490, 252273, Fax: 0175-2362490	1997pyf@gmail.com	56 SHGs were banks with the and Sangrur c people, Form build the capa empowerment counseling ce RCH program Patran, Organ Legal and Hu girls in associ Commisiion f of Punjab, Es service for em programme fo distress need shelter, Organ workshops fo scenario abou
413	Roop Chand Malhotra Charitable Trust	Col. Karaminder Singh Retd.	Amar Ashram Lower Mall, Patiala	(O) 0175-2301819, ® 2212929	col_karaminder@hotmail.com	Free Medical poor, Free clo medicines to
414	Red Cross De-Addiction Centre (SAKET)	Dir. Col. G. S. Virk	Badungar Khalsa College Colony, Patiala	0175-2371600		Drug-De-Addi
415	Rural Development and Social Welfare Society (RDSWS)	Mrs. S. K. Kalia, Chairman, Mr. S. K. Sharma, President	20, Ghuman Colony, Near Sant Nagar, Patiala	0175-2220912		Awarness ger Technology d assistance, C of Rural youth
416	Rural Voluntary Initiative for child education and social welfare society (Regd.)		House Plot no 3, Block B 10, Rajpura Town, Patiala			Primary Elem education, So
417	Sadhu Basant Residential Care for Elders, Mentally handicapped	Dr. N. S. Sodhi		0175-2213517, 2225979, 2218477	neelsodhi@yahoo.com	Residential S handicapped
418	Seniors Welfare Society	Sh. Nirmal Singh Secy.	Back side Tagore Cinema Model Town Patiala	0175-2351383		Seniors Citize to poor studen

419	Shri Sanatan Dharam Kumar Sabha		Yadvinder Puran Bal Niketan, New Lahori Gate, Patiala			Care of Destitute
420	S.D.K.S. Sh. Dasodhi Ram Birji Foundation		Durga Ashram Sheranwali Dharamshala, Sheranwala Gate Patiala 147001			Awareness generation, Policy advocacy, activism, Community implementation Environment, Health issues, Health
421	Sh. Bhartiya Sew Samiti Regd.	Sh. Anil Bansal President, Sh. Pardeep Gupta General Secretary	Patiala	0175-2302496, 5051575		To help the poor, organize medical camps for girls in her marriage
422	Society for Welfare of Handicapped	Col. Karaminder Singh (Retd.)	kishan singh kamboj hostel, Lower Mall- Patiala	(O) 0175-2301819, ® 2212929, 9888000198	col_karaminder@hotmail.com	Education to the blind Vocational training Blind
423	Senior Citizen Welfare Association	Sh. Inderjit Singh Chopra, President SCWA Patiala	Model Town Patiala	(O) 0175-2200841, ® 0175-2353023, (M) 0175-3118884		Social Projects
424	The Centre for Development Action (CDA)		4325-C, Urban Estate, Phase II Patiala - 147001			Awareness generation, training, Campaigns, surveys in the Development Technology, Information Population issues
425	The Indian Rural Development and Social Welfare Society		VPO Hariyou Khurd, Block Patran, Distt. Patiala	01764-244019, 43548, 9855598598		
426	The Nagar and Gram Sudhar Manila Society	Smt. Manjeet Kaur, Chairperson	397/4, Kalka road Rajpura - 140401	01762-232262, (M) 9417311760		Tailoring and generation, Education of water / sanitation
427	The Nabha Foundation	Ms. Namarta Kakkar, Project Manager, Sh. Uday Khemka, Chairman	44, Akalgarhia House, Hira Mahal, Nabha, Distt. Patiala 147201	Fax. 01765-504016, 9878143686, 01765-223168	info@thenabhafoundation.org	HIV - Comprehensive
428	Youth Club		Village Badshapur, Tehsil Samana, Distt. Patiala	9872796507, 9872796428		
429	Adarsh Sewa Samiti (ASS)		Mohala Bari Sakar Anandpur Sahib Distt. Ropar			Income Generation Health, Nutrition

430	Adarsh Sewa Samiti		Anandpur Sahib, Mohalla Bari Sarkar, Distt. Ropar			Impelementat medicine and Health Camps and H practiti awareness m demonstration Cultivation of areas.
431	Ambuja Cement Foundation	Mr. Mohinder (Project Manager)	Ropar Village Daburji PO Lodhi Majra, Ropar. C/o Saini Delux Dhabha, Near Bus Stand Ghanauli Ropar	9463289058		HIV - Compos
432	Ambuja Cement Foundation	Mr. Jamuna Parsad (Project Manager)	Ropar	9466340424		HIV - IDU
433	Arpan (Regd.)	Sh. Kuldip Singh, Director, Ms. Chander Prabha, Project Manager	Near Government Primary school, Dobhetta, Nangal, Distt. Ropar - 140124	9417563054, (O) 01887-224741, 211641, 9876478199	arpanociety@gmail.com	Organizes SH programme, C programmes, programmes reproductive a programmes, awareness pr
434	Association for Social and Rural Advancement (ASRA)	Sh. B. D. Vashishta, Chairman cum ED	Vill. And PO Dher, Distt. Ropar- 140133	9463288821, (O) 01887-260211	asranangal@rediffmail.com	Formation and empowermen and saving tra Organizes he women, Impa
435	Deny Garmudyog Samiti		C/o Sardar Natha Singh Sandhu, New Ranjit Nagar, Kharar, Distt. Ropar	01888-246108		
436	Nanaksar Anand Thath Welfare Society	Sh. Kartar Singh Tumber, President	Ward No. 6 Dashmesh Academy Road, Anandpur Sahib, Ropar	01887-230298		To provide tra Embroidery to Anandpur Sah chanauli Tehs Ropar and Vil Arsa Bela Dis the girls, free basic ameniti

437	Maharaja Sabhiacharak Club		Vill. Tanda Karor, PO Nayan Gaon, Tehsil Kharar Distt. Ropar			
438	Mahila Samaj Kalyan Samiti		Sanduan Road, Chamkaur Sahib, Distt. Ropar	01881-324783, 9888863283, 9463450514		
439	Pendu Vikas and Samaj Bhalia Sanstha	Ms. Sukhwinder kaur	Anandpur Sahib, Distt. Ropar	9316267981, 9914258899		Organizes work to equip them regarding health and formation vocational training tailoring work poor and need environment a Organizes leg
440	People Living With HIV/AIDS (PLWHA) Society	Ms. Daljit Kaur, Secretary	Tehsil road, Chamkaur Sahib, Distt. Ropar - 140112	9872634814, 01881-260283		To work for the with HIV/AIDS create awareness regarding the towards, PLW PLWHA women employment, education of (PLWHA) in the slums, To work of needy and SHGs for micro handicrafts and employment a
441	Punjab Welfare and Youth Affairs Society		H. No. 628, Giani Zail Singh Nagar, Ropar	01628-248280, 9781360808		
442	Rural Association for Human Interest (RAHI)		Pathan Road, Mandir Sarian, VPO Nurpur Bedi, Distt. Ropar			RCH Activities family planning and services Immunization Adolescent girls institutional de high risk preg

443	Rural Human Development Centre (RHDC)	Sh. Amar Singh Saini Director	Vill. Saini Majra, PO Nurpur Bedi Distt. Roopnagar - 140117	01887-240302		Awareness go Campaigns / development field of Enviro Pollution water Technology, Health / nutrit
444	Shanti Swaroop Memorial Educational Society (SSMES)		Chamkor Sahib, Near Electricity Board Distt. Roopnagar 140112			Awareness go Campaigns / Surveys, Netv implementation Marketing in t Development Protected are
445	S. S. Memorial Educational Society	Prof. R. C. Dhand, Chairman	(Micro Finance Institution Status by State Bank of India), Chamkaur Sahib, Distt. Ropar - 140112	9872634814, (F) 01881-260283, (O) 260283	redhand@yahoo.com	Provide health services to 60 belonging to v Migrated indu centers in rop Organizes RC National rural family counse women who s husband/in-la Women throu inculcating ha finance, Orga maketing of h
446	Social Work and Rural Development Centre	Mr. Jagtar Singh Director	VPO Nurpur Bedi Distt. Ropar 140117	01887-240238, 9417562629	swrdc2006@gmail.com	RCH Activities family planning and services Immunization Adolescent gi institutional d high risk preg
447	Social Development and Research Foundation	Mr. Ajaib Singh	Kharar		ajaibsingh87@gmail.com	

448	Social and Economic Developmet Centre	Sh. Surinderpal Singh Director	VPO Kotla Power House, The Anandpur Sahib Ropar	01887-265409		Awareness ca Women Empo camps, Drugs Tailoring for V persons
449	Society for education and rural Development		Vill. Mindhwan, PO Kotla Power House, Tehsil Anandpur Sahib, Distt. Ropar	01887-265466, 233862, 265575		
450	Art and Craft Self Help Training Society		Malerkotla, Distt. Sangrur	01675-220391, 01679-230373, 9463280127		
451	Association of Scientific Research in Homeopathy		Street No. 1, 108, Mubarkpur, Sangrur - 148001			Implementatio medicine and Health camps and H parctiti awareness m demonstration Cultivation of tribal areas.
452	Baba Heera Singh Bhattal Memorial Trust		Vill/PO Bhattal, Distt. Sangrur			
453	Bhai Ghanaiya Ji Sewa Dal Regd.	Sh. Lakhdeep Singh Anttal	Raikhya Studio Opp. Fire brigade Office Near Mahavir Chowk, Sangrur 148001	01672-235081, 9199144888	bhaighaniyaji@khalsa.com	Civic Issues, Environment & Family Welfare and Empower
454	Bharat Education and Peace Promotional Society		VPO Katraon, Sangrur	01885-220730, 9815372730		
455	Bharti Educational and Welfare Organisation	Sh. Narpinder Jindal	Jindal Complex, M K Bye Pass Road Dhuri, Distt. Sangrur 148024	01675-266008, 9872766855	bewodhuri@yahoo.com	Agriculture, E Environment

456	Gateway Education and Welfare Society (Regd.)	Sh. Mukesh Ratankar, President	(Computer Hardware and Training Institute), Kaula Park, Sangrur - 148001	01672-235333, 9878000928, 9216800926	amit.gatwawal@gmail.com	Counseling for and carrier building training centers and carrier guidance and placement cell programmes office, BDPO Government of candidates av employment/v employment
457	Indian Rural Health Organization	Dr. Rajan Solemn	Near Ucchi Pully, Opp. Officer Colony, GGS road Sangrur	9815544241		RCH Projects awareness
458	Indco Hightech Agro Rural Development of Women Welfare Society		VPO Sherpur, Sub-Tehsil Sherpur, Distt. Sangrur	01882-320679, 4620679. 9878052679		
459	Institute for Development and Social Welfare	Sh. Inam-ur-Rehman, Director	104, first floor, Cornet Café Complex, Bus stand road, Malerkotla - 148023, Distt. Sangrur	9815727499, 01675-258499 (O)	diridsw@hotmail.com	Conducting regular programme to Bridging gap in polity debate concerning economic welfare, Prom and training for gradation to y
460	Saint Daniel Organization	Dr. Rajan President, Dr. Ashok Kumar	C/o Rajan Vikas Mission Hospital, Near Housing Board Colony, Thalsea Bagh, Sangrur - 148001	9915065123, 9815366310		Runs Educational Handicapped awareness ge Organizes con training progr programmes medical camp
461	Samaj Bhalai Manch (Regd.)	Sh. Rajinder Singh Kalabulla, President.	H.O. Near Sub Tehsil Sherpur-148025, Tehsil Dhuri, Distt. Sangrur	9855153989		Awareness ca feticide, Blood Environmental Immunization
462	Sarav Club Bhadaur	Sh. Malkiat SNG Dr. Saleem	Distt. Sangrur	9872147825		Free Medical activities

463	Sarav Bhartia Sewa Samiti	Sh. Tek Bahadur, Sh. Puran Chand Singla, Sh. Jai Hind Kumar	Dhuri, Distt. Sangrur	9888359381, 01675-225541, 222207, 220511	sbssdhuri@gmail.com	Eye operation Drug-de-addiction welfare activities camp
464	Shree Bala Ji Medical and Educational Trust (Regd.)	Sh. Vinod Garg, Chairman	Dirba, Distt. Sangrur - 148035	01676-244194, 9417195844		Runs school bedded hospital Laparoscopy, Organizes camps and health camps and their children
465	Scientific Awareness and Social Welfare Forum	Dr. A. S. Mann President	21 A, Officer Colony, Sangrur	01672-309404, 250387, 230216, 9814806387, Fax: 01672-500388	safsangrur@yahoo.in	RCH activities
466	Rotary Club	Sh. Navin Garg, Advocate, 1, O, PP, BDO, Office sunam	Sunam City C/o Navin Garg Advocate, Sunam, Distt. Sangrur	01676-220250, 220012		Blood donation Eradication programme Control, AIDS camps
467	Rural Organisation for Medical Assistance		Behind Petrol Pump, Khanouri Block, Sherpur, Distt. Sangrur-148027	01672-270018		
468	Umeed Khanna Foundation	Col. R. S. Brar (Retd.)	Gaushala road, Opp. New Grain Market, Distt. Sangrur	011-26601060, 9810127271	umeed@vsnl.net	RCH activities family planning and services Immunization Adolescent girls institutional delivery risk pregnancies STD/RTI protection
469	Sehat Sewa Citizen Council	Sh. Satpal Singh, Chairman	Opp. Bus Stand, Jandiala Road, Distt. Taran-Taaran	01853-227824, 9877175480	sscc.tarantar@gmail.com	Agriculture, C Able, Dalit U Literacy, Envi Processing, H HIV/AIDS, Inf Communication Employment, Poverty Allevi Technology

470	Sukhmani Sewa Society	Sh. Kripal Singh Sohal	A-1, 295, Ritawali Gali, Deep Avenue, Taran Taaran	9855013985	-	
471	Swami Vivekanand Medical Mission (Regd.)	Mr. Raj Kumar, Project Manager	IDU, Gali No. 1, Guru Amardass Colony, Near Mata Kaulan Mandir, B/S, Tehsil and Distt. Taran Taran	9988017151		HIV - IDU

STANDARD OPERATING PROCEDURES



**DEPARTMENT OF REVENUE, REHABILITATION AND
DISASTER MANAGEMENT
GOVERNMENT OF PUNJAB**

STANDARD OPERATING PROCEDURES

Emergency Support functions (ESFs) are intended to help the Incident Commander of Punjab State at the time of emergency for restoring normal life. The ESF is an organized system of State level departments and agencies, which are to be worked under a structured pattern for response and recovery in accordance with the National Disaster Management Guidelines.

The Standard Operating Procedure (SOPs) for ESFs explains about the operations and responsibilities of the leading and supporting agencies that are to be involved in the ESF system. The document also outlines the purpose and scope for each function of operation that is to be followed by the respective ESF agencies when the Incident Commander activates the response plan during the emergency period.

The head of each primary department who is the Team Leader of each ESF and the nodal officers of the supporting agencies are responsible to be prepared for potential hazards that might impact the district severely. These departments/agencies have clearly identified roles and functions in accordance with the National Response Plan (NRP). They have been grouped in as ESFs as per their nature and type of assistance they can provide. When the team leaders of these ESFs are located in the EOC, they would function for the overall district response.

Emergency Support Functions (ESFs) related to Communication, Search and Rescue, evacuation, law and order, medical response and Trauma Counselling, water supply, electricity, warning and transport etc. All of these emergency functions consist of emergency plans that would be activated at the time of emergency.

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 and the State EOC, and will be the main coordinator incharge

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 and the district EOC. The Nodal Agency will also be a member of the Incident Management Team lead by an officer of the Revenue/Police or other department as decided upon by the district IC, and as required by the Incident Manager who may draw upon some or all of the ESFs for onsite response. The Nodal Agency must hence nominate a Team Leader (TL) at the State level and district level, and a member for the IMT(s) in advance, with appropriate (at least two) backstopping arrangements.

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.

Team Leader (TL) of EOC would be on the basis of its authorities, resources, and capabilities in the functional area. He would be the member of Disaster Management Team that represents all of the key functions of the state in a single location under the direction of the Relief Commissioner (Incident Commander).

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). Each of the Nodal and Support agencies would also comprise of quick response team trained to carry out their functions at the response site. The success of ESF will be of critical importance and would reflect in the lives saved in the golden hour. Below a list of ESFs has been given which will be activated at state/district level during emergency situation.

All ESFs have to assist the Incident Commander i.e. Deputy Commissioner

at State level as per their assigned duties described in the SOP's and to be followed during emergency within the District/State. A detailed organizational setup of all ESFs and team leaders has been given below.

I. SOP FOR EMERGENCY SUPPORT FUNCTIONS

The major functions of the incident command system are summarized as follows. Nevertheless, they are to be released in cooperation of all the ESFs and participating agencies in disaster management. The Incident commander is given with full control and command over the entire teams in state level.

Emergency Support Function (ESF)

ESF #1 - COMMUNICATION

Background

The Emergency Support Function (ESF) 'Communication' supports the Response Plan in case of Major Communication links damage in various parts of the state during a Disaster and there is a requirement for immediate restoration or replacement of the network. The Objective of the ESF is to provide failsafe and reliable communications support during and after a disaster; to restore communication facilities in the aftermath of a disaster and provide vital communication linkages between Emergency Operation Centers, and important response agencies. This ESF encompasses setting up of temporary communication centers in and around the area of impact and activation of Mobile units in case of widespread damage in a disaster like an earthquake.

Nodal agency

Special Relief Commissioner

Support Agencies

- ✓ Indian Meteorological Department
- ✓ Doordarshan
- ✓ All India Radio
- ✓ Department of Information and Public Relations
- ✓ Punjab State Information Commission
- ✓ Department of Science & Technology
- ✓ National Informatics Center, Punjab
- ✓ Police/Fire/Revenue Wireless
- ✓ Bharat Sanchar Nigam Limited (BSNL)
- ✓ Private Telecom Representatives

Situation Assumptions

1. There would be a congestion in the network because of increased

- calls to control rooms due to panic created in the community.
2. The initial reports on damage may not give a clear picture of the extent of damage to communication network.
 3. The affected site may cut off from the state control rooms and the officials on site and find difficulty in communicating to the District/State EOC.

ACTION AREAS/RESPONSIBILITY

INITIAL ACTION

- ✓ Prepare and implement incident wireless communication plan
- ✓ Ensure that incident communication center and message center are established.
- ✓ Establish appropriate communication distribution/maintenance locations within base/ camps
- ✓ Ensure equipment accountability system is established
- ✓ Ensure personal portable wireless sets cache is distributed as for incident wireless communication plan

Provide technical information required

1. adequacy of communication system currently in operation
 2. Geographic limitation on communication system
 3. Equipment capabilities/limitations
 4. Number and types of equipment available
 5. Anticipated problems is the use of communication equipments
- ✓ Ensure equipments are tested and repaired
 - ✓ Recover equipments from released units
 - ✓ Responsible to receive and transmit wireless and telephone messages among to between personnel to provide dispatch services at the incident
 - ✓ Set up message center location as required
 - ✓ Receive and transmit messages within and external to incident
 - ✓ Maintain files of general messages.
 - ✓ Maintain a record of unusual incident occurrences.

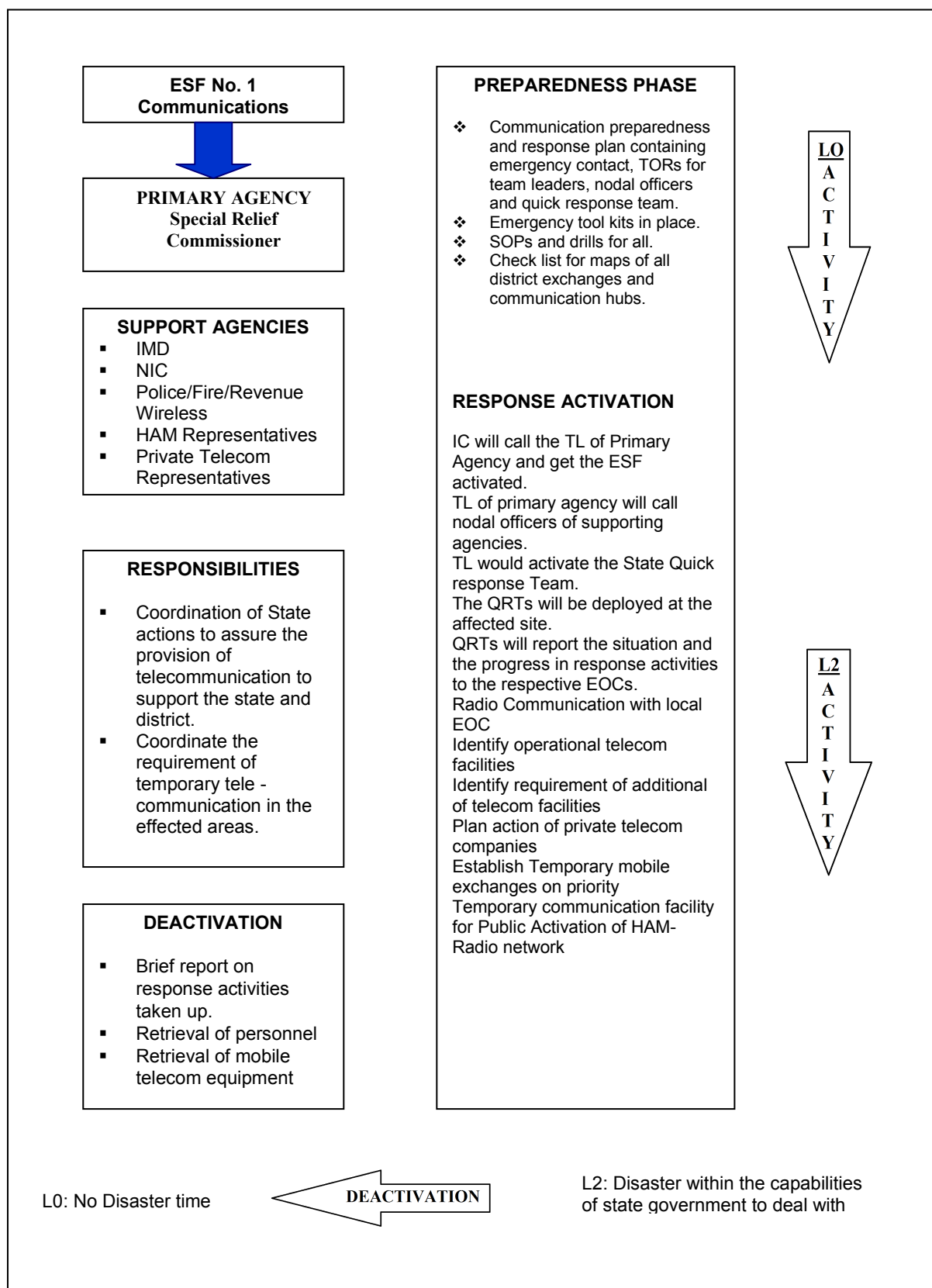
ESF 1- Communication	Requirements
<ul style="list-style-type: none"> ❖ Assess damage and reinstall facilities ❖ Establish two-way communication at the earliest ❖ Warn people against areas that are likely to get affected ❖ Special care on security matters 	<ul style="list-style-type: none"> ❖ VSATs, battery charged communication equipment, HAM radios, Inventory of mobile communication facilities

SOPs for Quick Response Team on Communication

- The QRT (Quick Response Team) members will reach to the nodal office as soon as they will get instructions.
- QRT teams would reach to the site immediately after receiving instructions from the nodal officer.
- On the site QRT members will take stock of the situation from the IC at the site and their counter parts.
- The QRTs will coordinate, collect, process, report and display essential elements of information and facilitate support for planning efforts in response operations.
- QRTs would assess the ground situation and would send sectoral report to the District ESF agency.
- A sectoral report would contain following:
 - ✓ An assessment of overall damage, listing specifically:
 - ✓ Overhead route damage (in miles/kilometers).
 - ✓ Cable damage (in yards/meters).
 - ✓ Specific equipment damaged.
 - ✓ Establish a temporary communication facility for use by the public.
- Identify requirements of manpower, vehicles and other materials and equipments Give priority and concentrate on repairs and normalization of communication system at disaster-affected areas.
- Begin restoration by removing and salvaging wires and poles from the roadways with the help of casual laborers.
- Carry out temporary building repairs to establish a secured storage area for the s equipments and salvaged materials.
- Report all activities to head office

- Begin restoration by removing and salvaging wires and poles from the roadways through recruited casual laborers.
- Establish a secure storage area for incoming equipments and salvaged materials.

Response Framework



Standard Operating Procedures for the Nodal Agency

- Identify the actual and planned actions of commercial telecommunication companies to restore services.
- Determine what assets are available and nearest to the affected area(s) by each emergency support functions support agency and the time frame in deploying those assets.
- Coordinate the acquisition and deployment of communications, equipment, personnel and resources to establish temporary communication capacities within the affected area.
- Accumulate damage information obtained from assessment teams, the media industry, the local Deputy Commissioners Office EOC, and other city/country/state agencies and report that information through Emergency Support Function.
- Prioritize the deployment of services based on available resources and critical needs.
- Coordinate communications support to all governmental, non-governmental & volunteer agencies as required.
- IC will call the TL of Primary Agency and get the ESF activated.
- TL of primary agency will call nodal officers of supporting agencies.
- TL would activate the State Quick response Team.
- The QRTs will be deployed at the affected site.
- QRTs will report the situation and the progress in response activities to the respective EOCs.
- Sending flash news of latest updates/donation requirements for disaster area all over the state
- Assisting the EOC in providing updated information to national as well as at the state level.
- Setting up of toll free numbers for emergency information assistance.

Background

The purpose of Emergency Support Function on Law and Order is to establish procedures for the command, control, and coordination of all law enforcement personnel and equipment. The Law and Order function encompasses a broad range of routine policing activities. The response function has as its primary goal the maintenance of law and order activities, and, if necessary the restoration of law and order should there be a breakdown within the normally law-abiding community.

State Nodal Agency

Home Department

Suggested Support Agencies

Punjab Home Guards and Civil Defence, Punjab Police, Punjab State Law Commission, Punjab State Human Rights Commission, Punjab Police Housing Corporation, Central Paramilitary Forces, Military and Border Security Force.

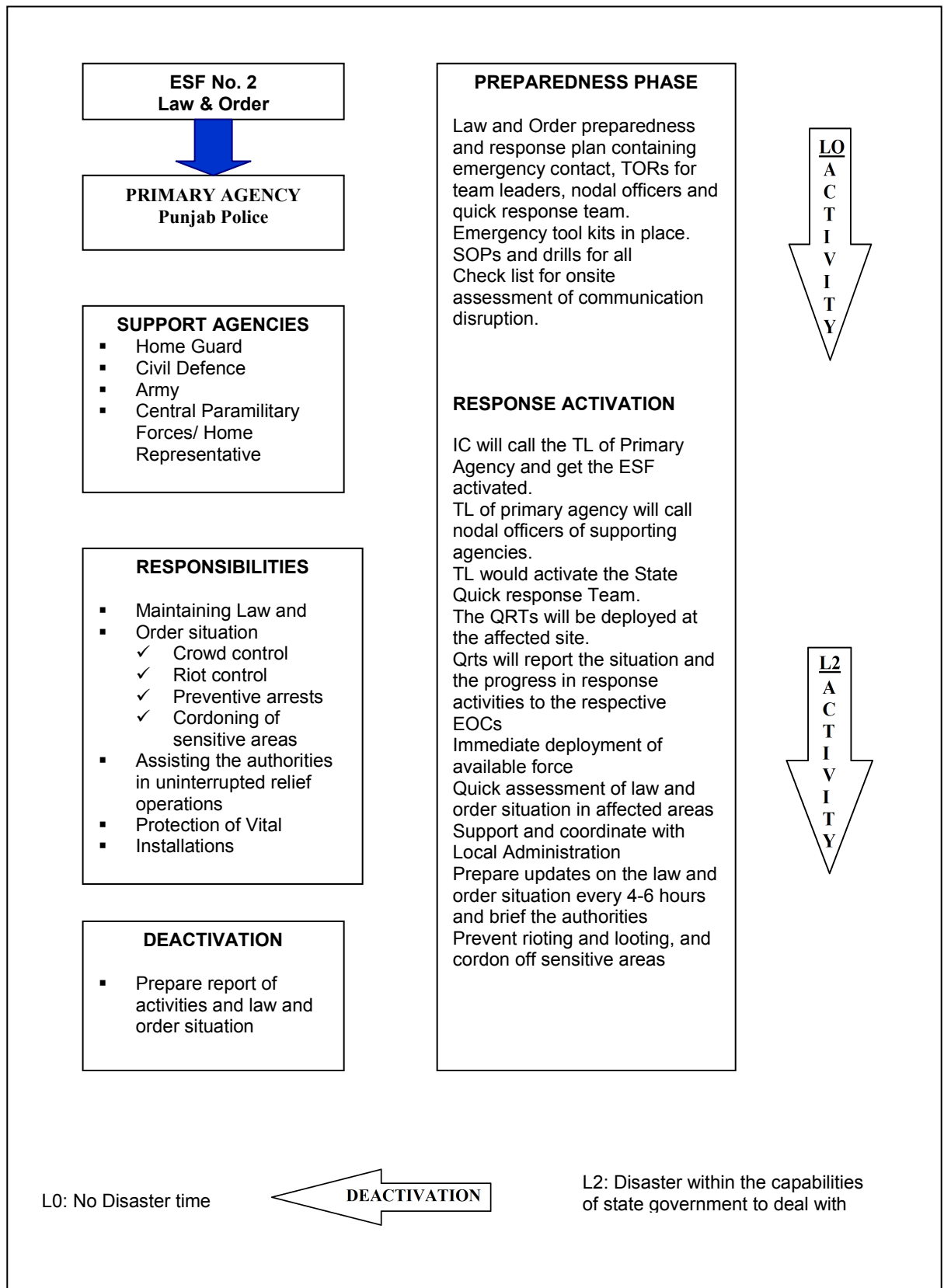
Situation Assumptions

- There would be panic and people will gather at a place.
- The crowds may go out of control.
- Riots may also take place.

SOPs for Nodal Agency

- IC will call the TL of Primary Agency and get the ESF activated.
- TL of primary agency will call nodal officers of supporting agencies.
- TL would activate the Quick Response Team.
- The QRTs will be deployed at the affected site.
- Cordoning of area to restrict movement of onlookers, vehicular and pedestrian traffic should be done.
- Any additional requirements at site to be taken care of.

Response Framework



SOP for Quick Response Team on Law and order

- Quick assessment of law and order situation in affected areas
- Support and coordinate with Local Administration
- Prepare updates on the law and order situation every 4-6 hours and brief the authorities
- Controlling situations like rioting and looting, and cordon off sensitive areas
- QRTs will guide property and valuables in affected areas.
- Control and monitor traffic movement.
- QRTs will provide diversion of traffic on alternate routes as and when it is necessary.
- The QRTs will also provide information about traffic flow along various corridors, especially heavy traffic or congested roads.
- QRTs will communicate to police control rooms, details on the field activities including deployment and reinforcement of staff and resources and communicate nature of additional requirements.

ESF #3 - SEARCH AND RESCUE OPERATIONS

Background

The State Response Plan (SRP) establishes an organized setup to conduct S&R operations for any of the Natural and Manmade Disasters. For S&R operations outlines an implementing framework of sharing resources as per the requirement within National and State level departments that will be engaged to support during an emergency situation. The Plan has structured the response of concerned departments i.e. primary and supporting departments so that they function together by grouping their capabilities, skills, resources, and authorities across the State and district Government within the ESF plan.

The S&R ESF has to respond to assist the Incident Commander as per their assigned duty, which has been described in the SOP's and is to be followed during emergency within the State. The scope of Response function includes the following broad areas

- Rescue of those trapped
- Search for victims of a disaster (whether living or dead).

STATE NODAL AGENCY

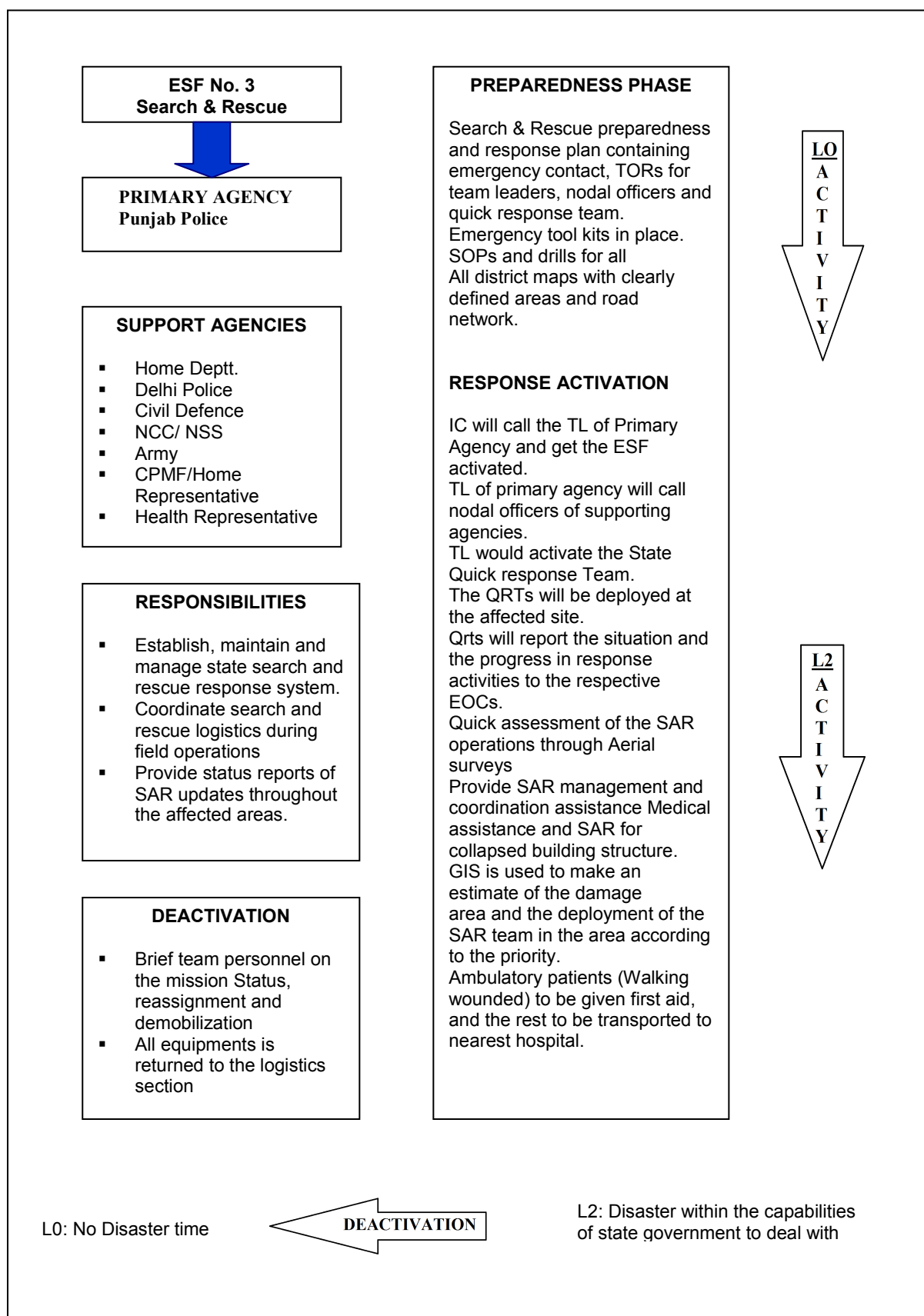
Punjab Police

ESF SUPPORT AGENCY

- Punjab Fire Services
- Municipal Corporations
- Public Works Department
- Civil Defence and Home Guard
- Army (if called upon)
- Directorate of Health Services
- Transport –Nodal Agency
- Punjab Ex-servicemen Corporation

- National Disaster Response Force (Bathinda)
- NGOs

RESPONSE FRAMEWORK



SOP of the ESF Nodal Agency

- IC / District EOC (on orders from IC) would contact the team leader of S&R Operations to activate the ESF response plan.
- Team leader of Nodal agency would report to the Quick response teams for immediate operation and Inform supporting agencies to coordinate in the situation depending upon the scale of the disaster.
- QRTs (of both nodal and supporting agencies) would perform a physical damage assessment and report to the leaders of central and nodal agency about the percentage of damage, percentage of casualties expected and possible requirement of equipments, manpower and rescue sites.
- Medical and Trauma Counselling Response Teams at District and State Level to be activated by ESF-TL if needed, and report to the Incident Manager at the On-site EOC who will coordinate their activities.
- Response Teams in the field communicate with the ESF-TL at the District EOC, through the Incident Manager.
- Major hospitals given warning to activate their contingency plan, if required
- ESF-TL to inform IC at District EOC if activation of the State EOC will be needed.
- Following up a systematic approach of transferring resources, manpower equipments, vehicles at the Disaster affected areas
- Determine the release of QRTs and facilities at effected site may be considered on a priority basis
- Contacting health services to instruct them to send first-aid and trauma counselling team to the affected site, so the patients can be treated before transporting to the hospital for the advance treatment (if needed).
- Contacting damage assessment teams and send them to the site so that assessment reports can be prepared and situation analysis can be done properly
- Establishing a failsafe communication system with QRTs members so

that current reports on situation analysis can be gathered and accordingly help can be provided to the site.

- Declaration of further help required at State and National level in case of damage is at large scale and situation is unmanageable with the available resources
- At the site, QRTs should contact the local volunteers and local people to gather information about vulnerable areas so that search and rescue operation can be take place through a proper channel in heavily dense areas, large buildings, community centers, hotels, hospitals, public building and any other area having large gathering
- Special care to women and children groups should be given as they are expected to be more affected and helpless incase of any emergency situation
- Further request to the health department to deploy mobile hospitals in case the casualties are severe and transportation of patients may take much more time.
- Provide regular updates to the IC at the District/State EOC based on reports from the field and the hospitals
- Coordinate with the Transportation ESF if a large number of medical professionals need to be sent to the affected sites and/or a large number of victims need to be transported to health facilities.
- Ensure the provision and continuous supply of medical facilities (medicines, equipments, ambulances, doctors and manpower etc) required at the disaster affected site and the hospital health centers catering to disaster victims.
- Coordinate with the ESFs on Law & Order, Evacuation, and Debris and Road Clearance, for setting up of field medical posts, transport of victims, and setting up of mobile hospitals.

SOP OF QUICK RESPONSE TEAM (QRT)

- QRTs will reach on the spot and take an damage assessment including type of injuries, number of people affected and possible medical assistance need.
- QRTs will provide situation and progress reports on the action taken by the team to the ESF-TL
- QRTs will ensure timely response to the needs of the affected victims by establishing field medical posts at disaster sites, as needed
- QRTs should maintain a coordination with the local people so the S&R operation may take place at more vulnerable locations having dense population, multi-storied buildings and community gatherings as more people are expected to be trapped in such areas
- QRT will report to Nodal agency in case of shortage of vehicles, manpower, resources and relief materials
- QRT will also work effectively with the other teams conducting first aid, trauma counselling, law and order, debris clearance, damage assessment and water and sanitations so the effective rehabilitation may take place accordingly.

ESF #4 - EVACUATION

BACKGROUND

The purpose of this Emergency Support Functions is to coordinate efforts in safely evacuating the public from a threat to life and/or health. Evacuation and movement involves the coordination of varying agencies and good communications with the public. Evacuation and movement is the responsibility of public safety and the legislative authorities of a jurisdiction. This ESF applies to those agencies and others that are necessary for an evacuation.

NODAL AGENCY

Punjab Police

SUPPORT AGENCIES

Punjab Police, Punjab Fire Service, Directorate of Home Guard & Civil Defence, National Cadet Core/NSS, Indian Army, Nehru Yuva Kendra, National Disaster Response Force (Bathinda), Police Department, Transport –Nodal Agency, Punjab Ex-servicemen Corporation, National Disaster Response Force (Bathinda), NGOs and Department Of Sports and Youth Services.

SITUATION ASSUMPTION

Any disaster situation could cause the need for evacuation. Of particular concern to Punjab is from earthquake, flooding or a fire, which could cause the need for an immediate evacuation, with very little time to plan for the specific evacuation.

1. Individuals and families may be displaced from their homes and may be provided shelters by one or more volunteer organizations.
2. Approximately 10% of the populous may seek shelter in organized shelters. The rest usually will find their own through friends, family, or commercial sources.

3. Displaced persons may require transportation to shelter facilities. This should be provided for by private transportation.

4. Shelter operations will have sufficient sanitation and cooking facilities, including cold and frozen storage, to maximize the use of available products.

SOP OF NODAL AGENCIES

a. Responsible for implementing and coordinating emergency evacuation. This is done in the event of a situation that immediately threatens an area and there is no time to obtain a proclamation from elected officials.

b. Responsible for determining when and how the public can re-enter the evacuated area(s).

c. Provides security for evacuated areas.

d. Documents evacuation status and disseminate status to appropriate personnel, Agencies and the public on a continual and timely basis.

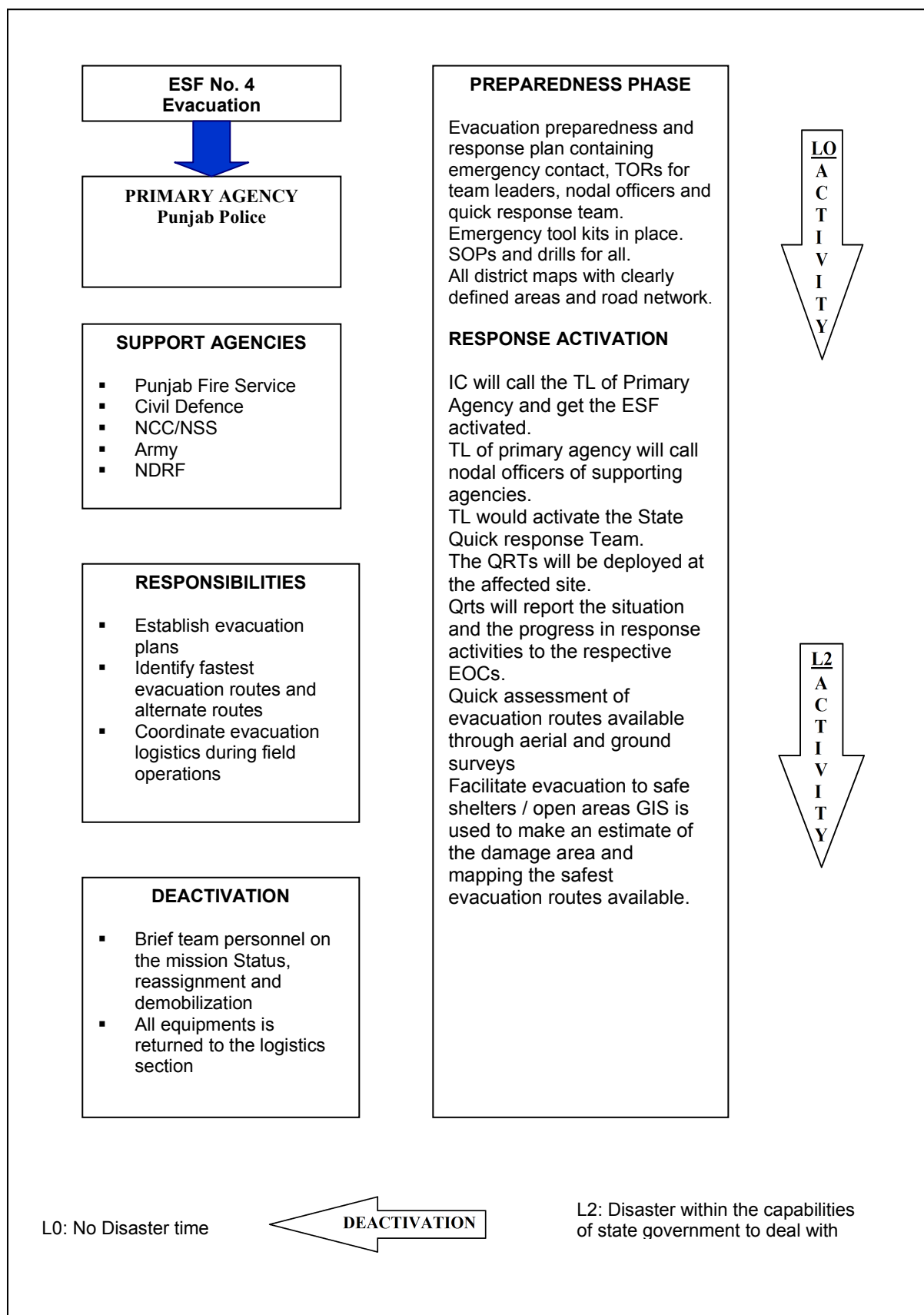
SOP of the QRT

- Required to reach Department of Revenue HQ immediately upon receiving notification from the ESF TL control room
- Contact the field level QRTs and give them information about the disaster
- Inform the field offices to contact their staff designated for the ESF
- Coordinate the ESF activities with the ESF TL at the State EOC

Responsibilities of the QRT in the field

- Required to reach the nearest field office immediately upon receiving notification from the HQ QRT / Central control room
- Co-ordinate with the field QRT from the support agencies
- Provide field assessment information to the ESF TL at the State EOC and to Central control room
- Assist the field office in the response activities

RESPONSE FRAMEWORK



BACKGROUND

The purpose of this Emergency Support Function is to identify food and water needs in the aftermath of a disaster or emergency; obtain these resources; and transport them to the impact area. Food supplies obtained and distributed by Emergency Support Function (Food).

Obtaining food and supplies, arranging for transportation and authorizing assistance may be required. Food must be suitable for household distribution or congregate meal service. Transportation and distribution of food and supplies will be arranged by local, state, private and/or federal agencies/organizations. The Emergency Food Stamp Program may be requested, authorized and implemented. The Food & Civil Supplies Department assumes overall coordination for this function. The scope of the function is to primarily provide food and civil supplies to the affected area. It would include setting up of storage facilities at the disaster site and distribution of the supplies to the effected.

NODAL AGENCY

Food & Civil Supplies

SUPPORT AGENCY

Revenue Department, IRCS/NGO Rep, Transport Department, Punjab State Civil Supplies Corporation Ltd. (PUNSUP), Punjab State Consumer Dispute Redressal Commission, FCI (Food Corporation of India), Marketing Federation (MARKFED), Punjab State Civil Supplies Corporation Limited (PUNSUP), Punjab Agro-Industries Corporation (PAIC) and Punjab State Warehousing Corporation (PSWC).

SITUATION ASSUMPTION

A disaster may partially or totally destroy food products stored in the

affected area. There may be a disruption of energy sources (e.g., electricity and gas). Oil for generators and propane tanks may be essential. Commercial cold storage and freezer facilities may be inoperable. Bordering areas affected, schools and other facilities may have food and supplies sufficient to feed victims.

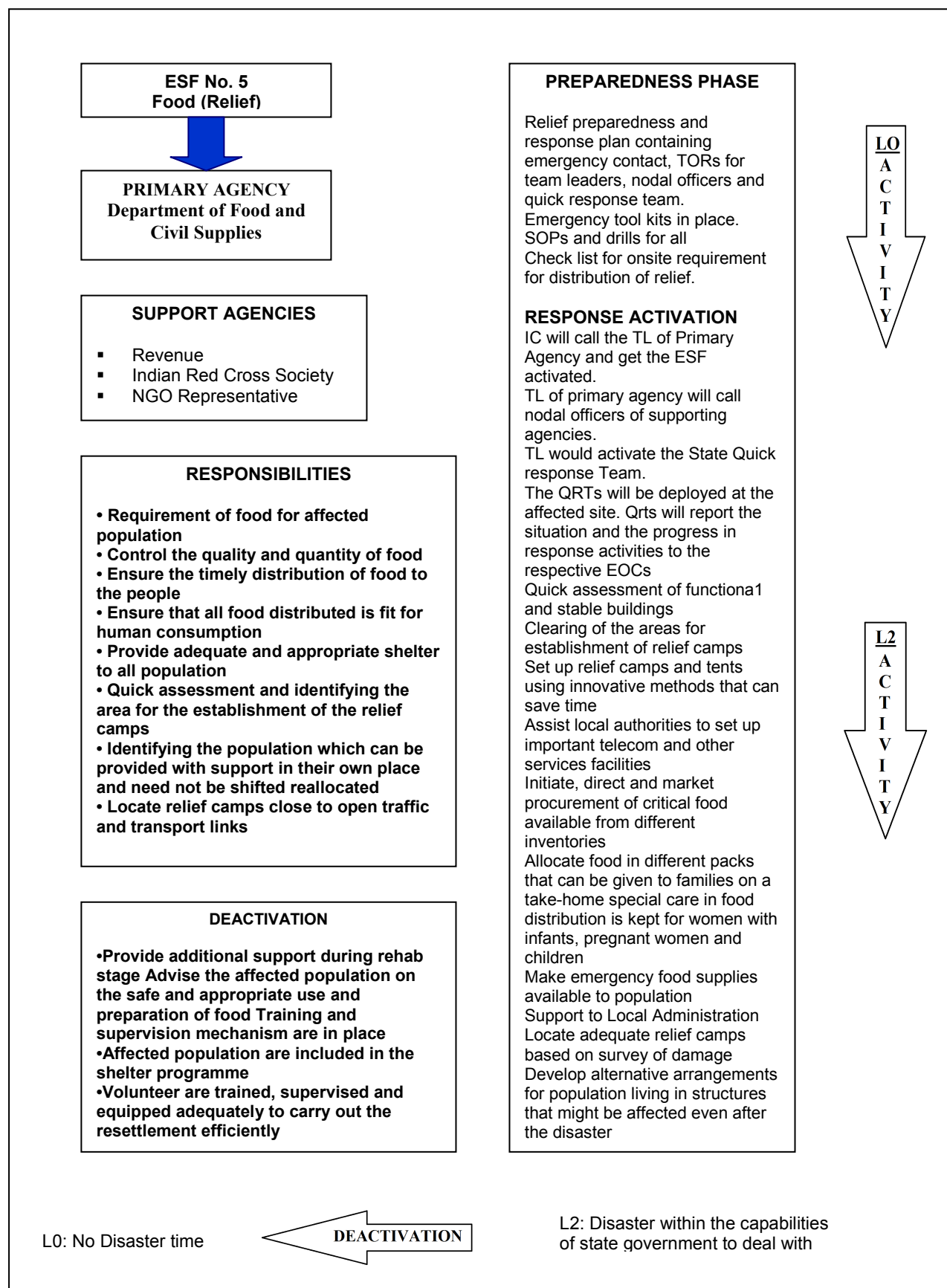
SOP OF THE NODAL AGENCY

- a. Determine needs of the affected population, location and food preparation facilities for congregate feeding;
- b. Secure food, transportation, equipment, storage and distribution facilities;
- c. Evaluate available resources relative to need and location;
- d. Initiate procurement of essential food and supplies not available from existing inventories;
- e. Respond immediately to requests for Expedited and/or Emergency Food Stamps and access commercial food resources;
- f. Establish linkages with private agencies/organizations involved in congregate meal services;
- g. Replace products transferred from existing inventories;
- h. Phase down feeding operations as victims return home;
- i. Refer victims needing additional food to private agencies/organizations;
- j. Coordinate public information and provide updates;
- k. Maintain financial records on personnel, supplies and resources utilized and expenditures;
- l. Resume day-to-day operations.

- 1. establish communications with Support Agencies representatives and staff to monitor the situation and assess damages food sectors and their requirements, including human resources;
- 2. maintain a data base of provincial food stocks and distribution

- systems and other vital requirements;
3. establish contact with other provincial ministries and private industry, including processors, distributors and retailers, to obtain their cooperation;
 4. secure food/water sources and maintain food/water stockpiles, and work with Support Agencies to distribute food/water to relocation centers for the affected population;
 5. secure and allocate feed stuffs for commercial farm animals and arrange for distribution as necessary;

Response Framework



ACTION AREAS/ RESPONSIBILITIES

INITIAL ACTION

- Responsible for supply needs for the entire incident including camps, staging areas.
- Determine food and water requirement.
- Determine method of feeding to best fit each facility or situation.
- Obtain necessary equipments and supplies and establish working facilities.
- Order sufficient food and potable water from the supply unit.
- Maintain an inventory of food and potable water.
- Maintain food service areas and ensure that all appropriate health and safety measures are being followed.
- Supply unit Leader
- Primarily responsible for ordering personnel, equipment and supplies receiving and storing all supplies for the incident maintaining an inventory of supplies servicing non expendable supplies to equipment.
- Receive and respond to requests for personnel and supplies.
- Maintain inventory of supplies.

SOP OF THE SUPPORT AGENCIES

The role of the Support Agencies is to assist in food production, processing and distribution. Specifically, the function will:

- help in providing safe, wholesome food stuffs and water (such as commercial bottled drinking water) for the people affected, by identifying, securing and arranging where necessary the delivery of food stuffs and drinking water to appropriate staging areas when it is beyond the capability of local agencies to do so;
- identify, secure and arrange delivery (where required) of feed supplies for commercial farm animals and other emergency farm input requirements;
- Actively involved in day-to-day operations.

ESF #6 - Medical Response and Trauma Counselling

Background

All disasters affect human life and health. Health is both a main objective and a yardstick in disaster management. This Emergency Support Function (ESF) will be responsible for the emergency medical treatment and mental trauma support in the aftermath of any hazardous event.

STATE NODAL AGENCY

Department of Health and Family Welfare (DOH) / Directorate of Health Services (DHS)

SUPPORT AGENCIES

Centralized Accident and Trauma Services (CATS), Punjab Fire Services (PFS), Punjab Civil Defence (CD), Indian Red Cross Society – Punjab Chapter, St. Johns Ambulance Brigade, Directorate General of Health Services – Central Government (DGHS), Municipal Corporation of Punjab – Health (MCD), Employee State Insurance Corporation (ESI), Punjab Cantonment Board (Cantonment Board), Central Government Health Scheme (CGHS), Punjab Dairy Development Board, Punjab Livestock Development Board, Punjab State Veterinary Council Department of Animal Husbandry, Dairy Development & Fisheries, Punjab Nursing Council, Punjab State Institute of Nursing and Paramedical Sciences, Institute of Mental Health, Punjab Health System Corporation, Punjab Medical Council, State Reproductive and Child Health Programme (RCH) Project Society, Department Of Animal Husbandry, Dairy Development & Fisheries, Dispensaries, Mobile dispensaries, Hospitals, Ambulance Service, Blood Bank, NSS, NCC, Rotary club, Lions Club, IMA, Medicine Stockiest, NGOs.

Situation Assumptions

- Emergency Medical care and trauma counselling will be required
- Hospital services would be affected
- Communication and transport services would be disrupted

SOP OF NODAL AGENCY

- Upon finding out about any hazardous event, ESF-TL will contact the District/State EOC by any means possible (phone, wireless, personally)
- If asked to activate the ESF, Team leader (TL) will call nodal officers of supporting agencies of the ESF.
- QRTs will be activated and deployed at the affected sites.
- Medical and Trauma Counselling Response Teams to be activated, based on report from the QRTs.
- Provide systematic approach to patient care (Mass Casualty Management)
 - Triage done to determine who needs to be taken to a medical facility on a priority basis and who can be treated on-site. (CATS, DHS, CGHS)
 - First-aid provided as required (CATS, DFS, CD, Red Cross, St. Johns)
 - Patients Stabilized before transport (CATS, DHS)
 - Patients transported to nearest available medical facility having the required facilities (CATS, CD, St. Johns)
 - Trauma counselling provided to the victims and their relatives at the site and in the hospital
- In the hospital emergency department, triage carried out again to prioritize treatment, and appropriate care provided
- Maintain patient tracking system to keep record of all patients treated
- Deploy mobile hospitals as needed
 - ✓ If medical facilities severely affected by the disaster, or roads blocked preventing transport of patients to the hospital, mobile hospitals deployed at required sites.

- Provide regular updates to the IC at the District/State EOC based on reports from the field and the hospitals
- Coordinate with the Transportation ESF if a large number of medical professionals need to be sent to the affected sites and/or a large number of victims need to be transported to health facilities.
- Ensure the provision and continuous supply of medical facilities (medicines, equipments, ambulances, doctors and manpower etc) required at the disaster affected site and the hospital health centres catering to disaster victims.
- Coordinate with the ESFs on Law & Order, Evacuation, and Debris and Road Clearance, for setting up of field medical posts, transport of victims, and setting up of mobile hospitals.

SOP of Quick Response Team (QRT)

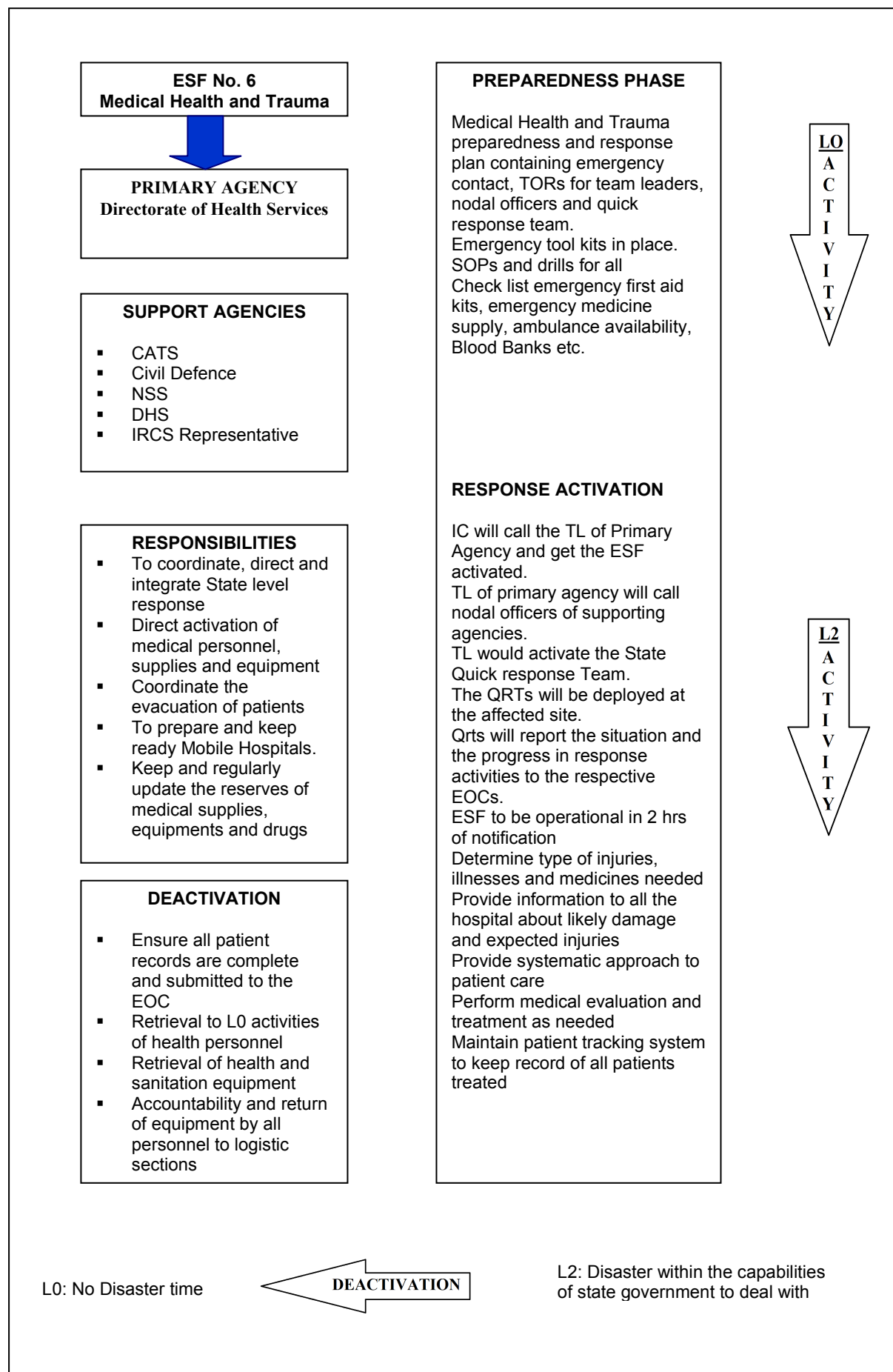
- QRT's will assess the damage: type of injuries, number of people affected and possible medical assistance need.
- QRTs will provide situation and progress reports on the action taken by the team to the ESF-TL
- QRTs will ensure timely response to the needs of the affected victims by establishing field medical posts at disaster sites, as needed
- QRTs should maintain check posts and surveillance at each railway junction, bus depots and all entry and exit points from the affected area, especially during the threat or existence of an epidemic.

ACTION AREA/RESPONSIBILITIES INITIAL ACTIONS

- Development of Medical response plan
- Respond to requests for medical side and transportation for injured and ill.
- Ensure adequate number of medical professional to reach at site.

- Ensure setting up of temporary information centers at hospitals.

RESPONSE FRAMEWORK



ESF #7 - Equipments Support - Debris & Road Clearance

BACKGROUND

The purpose of this Emergency Support Function is to provide, in a coordinated manner, the resources (human, technical, equipment, facility, materials and supplies) of member agencies to support emergency transportation needs during an emergency/disaster situation. This ESF may also obtain resources through agency contractors, vendors, and suppliers. Resources may also be obtained from agency related local, State, regional, national, public, private associations, and/or groups.

Primary Agency: Municipal Corporation of Punjab (Commissioner MCP) and Municipal Councils.

Support Agencies: Public Works Department (PWD), Central Public Works Department (CPWD), Military Engineering Services (MES), PWD (B & R), Civil Defence, Private Contractors, Punjab Water Supply and Sewerage Board, Punjab Municipal Infrastructure Development Company (PMIDC), Punjab Roads & Bridges Development Board (PRBDB), Department Of Housing And Urban Development, Greater Mohali Area Development Authority, Punjab Urban Development Authority, Bathinda Development Authority, Department of Industries and Commerce, Department of Defence.

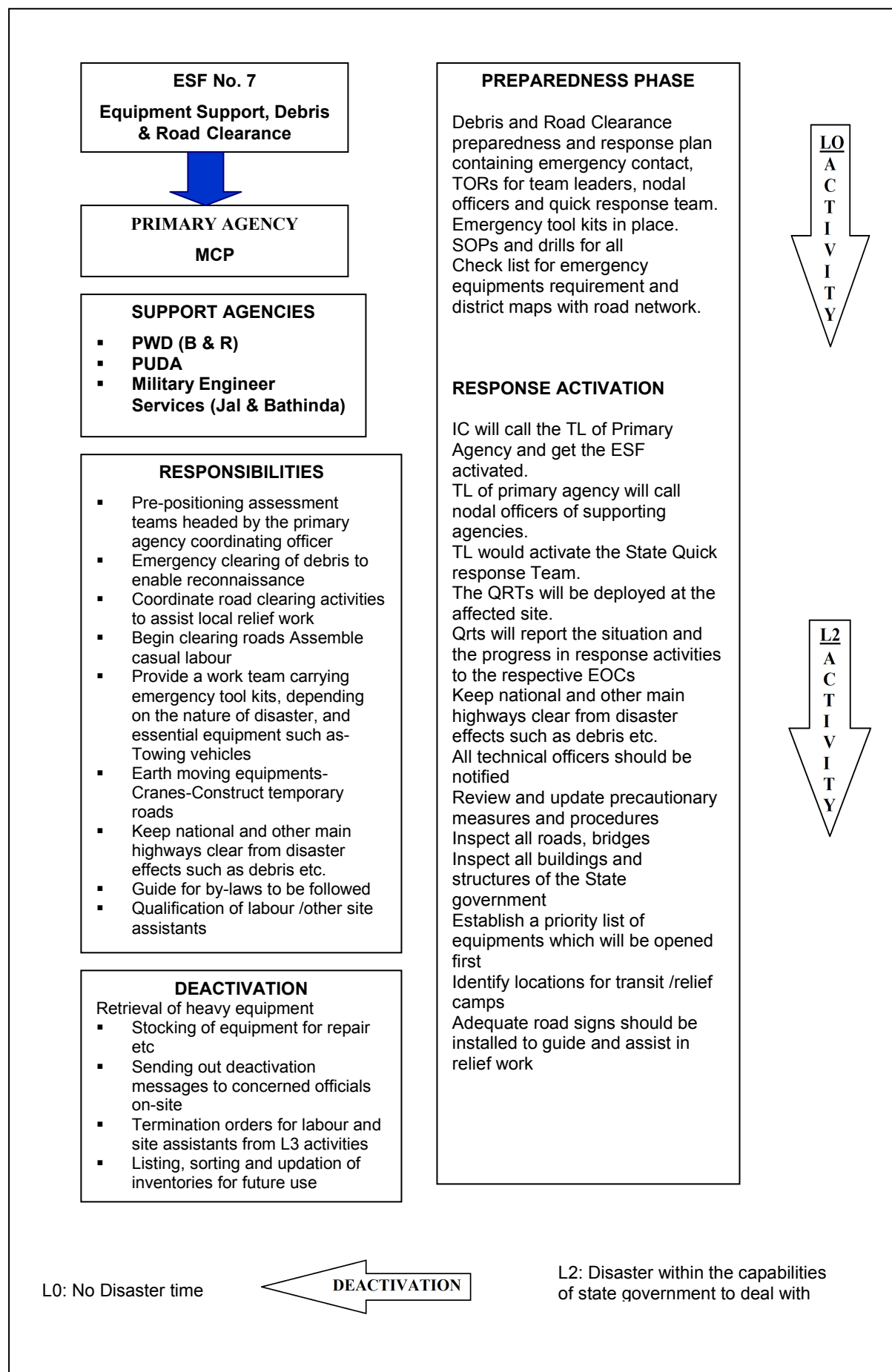
ACTION AREAS/ RESPONSIBILITIES

INITIAL ACTION

- Damage assessment including locations, number of structures damaged and severity of damage.
- The QRTs will be deployed as compiled from IDRN resource inventory for conducting the debris clearance.
- The QRTs will report the situation and the progress in response activities to the representative EOCs.
- Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.

- Repairing of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.

Response Framework



SOP FOR NODAL AGENCY

- Team leader (TL) will activate the ESF on receiving the information of the disaster from State EOC.
- TL would inform Nodal Officers (NOs) of support agencies about the event and ESF activation.
- TL will coordinate with the supporting agency to mobilize equipments from the ware houses through IDRN database
- The respective supporting agencies will contact their respective personal to move the equipments to central warehouse
- The equipments like JCB, concrete cutters identified as per the need will be transported to the site.
- As per the information the nodal officer of Debris road clearance will make an assessment on of the damages of roads and built structures at the site and surrounding areas
- The nodal officers of Supporting Agencies will immediately start debris clearance operation to enable movement to the affected site.
- Review of the current situation is taken up by the nodal agency to update the support agencies and to delegate their respective personnel to take precautionary measure to plan de-routes for the transportation ESF's to be operational
- All supporting agencies will inspect the road and rail network and structures within the disaster site and surrounding.
- TL will also ensure proper corpse disposal and post mortem by coordinating with ESF on medical response.

SOP FOR QUICK RESPONSE TEAM

- Damage assessment including locations, number of structures damaged and severity of damage
- The QRTs will be deployed at the affected site.
- Enlisting the types of equipment as compiled from IDRN resource inventory required for conducting the debris clearance
- The QRTs will report the situation and the progress in response activities to the respective EOCs.

- Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.
- Repairing of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.

Equipment Support and Facilities Pool

The following is the public works and engineering equipment, personnel, and facilities pool of all Emergency Support Function 07 agencies from which certain and specific resources are referenced and assigned as the responsibility of each Emergency Support Function 07 agency identified herein:

1. Trucks and/or trailers of various types, sizes, and combinations with drivers/operators;
2. Front-end loaders, bulldozers, and excavators of various sizes and types, to include rubber-tired and tracked, with operators;
3. Cranes, bucket trucks, and pole trucks of various types and sizes, with operators;
4. Heavy equipment transporters, trucks, trailers, vans, and vehicles, with drivers, to transport the public works and engineering equipment, equipment support and service vehicles, and personnel listed herein;
5. Electrical generators, welding machines, cutting torches and tanks, work lights, pumps with and without pipe and hose, and work boats and work barges, of various types and sizes;
6. Skilled and semi-skilled carpenters, low and high voltage electricians, masons, plumbers, pipe fitters, welders, general construction personnel, and debris clearing personnel, with trade safety equipment and hand and power tools;
7. Public works and civil engineering engineers, technicians, specialists, managers, and supervisors;

8. Mobile and non-mobile repair facilities, equipment, and personnel to be used for repairs to various types of public works and engineering equipment;
9. Parking and storage areas to be used for the staging, parking, and storage of various types of public works and engineering equipment; and
10. Mobile and non-mobile motor pool and service facilities, equipment, and personnel to be used for refueling and servicing various types of public works and engineering equipment.

Background

This ESF encompasses sheltering at Incident site post and providing for long term shelter rehabilitation in case of widespread damage to existing accommodations due to disasters. Damage to structures in a disaster like earthquake will require additional resources to be directed to the Operational Area. Most engineering and construction work which needs to be done will have a responsible government agency co-ordinating the ESF, which can arrange for the shelter needs of the affected area and prioritize rehabilitation efforts in the areas according to the needs.

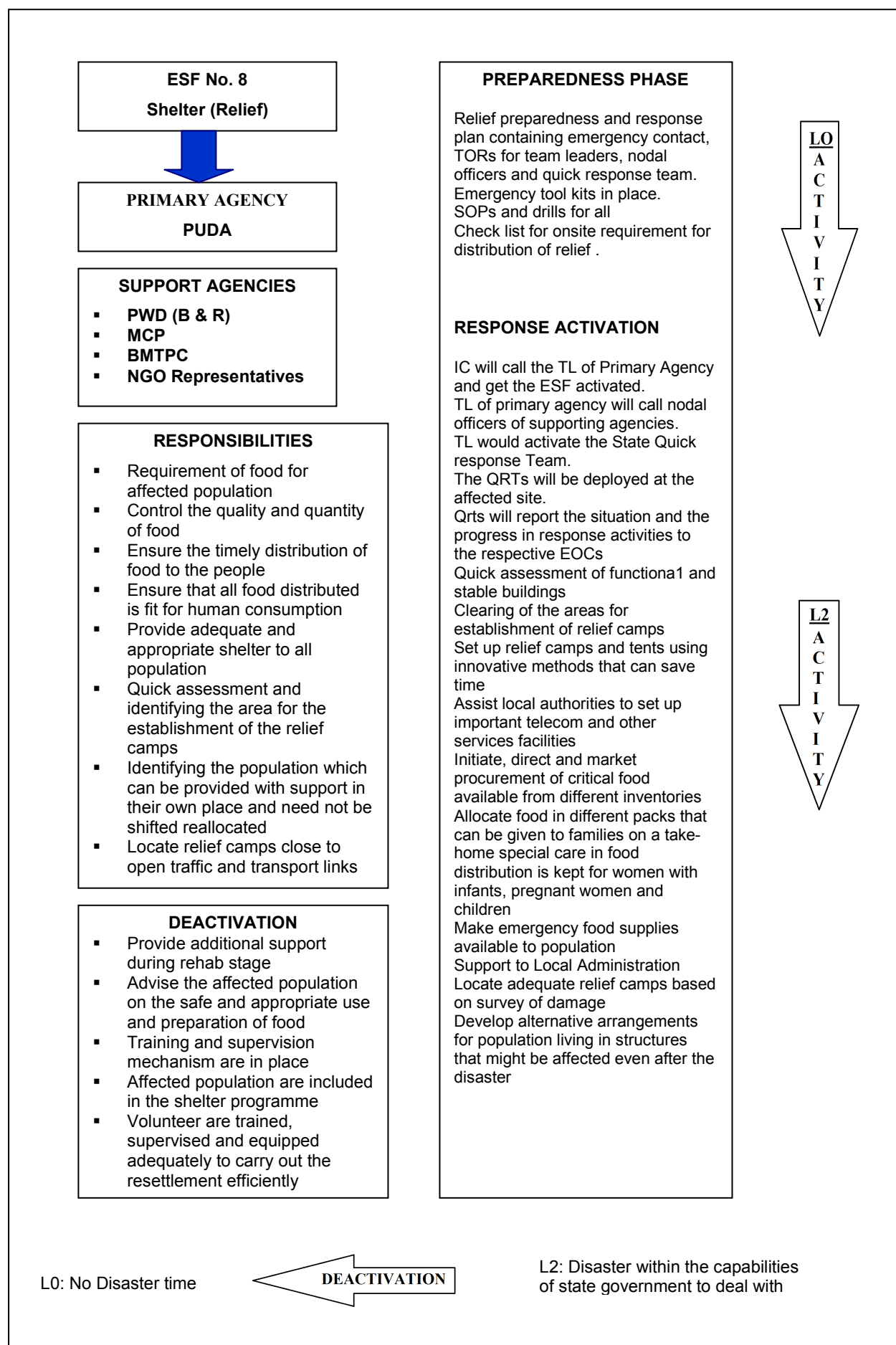
NODAL AGENCY

The coordination of shelter requirements and resources is a function of the Punjab Urban Development Authority.

SUPPORT AGENCIES

- a. **Other Government Agencies:** MCP, PWD, (CPWD – Central Agencies).
- b. **Engineering and Construction Resource Agencies:** Association of structural engineers and architects, Private Contractors and Building Material Promotion Technology Council (BMPTC).
- c. **Private Sector:** private construction firms (with whom the coordinating agency /support agencies have entered into a pre-contract)

Response Framework



SOP OF THE NODAL AGENCY

The emergency operations necessary for the performance of this ESF include, but are not limited to:

TL will activate the ESF on receiving the information of the disaster from State EOC.

- TL would inform Nodal Officers (NOs) of support agencies about the event and ESF activation
- Damage survey preparation of damage assessment report
- Locating emergency shelters camps based on damage survey
- Manage and operate emergency shelters in coordination with the Incident Commander
- Secure personnel to operate emergency shelters,
- Secure transportation;
- Establish communications between shelters, and other support agencies;
- Close and restore shelters to pre-emergency conditions;
- Coordinate public information and provide updates for ESF Information and Planning;
- Maintain financial records on personnel, supplies and other resources utilised and report to the Incident commander upon request; and
- Prepare a comprehensive plan for organised and sustained rehabilitation
- Resume day-to-day operations.

SOP OF QUICK RESPONSE TEAM (QRT)

- QRTs will report to site of the relief camps
- QRTs will be responsible to manage and set up emergency shelters at the incident site and all other activities needed to perform the same (use of innovative methods, .
- QRT's will be responsible for reporting the progress on action taken by the team to the EOC.

- QRTs will provide information to their Team Leader about the need of additional resources.
- Assist local authorities to set up important telecom and other service related facilities
- Ensuring support to Local Administration
- Locating adequate relief camps based on damage survey
- Develop alternative arrangements for population living in structures that might be affected even after the disaster

Background

The purpose of this Emergency Support Function is to identify water and ice needs and restore basic water supply if damaged, in the aftermath of a disaster or emergency. Till the time water supply to the damaged areas is restored water requirements need to be arranged by the ESFs and distributed either using their own transportation mechanisms or in coordination with transportation agencies.

NODAL AGENCY

Department of Water Supply

SUPPORT AGENCIES

Municipal Corporation of Punjab, Central Ground Water Authority, Central Water Commission, Punjab Water Supply and Sewerage Board and Irrigation and Flood Control Department, NGOs and Fire Control.

Situation Assumptions:

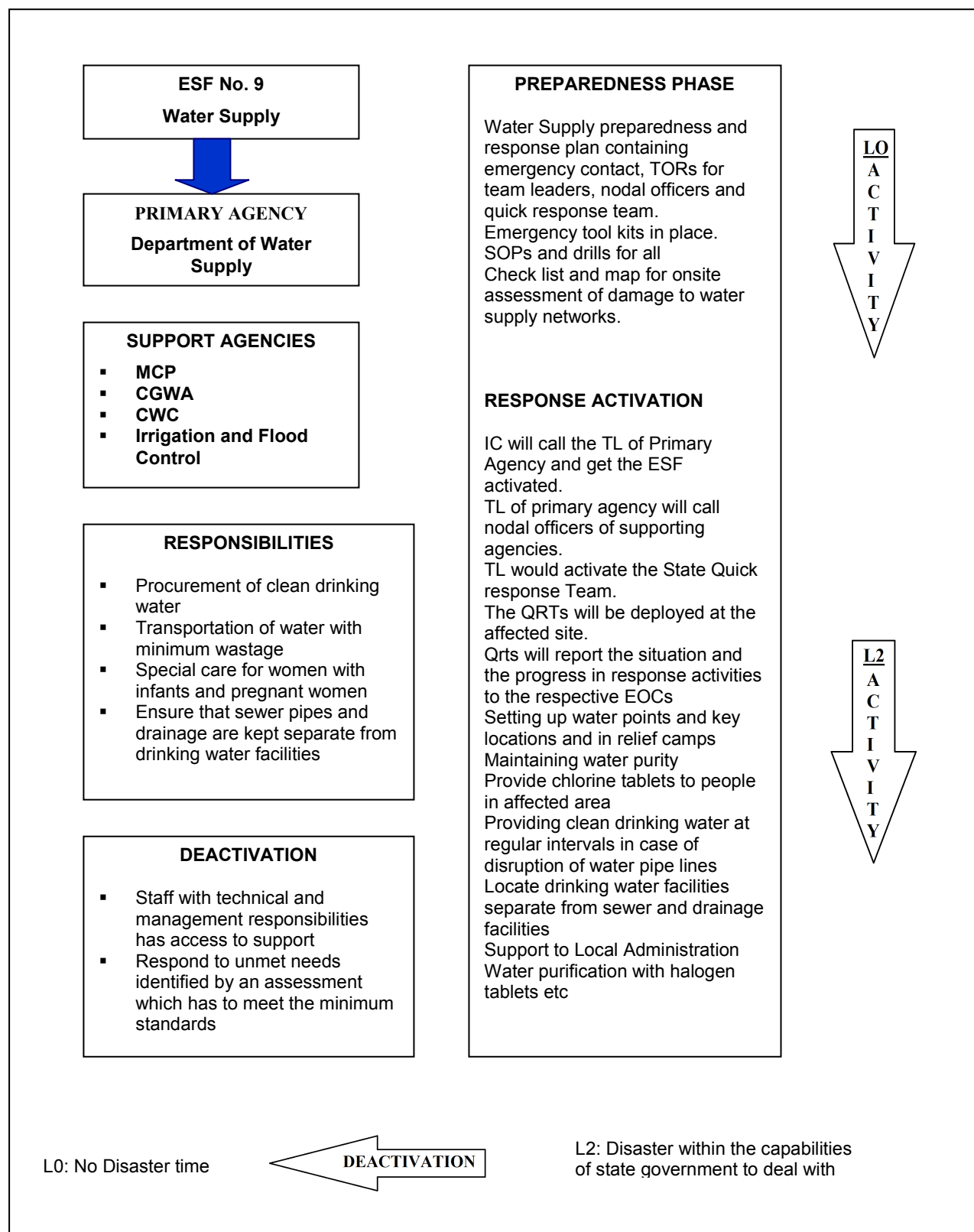
- Existing water storage bodies will be damaged and unusable.
- There would be an urgent need of water to assist victims in rescue operation.
- Break down of sanitation system.
- Contamination of water due to outflow from sewers or due to breakage of water pipelines.

ACTION AREAS/RESPONSIBILITIES

INITIAL ACTION

- water at temporary shelters
- ensure restoration of potable water as per standards
- Plan for emergency accommodation of water supply in or near temporary shelters.
- Ensure cleanliness of sanitation facilities, relief shelters etc.

Response Framework



SOPs for Nodal Agency

- Team leader (TL) of ESF on Water Supply will activate the ESF on receiving the intimation of the disaster from State EOC.
- TL would inform Nodal Officers (NOs) of support agencies about the event and ESF activation.
- TL will ensure special care for women with infants and pregnant women.
- Provide for sending additional support along with food, bedding, tents
- Send vehicles and any additional tools and equipments needed.

SOP for Quick Response Team (QRT)

- QRTs will ensure that supply of drinking water is made available at the affected site and relief camps
- QRT's will ensure the temporary sewerage lines and drainage lines are kept separate.
- QRTs will report the situation and the progress on action taken by the team to the EOC.
- QRTs will intimate their TL of the additional resources needed.
- Carry out emergency repairs of all damages to water supply systems.
- Assist health authorities to identify appropriate sources of potable water.
- Identify unacceptable water sources and take necessary precautions to ensure that no water is accessed from such sources, either by sealing such arrangements or by posting the department guards.
- Arrange for alternate water supply and storage in all transit camps, feeding centers, relief camps, cattle camps, and also the affected areas, till normal water supply is restored.
- Ensure that potable water supply is restored as per the standards and procedures laid down in "Standards for Potable Water".
- Plan for emergency accommodations for staff from outside the area.
- QRTs will ensure timely response to the needs of the affected victims.
- QRTs will set up temporary sanitation facilities at the relief camps.

Background

The ESF on electricity will facilitate restoration of electricity distribution systems after a disaster. In the event of a disaster there would be major electricity failure with many power stations damaged.

STATE NODAL AGENCY

Punjab State Electricity Board

SUPPORT AGENCIES

- Punjab State Electricity Board (PSEB)
- Punjab State Electricity Regulatory Commission (PSERC)
- Punjab State Power Corporation Ltd. (POWERCOM)
- Punjab State Transmission Corporation Ltd. (TRANSCO)
- Private Generators Operators

SITUATION ASSUMPTIONS

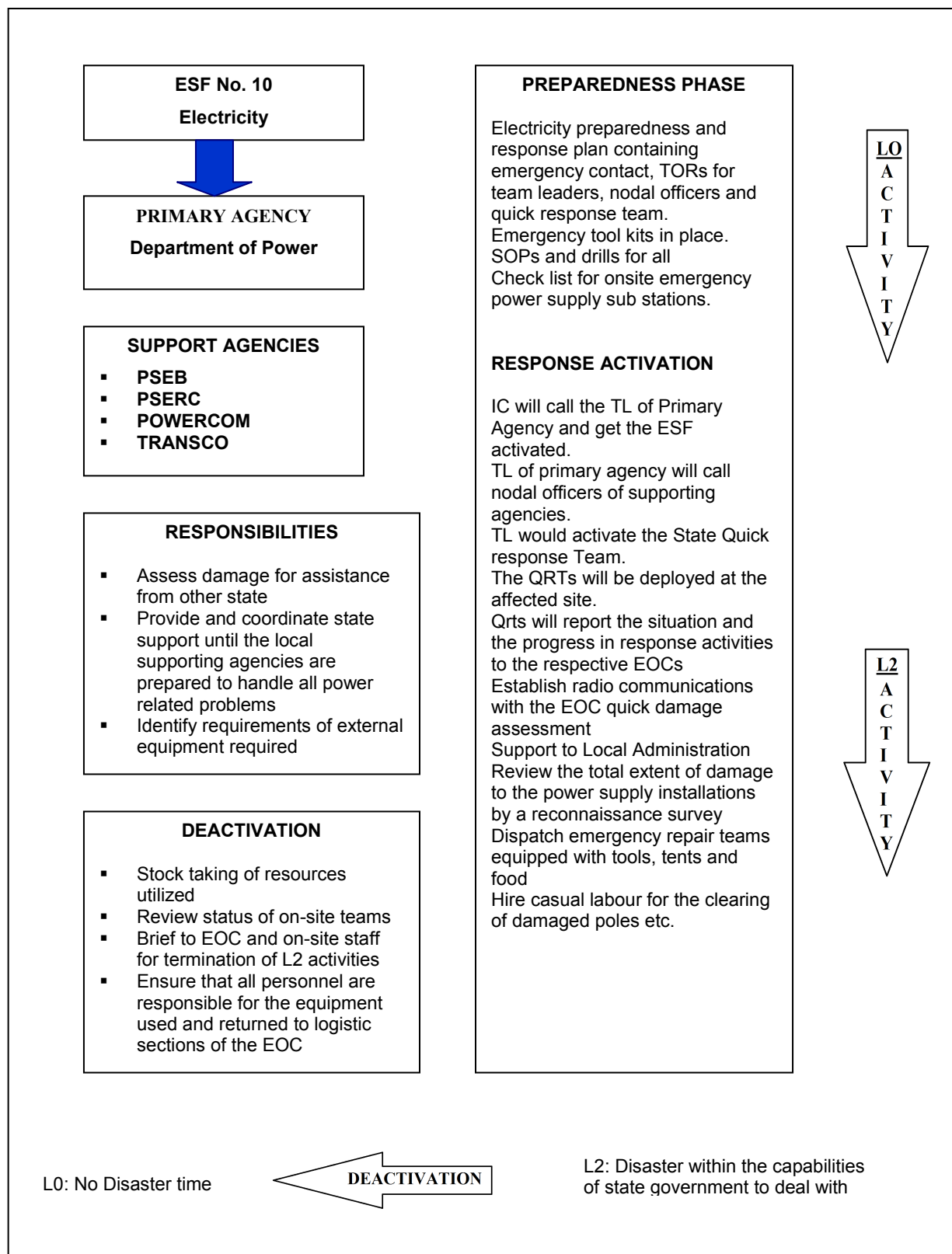
- There will be prolonged electricity failure.
- The affected victims will be panicked
- Halt of all activities specially jamming communication networking systems in the affected site.

ACTION AREA/ RESPONSIBILITIES

INITIAL ACTION

- Electric fitting of the affected areas may get damaged and may need to be repaired.
- There may be a requirement of temporary lightening arrangements and provisioning of back up power during emergency.
- Carry out task of repairing all damages to water supply system.

Response Framework



SOP FOR NODAL AGENCY

- Incident commander will call the Nodal Officer of TRANSCO and get the power ESF activated.
- Nodal Officer of primary agency will call nodal officers of supporting agencies (BSES & NDPL).
- As per the information from IMTs, the nodal officer of primary agency will activate the State Quick Response Teams at field level.
- The Quick response teams will be deployed at the affected site.
- TL will dispatch emergency repair teams equipped with tools, tents and food.

Responsibilities of the QRT in the field

Required to reach the nearest field office immediately upon receiving notification from the HQ QRT / Central control room

Co-ordinate with the field QRT from the support agencies

Provide field assessment information to the ESF TL at the State EOC and to Central control room assist the field office in the response activities the response activities

Responsibilities of the QRT at HQ

Required to reach their head office immediately upon receiving notification from the ESF Team Leader control room

Inform the field offices to contact their staff designated for the ESF

Coordinate the ESF activities with the ESF Team Leader at the State EOC

ESF # 11 – Transportation

Background

The ESF on Transport should ensure smooth transportation links at state and district level. Within the disaster context, quick and safe movement of material and humans are a priority. It should coordinate the use of transportation resources to support the needs of emergency support forces requiring transport capacity to perform their emergency response, recovery and assistance missions.

Situation assumptions

- The state civil transportation infrastructure will sustain damage, limiting access to the disaster area.
- Access will improve as routes are cleared and repaired.
- The movement of relief supplies will create congestion in the transportation services.

State nodal agency

Department of Transport

Support Agencies

PEPSU Road Transport Corporation, Civil Aviation, Punjab State Bus Stand Management Company Ltd., PWD, MCP, Northern Railways, Civil Defence, Scout, NCC, City Bus, Minibus, and Truck association, Taxi and auto associations, private ambulances etc.

ACTION AREA/ RESPONSIBILITIES INITIAL ACTION

- Transportation of personnel, supplies, food and equipment.
- Fuelling, service, maintenance and repair of vehicles and other ground support equipment.
- Implementing traffic plan for the incident.

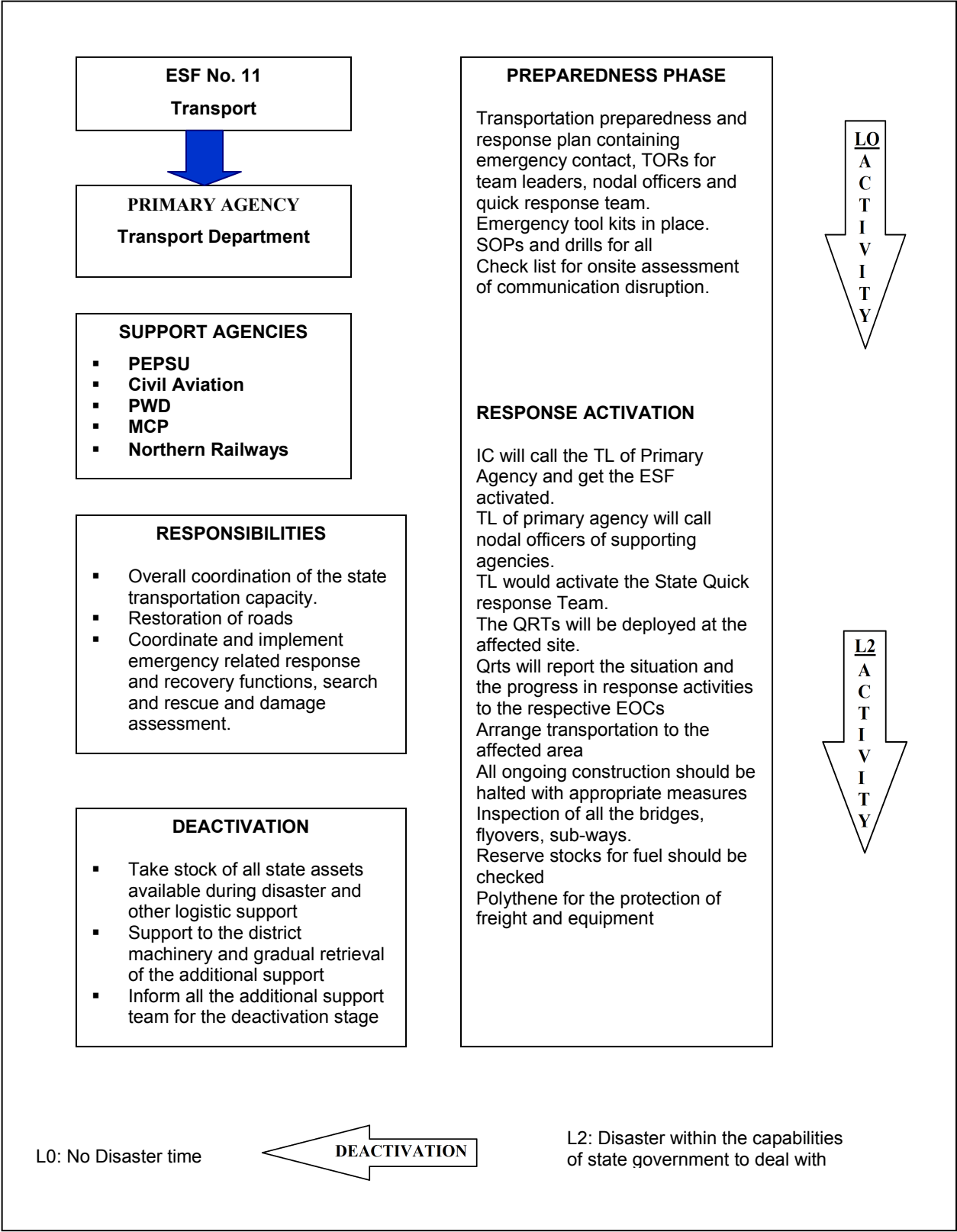
SOPs for Nodal Agency:

- TL of Transportation ESF will activate the ESF on receiving the intimation of the disaster from State EOC.
- TL would inform Nodal Officers (NOs) of support agencies about the event and ESF activation.
- TL establishes contact with the district EOC for FIR
- TL requests for reports from local Transportation ESF contact person
- TL communicates situation to support agencies and requests for detailed information on the status of transportation infrastructure in the affected area(s).

SOP for Quick Response Team on Help Lines, Warning Dissemination

- The QRT members will reach to the nodal office as soon as they will get instructions to do so from the TL.
- As quick response teams will receive instructions from the nodal officer they would reach to the site immediately.
- QRTs would report the situation and the progress on action taken by the team to the respective EOCs
- QRT will send a requirement schedule for the different modes of transportation eg. trucks, boats, helicopters to be put on stand-by.
- QRTs will ensure timely re-establishment of the critical transportation links.
- The members of QRTs will establish temporary electricity supplies for relief material godowns.
- Compile an itemised assessment of damage, from reports made by various electrical receiving centres and sub-centres. Reporting about all activities to the head office.

Response Framework



ESF #12 - Help Lines and Information Dissemination

Background

Information is a powerful tool. In this day and age of instant news and the strides made by information technology, the information available is overwhelming and very comprehensive. In times of disaster, this information is often chaotic and sketchy. Correct information can not only help tremendously in the decision making process, but also allay the fears of the general public and provide them with the knowledge they can use to save themselves. Additionally, there is widespread panic and concern about the safety of friends and family. Help lines set up for this purpose can assist in locating and reuniting people.

NODAL AGENCY

State Department of Revenue

SUPPORT AGENCIES

- Department of Information and Publicity
- Bharat Sanchar Nigam Ltd. (BSNL)
- All India Radio (AIR)
- Doordarshan
- United News of India (UNI)
- Press Information Bureau (PIB)
- Press Trust of India (PTI)
- Indian Red Cross Society

SITUATION ASSUMPTIONS

- There may be a flood of information and confusion about the injured population.
- The communication with affected area may be partially impaired

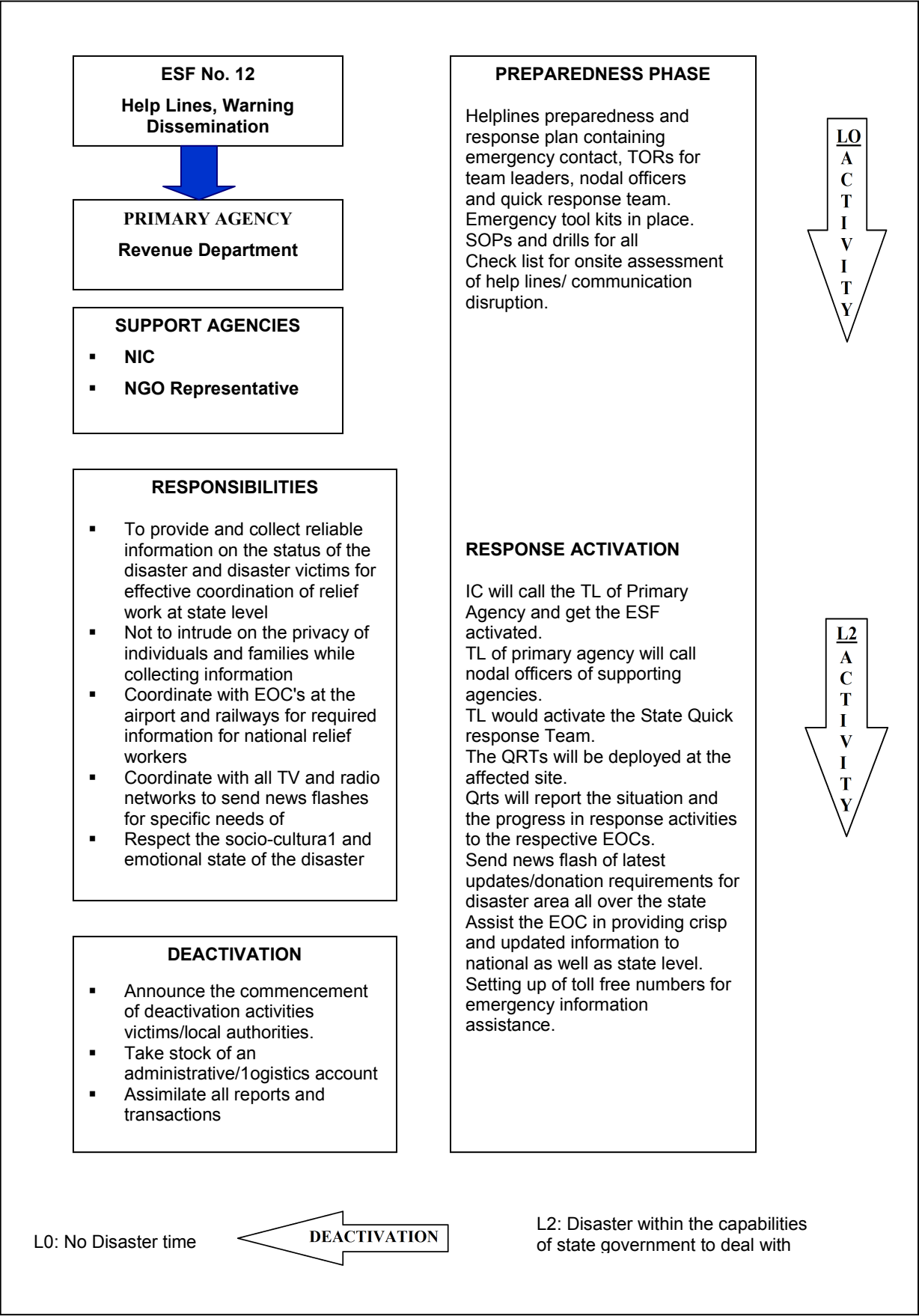
SOP OF NODAL AGENCY

- Upon finding out about any hazardous event, ESF-TL will contact the
- District/State EOC by any means possible (phone, wireless, personally)
- If asked to activate the ESF, Team leader (TL) will call nodal officers of supporting agencies of the ESF.
- QRTs will be activated and deployed at the affected sites.
- Coordinate with the different ESFs to get regular information in order to compile and prepare updates, situation reports, damage assessment reports, and media briefs
- Upon finding out about any hazardous event, Nodal officers will contact the ESF-TL / District EOC by any means possible (phone, wireless, personally)
- Provide support to the nodal agency / Incident Manager on-site.
- The agencies to mobilise their Quick Response Teams (QRTs)
- Activate and mobilise their personnel as per their SOP.

SOP OF QUICK RESPONSE TEAM (QRT)

- The QRT members will reach to the nodal office as soon as they will get instructions.
- QRT teams would reach to the site immediately after receiving instructions from the nodal officer
- On the site QRT members will take stock of the situation from the IC at the site and their counter parts.
- The QRTs will coordinate, collect, process, report and display essential elements of information and facilitate support for planning efforts in response operations.

Response Framework



Follow-Up Actions

All follow-up initiative will start within one year of approval of the plan document by State Government. The concerned departments and agencies will take steps to incorporate social, environmental, interests of disadvantage groups and communities, traditional coping mechanism and other cultural variable in all follow up efforts.

LIST OF CHECKLISTS AND HANDBOOKS

I. Documents Required for Quick Assessment and Response

1. Declaration of L2-Format
2. Deployment of Assessment Team-Format
3. SRC Responsibilities-Handbook
4. Survival Kit-Checklist
5. Assessment Equipment – Checklist
6. Damage Assessment – Format
7. Format for Media Release
8. Handbooks for
 - ◆ International NGOs
 - ◆ NGOs
 - ◆ Media personnel
 - ◆ Researchers/Students
 - ◆ Field/Relief Workers / Volunteers
 - ◆ Government Functionaries
9. EOC Set-up-Checklists
10. Layout and dimensions, equipment, etc., for EOC – Minimum standards Handbook
11. ESF Desk – Checklist
12. Matrix of primary and secondary functions of each ESF
13. Do's and don'ts to be followed during disaster times in EOC
14. Regular staff – Schedule and Checklist
15. Staff on Call – Schedule and Checklist
16. Staff on Disaster Duty – Schedule and Checklist

II. DOCUMENTS FOR EACH ESF

ESF 1 – Communication

- Checklist of tool kits
- Handbook on Disaster Telecommunication Assistance
- Handbook on Team Equipment and Inventory
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Emergency tool kits
- Equipment Damage Assessment
- Operational checklists Equipment Damage Assessment
- On-site operations
- Planning checklist Deactivation checklist
- Deactivation checklist

- List of PSUs and Private Agencies

ESF 3 – Search and Rescue

- Training handbooks on Search & Rescue
- Inventory of professionally trained volunteers in Search & Rescue
- Handbook on team Equipment and Inventory
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Emergency toolkits, , search & rescue kits/equipments
- Operational checklists
- Medical tool kits
- On-site aerial surveys
- MFR and CSSR kits
- Deactivation checklist
- List of PSUs and Private Agencies/NGOs working in the area

ESF 5 – Food

- Checklist of food materials for
 - Family packs for four
 - Family packs for two
 - Food distribution in relief camps
- Minimum standards to maintain food quality
- Catalogue of available resources of food
- Handbook on food distribution
- Responsibilities of Primary Agency
- Responsibility of each Support Agency

ESF 6 – Medical Response And Trauma Counselling

- Detailed checklist of symptoms of common diseases along with medicine dosages for each disease
- Checklist of doctor's tool kit for specialized doctors
- Checklist for maintaining hygienic conditions
- Disaster Health Assistance and emergency services
- Team Equipment and Inventory
- Responsibilities – Primary /Support Agencies
- Minimum standards of health facilities
- Location of health facilities in disaster area (map)
- Information manual for biological disaster
- Doctor's manual for emergency relief
- Emergency toolkits
- Operational checklists for health officials
- Equipment Damage Assessment
- On-site operations
- Planning checklist
- Qualification of health personnel
- Checklist of doctor's tool kit
- Symptoms of common ailments
- Deactivation checklist
- Dosages checklist for common epidemics and ailments during a disaster

ESF 8- Shelter

- Inventories of manufacturing agencies
- Procedures of storage
- Minimum standards for relief camps
- Minimum requirement of space per person
- Handbook on Team Equipment and Inventory
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Handbook on tent structure and other collapsible structures
- Handbook on assembling of structures
- Inventories of agencies that can be used for putting up tents
- Minimum standards for shelter
- Relief camps
- Tents and other temporary structures
- Location of camps for different disasters
- Existing locations that can be used for shelter
- Minimum standards for buildings to be used as relief camps

ESF 9 – Drinking Water

- Handbook on purifying drinking water during different types of disasters
- Handbook on Team Equipment and Inventory
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Inventories of agencies that can provide drinking water
- Procedures of storing water to maintain purity
- Minimum standards for safe drinking water
- Minimum quantity of requirement of water per person

ESF 10 – Electricity

- Handbook on Disaster Power Assistance (alternative power supply arrangements and quick restoration of electrical installations)
- Handbook on Team Equipment and Inventory
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Manuals on handling of equipment which is unique to a particular disaster
- Emergency toolkits
- Operational checklists
- Equipment Damage Assessment
- On-site operations
- Planning checklist and Deactivation checklist,
- List of PSUs and private agencies
- Minimum qualifications and equipment required for personnel in EOC and on-site operations
- Deactivation checklist

ESF 11 – Transport

- Inventories of available transport facilities
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Handbook on transport assistance

- Handbook on Team equipment and Inventory
- Emergency tool kits
- Operational checklists
- Equipment Damage Assessment
- On-site operations
- Formats for check of roads, bridges and other civil works
- Planning checklist
- List of PSUs and private Agencies
- Deactivation checklist

ESF 12 – Help lines and Information Dissemination

- Media personnel on-site
- Disaster-specific media operations
- Catering to all the L2 disasters mentioned in the Plan
- Media personnel in the EOC
- Manual for ESF- Head
- Types of information required for each disaster
- Checklists of do's and don'ts in a disaster site, specific to each disaster
- Checklist of queries to be made on site
- Checklist of appropriate graphics and pictures to assist relief work and spread pictures to assist relief work and spread useful information in the disaster affected area
- Standard operating procedures and responsibilities of Radio and TV stations
- Checklist of tool kit (land line connection, portable TV and battery powered radios, etc.)
- Inventory of engineering equipment
- Area Specific Handbook on Team Equipment and inventory
- Responsibilities of Primary Agency and each Support Agency
- Guidelines on specific types of items/situations for specific disasters
- Inventory of equipment / agencies / personnel
- Emergency tool kits
- Operational checklists for team heads and team members
- Equipment Damage Assessment
- Handbook on Disaster Information Assistance on Disk net
- Handbook on Team Equipment and Inventory
- Responsibilities of Primary Agency
- Responsibility of each Support Agency
- Guidelines on Specific types of items
- Disaster specific issues related to information technology
- Emergency tool kits
- Operational checklists
- Equipment Damage Assessment
- On-site operations
- Handling of equipment
- Deactivation checklists

DEPARTMENT SPECIFIC ACTION PLANS

Sr. No.	ACTION PLAN	RESPONSE ACTIVATION:	ACTIONS TO BE TAKEN:	EQUIPMENTS TO BE BROUGHT:
1.	Police	<ol style="list-style-type: none"> 1. The Nodal Officer from Punjab Police will activate the Quick Response teams. 2. The Quick Response teams will be deployed at the onsite EOCs. 3. As per the information from IMTs, more officers may be sent at site. 	<ol style="list-style-type: none"> 1. If felt, cordoning of area to restrict movement of onlookers, vehicular and pedestrian traffic should be done. 2. Quick assessment of law and order situation in affected areas. 3. Prepare updates on the law and order situation every 2-3 hours and brief the Incident Commander. 4. Arrangements for controlling situations like rioting and looting. 5. QRTs will guard property and valuables in affected areas. 6. Control and monitor traffic movement. 7. QRTs will provide diversion of traffic on alternate routes as and when it is necessary. 8. The QRTs will also provide information about traffic flow along various corridors, especially heavy traffic or congested roads. 9. QRTS will communicate to police control rooms, details on the field activities including deployment and reinforcement of staff and resources and communicate nature of additional requirements. 	<ol style="list-style-type: none"> 1. Search lights 2. Electric Generators 3. Crane- Heavy Duty, Fork Type 4. Recovery Van 5. Stretchers 6. First Aid Kits 7. Vehicles: Mini Buses, heavy trucks, light ambulance vans, mobilization trucks 8. Water tanker 9. Any other
2.	Civil Defense & Home Guards	<ol style="list-style-type: none"> 1. As soon as the Nodal Officer gets information about the disaster, reach the EOC. 2. The Quick Response teams will be deployed 	<ol style="list-style-type: none"> 1. Support and coordinate with the Incident Command System of Punjab for Law and Order, Search and Rescue and Medical Response and Trauma Counselling functions. 2. Locate the damaged and collapsed structures and 	<ol style="list-style-type: none"> 1. Extension Ladders 2. Sledge Hammers 3. Lifting Tackles 4. Stretchers 5. Tarpaulins 6. Any other

		<p>at the three sites.</p> <p>3. As per the information received from IMT, more officers may be sent at site.</p>	<p>rescue the population buried and trapped in rubble.</p> <p>3. The injured people should be taken out of damaged buildings etc with utmost care.</p> <p>4. Special care to women and children groups should be given as they are expected to be more affected and helpless incase of any emergency situation.</p> <p>5. In case of fire, the CD team members should do fire fighting.</p> <p>6. First Aid should be provided along with the members of ESF on Medical Response.</p> <p>7. Demonstrate Search and Rescue.</p>	
3.	Transport	<p>1. Team Leader will activate ESF on receiving information of the disaster from State EOC</p> <p>2. Team leader will inform Nodal Officers of support agencies about the event and ESF activation.</p>	<p>1. Team leader communicates situation to support agencies and requests for detailed information on the status of transportation infrastructure in the affected area(s)</p>	
4.	BSNL	<p>1. Soon after receiving information about disaster (from any source), Nodal Officer will contact State/ District Emergency Operations Center.</p> <p>2. The Nodal Officer from Landline will activate the</p>	<p>1. Communicate situation to support agencies (Tata, Airtel, Vodafone, Idea, NIC, and HAM etc.) and request for detailed information on the status of equipment and infrastructure damage in the affected areas.</p> <p>2. Launch assessment mission to understand better the nature of damage to telecom services and network.</p> <p>3. Ensure possible arrangements for establishing reliable and appropriate network.</p> <p>4. Work out a plan of action for</p>	<p>1. Emergency Communication Van with GSM and CDMA services.</p> <p>2. Other necessary equipments to restore communication network/ set-up alternative emergency communication</p>

		<p>Quick Response Teams.</p> <p>3. As per the information from Incident Management Team, more teams may be deployed at affected sites.</p>	<p>private telecom companies and convene a meeting to discuss and finalize the modalities.</p> <p>5. Compile and communicate Action taken Report to District and State Authorities.</p> <p>6. New number and details of contact persons to be communicated to Emergency Operations Center (District/ State).</p> <p>7. Mobile exchanges should be deployed as alternative mode of communication for authorities and general public.</p> <p>8. Establish telephone facilities for the public and information on this should be announced through media.</p> <p>9. Monitor the situation and arrange for emergency staff required to operate systems established.</p> <p>10. Inform district/ state authorities on debris clearance of the work required.</p> <p>11. Initiate temporary rehabilitation work required.</p> <p>12. Launch rehabilitation work and arrange for repairs and relocation, if required.</p> <p>13. Make available various types of equipment/ material/ technical manpower and services, if requested.</p>	<p>on.</p>
5.	Private Mobile Operators	<p>1. Soon after receiving information about the calamity (from any source), Nodal Officer will contact Team Leader from Landline.</p>	<p>1. Communicate situation to Landline and arrange for detailed information on the status of equipment and infrastructure damage in the affected area(s).</p> <p>2. Launch assessment mission to understand better the nature of damage to telecom services and network.</p>	<p>1. Emergency Communication Van with GSM and CDMA services.</p> <p>2. Other necessary equipments to restore</p>

		<ol style="list-style-type: none"> 2. The Nodal Officer will activate the Quick Response Teams. 3. The Quick Response Teams will be deployed at the three incident sites. 4. As per the information from Incident Management Team, more teams may be deployed at affected sites. 	<ol style="list-style-type: none"> 3. Ensure possible arrangements for establishing reliable and appropriate network. 4. Work out a plan of action for restoration and convene a meeting to discuss and finalize the modalities. 5. Compile and communicate Action Taken Report to MTNL. 6. New numbers and details of contact persons to be communicated to Emergency Operations Centre (District/ State). 7. Mobile exchanges should be deployed as alternative mode of communication for authorities and general public. 8. Establish telephone facilities for the public and information on this should be announced through media. 9. Monitor the situation and arrange for emergency staff required to operate systems established. 10. Inform district/ state authorities on debris clearance of the work required. 11. Initiate temporary rehabilitation work required. 12. Launch rehabilitation work and arrange for repairs and relocation, if required. 13. Make available various type of equipment/ material/ technical manpower and services, if requested. 	<p>communication network/ set-up alternative emergency communication.</p>
6.	HAM radio operators	<ol style="list-style-type: none"> 1. Inform other Ham clubs, individuals from other parts of Punjab. 2. HAM radio operators, through their 		

		<p>association, call active members to set up a HAM communication system.</p> <p>3. Coordination mechanisms to be shared with critical authorities.</p> <p>4. Setup alternative communication network till the main communication linkages restored.</p>		
7.	MCP	<p>24. MCP will bring debris of heavy RCC structures (having beams/ columns) and put dummies beneath the debris. This will facilitate demonstration of search and rescue operations. Soon after search and rescue team leave the site, MCP will mobilize equipments for debris clearance.</p> <p>25. MCP will assume main role in Equipment support, debris and road clearance, on receiving the intimation of the disaster from State EOC.</p> <p>26. MCP will coordinate with the supporting agency's officers to mobilize equipments from the ware houses.</p> <p>27. The respective supporting agencies will contact their respective personal to move the equipments to central warehouse.</p> <p>28. The equipments like JCB, concrete cutters identified as per the need will be transported to the site.</p> <p>29. On receiving intimation on the intensity of the damages of structure, the nodal officer will make an assessment on of the damages of roads and structures reported at the site and surrounding areas.</p> <p>30. The Supporting Agencies nodal officers will call for personal to immediately start debris clearance operation to enable movement of the affected site.</p> <p>31. A review of the current situation is taken up by the nodal agency to update the support agencies to delegate their respective personnel to take precautionary measure to plan de-routes for the</p>	<p>1. JCB, concrete breakers, cranes, Grader, Bulldozers, Gas Cutter, Jack Hammer, Tipper, Folkanes, Dumper, Aeromatic Hammer for debris/ road clearance, supporting rescue operations.</p> <p>2. Vehicles (Trucks).</p> <p>3. Earth movers, rescue equipments.</p> <p>4. Mobile medical vans.</p> <p>5. Other disaster</p>	

		<p>transportation ESF's to be operational.</p> <p>32. All supporting agencies will inspect the road/ rail network and structures within the disaster site and surrounding.</p> <p>33. MCP will also ensure proper corpse disposal and post mortem by coordinating with ESF on medical response.</p> <p>34. Assessment of damage (locations, no. of structures damaged, severity of damage).</p> <p>35. The QRTs will be deployed at the affected site.</p> <p>36. Enlisting the types of equipment as compiled from resource inventory required for conducting the debris clearance.</p> <p>37. The QRTs will report the situation and the progress in response activities to the respective EOCs.</p> <p>38. Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.</p> <p>39. Undertake repair of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.</p> <p>40. Ensure a critical number of medical professionals to reach the site including specialists from outside the state.</p> <p>41. If temporary living arrangements are being made from the affected populace, the MCP must ensure high standards of sanitation in settlements in order to prevent the multiplicity of the disaster.</p> <p>42. It should also ensure the provision of medicine and other medical facilities required at the disaster site and the hospital health centers catering to disaster victims.</p> <p>43. In case of orthopedic care required in disasters like earthquakes the immediate response would have to be complimented by a follow up treatment schedule for a majority of the patients in/ near their place of residence.</p> <p>44. MCP should ensure setting up of temporary information centers at MCP hospitals with the help of ESF on help lines and warning dissemination.</p> <p>45. MCP will coordinate, direct, and integrate state level response to provide Equipments support, relief camps establishment, and sanitation health assistances.</p> <p>46. Mobilize different modes of transportation e.g. trucks, etc to be put on stand-by.</p>	<p>management related equipments.</p>
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		<p>47. Assist timely re-establishment of the critical transportation links.</p> <p>48. Establish temporary electricity supplies for relief material go downs and relief camps.</p> <p>49. Compile an itemized assessment of damage, from reports made by various receiving centers and sub-centers.</p>	
8.	PWD	<p>20. The above agencies will bring debris of heavy RCC structures (having beams/columns) and put dummies beneath the debris. This will facilitate demonstration of search and rescue operations. Soon after search and rescue leave the site, will mobilize equipments for debris clearance.</p> <p>21. Assume role in Equipment support, debris and road clearance, on receiving the intimation of the disaster from State EOC/ Nodal Officer of MCP.</p> <p>22. Coordinate with the MCP officers to mobilize equipments from the ware houses.</p> <p>23. Contact respective personal to move the equipments to central warehouses.</p> <p>24. The equipments like JCB, concrete cutters identified as per the need will be transported to the site.</p> <p>25. On receiving intimation on the intensity of the damages of structures, the nodal officer will make an assessment on of the damages of roads and structures reported at the site and surrounding areas.</p> <p>26. The nodal officer will call for personal to immediately start debris clearance operation to enable movement to the affected site.</p> <p>27. A review of the current situation should be taken up by the nodal agency to update the support agencies to delegate their respective personnel to take precautionary measure to plan de-routes for the transportation ESF's to be operational.</p> <p>28. All supporting agencies will inspect the road/rail network and structures within the disaster site and surrounding.</p> <p>29. Ensure proper corpse disposal and post mortem by coordinating with ESF on medical response.</p> <p>30. Assessment of damage (locations, no. of structures damaged, severity of damage).</p> <p>31. The QRTs will be deployed at the affected site.</p> <p>32. Enlisting the types of equipment as compiled from resource inventory required for conducting the debris clearance.</p>	<p>1. JCB, concrete breakers, cranes, Grader Bulldozers, Gas Cutter, Jack Hammer, Tipper, Folkanes, Dumper, Aeromatic Hammer for debris/ road clearance, supporting rescue operations.</p> <p>2. Vehicles (Trucks), Earth movers, rescue equipments, Mobile medical vans.</p> <p>3. Other disaster management related equipments.</p>

		<p>33. The QRTs will report the situation and the progress in response activities to the respective EOCs.</p> <p>34. Undertake construction of temporary roads to serve as access to temporary transit and relief camps, and medical facilities for disaster victims.</p> <p>35. Undertake repair of all paved and unpaved road surfaces including edge metalling, pothole patching and any failure of surface, foundations in the affected areas by maintenance engineer's staff and keep monitoring their conditions.</p> <p>36. Ensure a critical number of medical professionals to reach the site including specialists from outside the state</p> <p>37. If temporary living arrangements are being made from the affected populace, the agencies must ensure high standards of sanitation in settlements in order to prevent the multiplicity of the disaster.</p> <p>38. Coordinate, direct, and integrate response equipments support, relief camps establishment, and sanitation health assistances.</p> <p>39. Mobilizes different modes of transportation e.g. Trucks, etc to be put on stand-by.</p> <p>40. Assist timely re-establishment of the critical transportation links.</p> <p>41. Establish temporary electricity supplies for relief material do downs and relief camps.</p> <p>42. Compile an itemized assessment of damage, from reports made by various receiving centers and sub-centers.</p>			
9.	Health Services	<ul style="list-style-type: none"> • Nodal Officer will call nodal officers of supporting agencies • In coordination with the transportation ESF, it will ensure a critical number of medical professionals to reach the sites including specialists • If temporary 	<ol style="list-style-type: none"> 1. Ready all hospitals (including private hospitals) for managing large no. of casualties and severely injured populations. 2. Sufficient stock of required medicines, vaccines, drugs, plasters, syringes, etc. 3. Provide systematic approach to patient care (Mass Casualty Management). <ul style="list-style-type: none"> • Triage done to determine who needs to be taken to a medical facility on a priority basis and who can be treated on-site. (CATS, 	<ol style="list-style-type: none"> 1) Mobile medical vans (Clinics) with paramedical staff as well. 2) Mobile radiology units, pathology test arrangements. 3) Vehicles for carrying severely 	

		<p>living arrangements are being made from the affected populace, must ensure high standards of sanitation in settlements in order to prevent the multiplicity of the disaster.</p> <ul style="list-style-type: none"> • Also ensure the provision of medicine and other medical facilities required at the disaster site and the hospital health centers catering to disaster victims • In case of orthopedic care required, immediate response would have to be complimented by a follow up treatment schedule for a majority of the patients' in/ near their place of residence • Trained professionals should be mobilized by psychosocial support • Ensure setting up of temporary information centers at hospitals with 	<p>DHS).</p> <ul style="list-style-type: none"> • First-aid provided as required (CATS, Red Cross. St. Johns). • Patient Stabilized before transport (CATS, DHS). • Patients transported to nearest available medical facility having the required facilities (CATS, St. Johns). • Trauma counseling provided to the victims and their relatives at the site and in the hospital. • In the hospital emergency department, triage carried out again to prioritize treatment, and appropriate care provided. • Maintain patient tracking system to keep record of all patients treated. • Deploy mobile hospitals as needed. <p>4. Arrange for additional blood supply, organize blood donation camp for additional blood requirement.</p> <p>5. Provide for sending additional medical personnel equipped with food, bedding, and tents.</p> <p>6. Send vehicles and any additional medical equipment.</p> <p>7. QRTs will report the situation and the progress on action taken by the team to the respective EOCs.</p> <ul style="list-style-type: none"> • QRTs Quickly assess type of injuries, no. of people affected, and possible medical needs. • QRTs will ensure timely response to the needs of the affected victims. 	<p>injured.</p> <p>4) Stretchers, life saving drugs, blood etc.</p> <p>5) Other resources required during emergency for setting up medical camps.</p>
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		<p>the help of ESF on help lines and warning dissemination</p> <ul style="list-style-type: none"> • Coordinate, direct, and integrate state level response to provide medical and sanitation health assistances. 	<p>8. Establish health facility and treatment centers at disaster sites.</p> <p>9. The district civil surgeon with district/state control room should coordinate the provision of medical services.</p> <p>10. Procedures should be clarified between</p> <ul style="list-style-type: none"> • Peripheral hospitals • Private hospitals • Blood banks • General hospitals and • Health services established at transit camps, relief camps and affected villages. <p>QRTs should maintain check posts and surveillance at each railway junctions, ST depots and all entry and exit points from the affected area, especially during the threat or existence of an epidemic.</p>	
10.	Red Cross Society	<p>1) Upon receipt of notification about disaster, nodal officer will activate quick response teams.</p> <p>2) The quick response teams will be deployed at the three sites</p>	<p>1) Establish camps to provide first aid and minor medical services to affected populace.</p> <p>2) Mobilize stretchers</p> <p>3) Organize blood donation camps and encourage people to donate blood.</p> <p>4) Arrange for safe collection, storage, testing and supply of blood to needy populace.</p> <p>5) Provide ambulance service</p>	
11.	Irrigation and Flood Control	<p>1. Team leader of ESF will activate Quick Response Team</p> <p>2. QRTs will be deployed at all three sites</p>	<p>1. QRT to report situation and progress of action to the EOC</p> <p>2. Coordinate will Team leader for water supply</p> <p>3. Provide arrangements for transportation means across river Yamuna in case bridge network fails</p>	
12.	Food and Civil	<p>1. Team Leader will activate ESF on</p>	<p>1. Coordinate with ESFs related to transportation, debris and</p>	<p>1. Food packets</p>

	Supplies	<p>receiving information of the disaster from State EOC</p> <p>2. Team leader will inform Nodal Officers of support agencies about the event and ESF activation</p>	<p>road clearance to ensure quality supply chain management and relief materials</p> <p>2. QRTs to report to site of relief camps</p> <p>3. QRTs responsible for management and distribution of food and relief items to affected victims</p> <p>4. QRTs responsible for reporting progress of action taken to EOC</p> <p>5. Preparing take-home food packets for families</p> <p>6. Ensuring support to local administration</p>	
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