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Country Presentation : India

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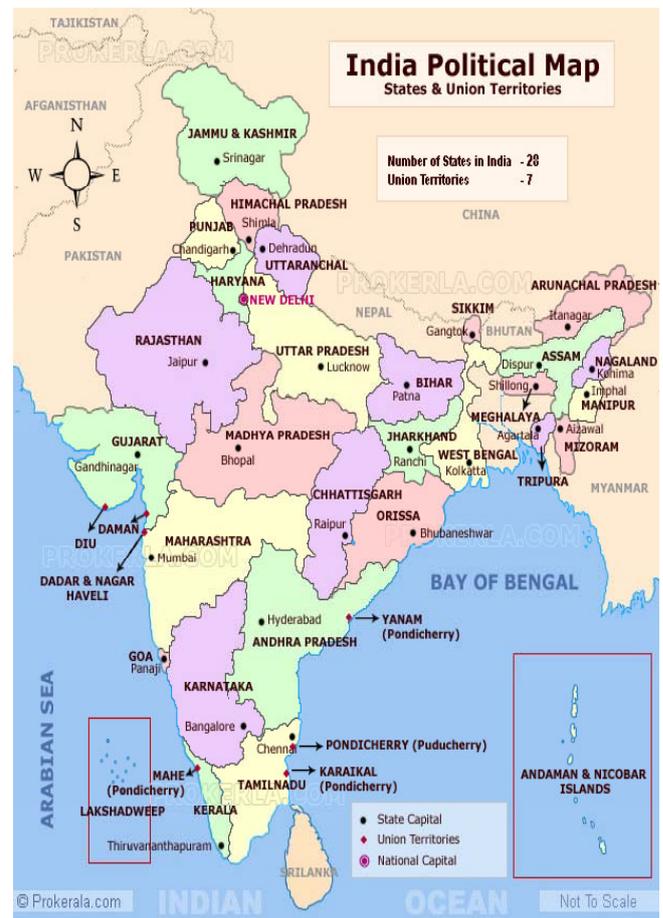


Basic Information



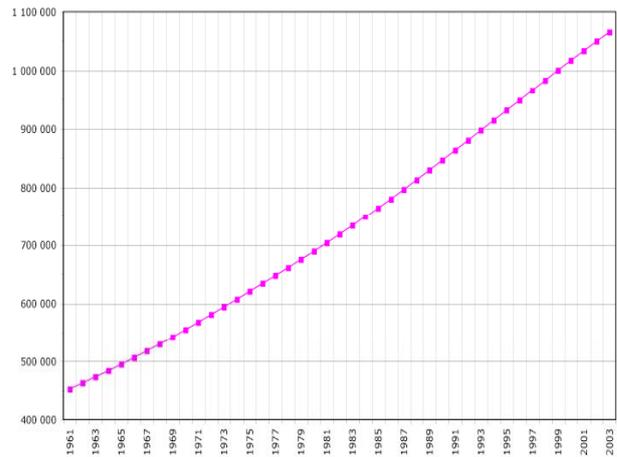
Administrative System

- Parliamentary Democracy
- PM Head of National Govt. and President Head of State
- 28 States and 7 UTs
- Chief Minister Political Head of State Government
- Governor for each State and Administrator for UTs
- States have many districts and districts have Sub-Divisions
- Local Government – Urban Local Bodies and Panchayati Raj Institutions



Demographic Profile

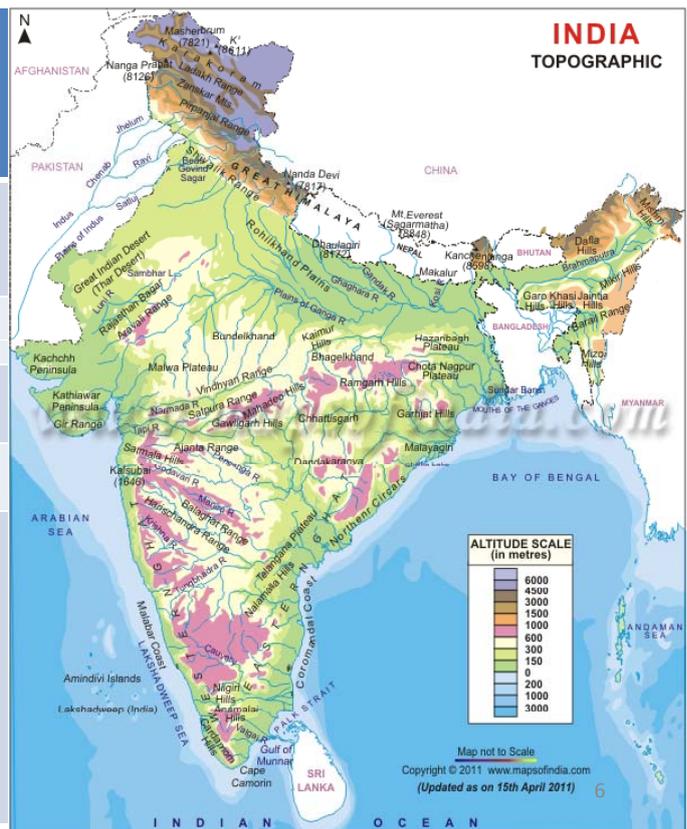
Population 1.21 billion (Second Most populous)	1.21 billion (Second Most populous – likely to be the most populous by 2025)
Sex Ratio	940
Life Expectancy	69.89
Population Density	382 person/Sq. Km.
Literacy Rate	74.04 %
Net Enrolment Ratio (UPE)	98.3



Age structure	Key Demographic Facts
0-14 years: 31.1%	❖ More than 1/6 th of the World Population (16.7%)
15-64 years: 63.6%	❖ More than 50% below the age of 25
65-over: 5.3%	❖ More than 65% below 35 %
	❖ 2020 – Average Age 29 (China 37; Japan 48)
	❖ Over 2000 ethnic groups and all major religions

Land

Area	3.28 million Sq. KM (2.5 % world area) 7 th Largest country of the world
Land	90.44 %
Water	9.56 %
Forest Area	22.7 %
Latitude	8° 4' and 37° 6' North
Longitude	68° 7' and 97° 25' East
Climate	Winter (December-February) Summer (March-June) South-west monsoon season (June-September) Post monsoon season (October-November)



Indian Economy

Rank	10 th Largest Economy (Nominal) 3 rd PPP
GDP	\$ 1.847 trillion (Nominal) (2011)
Labor Force	487.6
Unemployment	9.4 %
Poverty Ratio	29.8%
GDP by sector	Agriculture: 17.2%, Industry: 26.4%, Services: 56.4% (2011 est.)
Growth Rate	6.5 (2011-12)

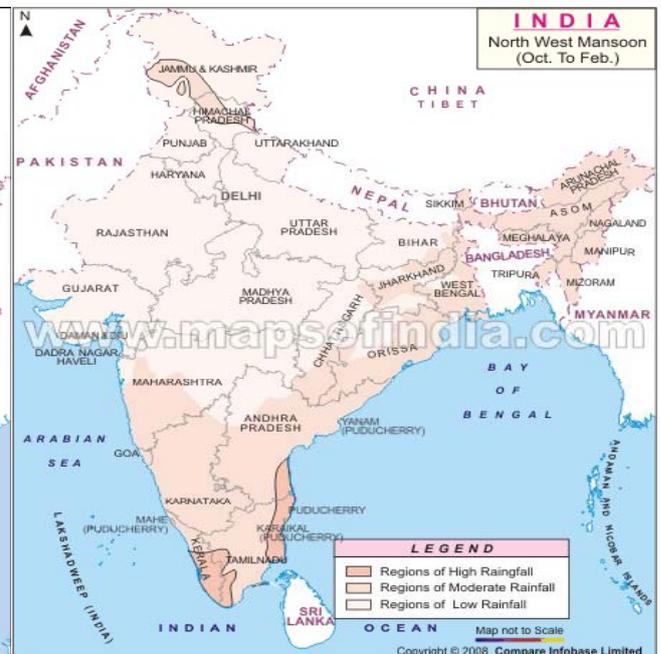
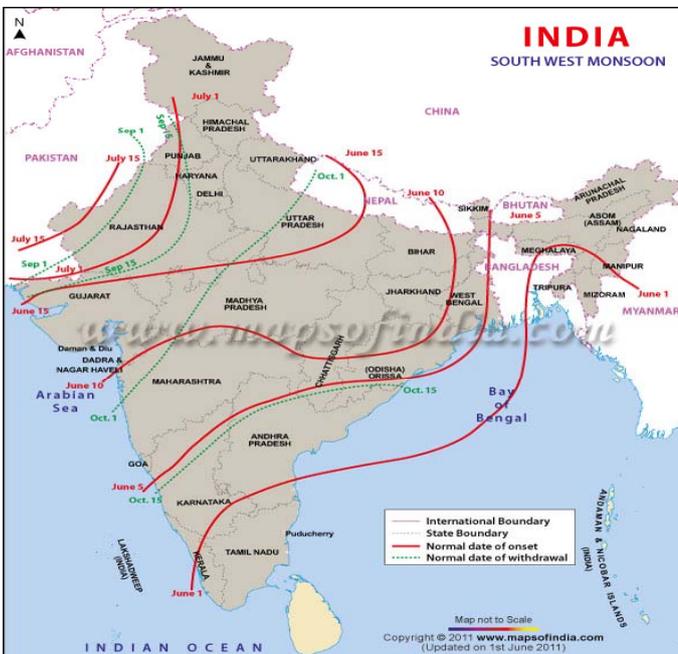
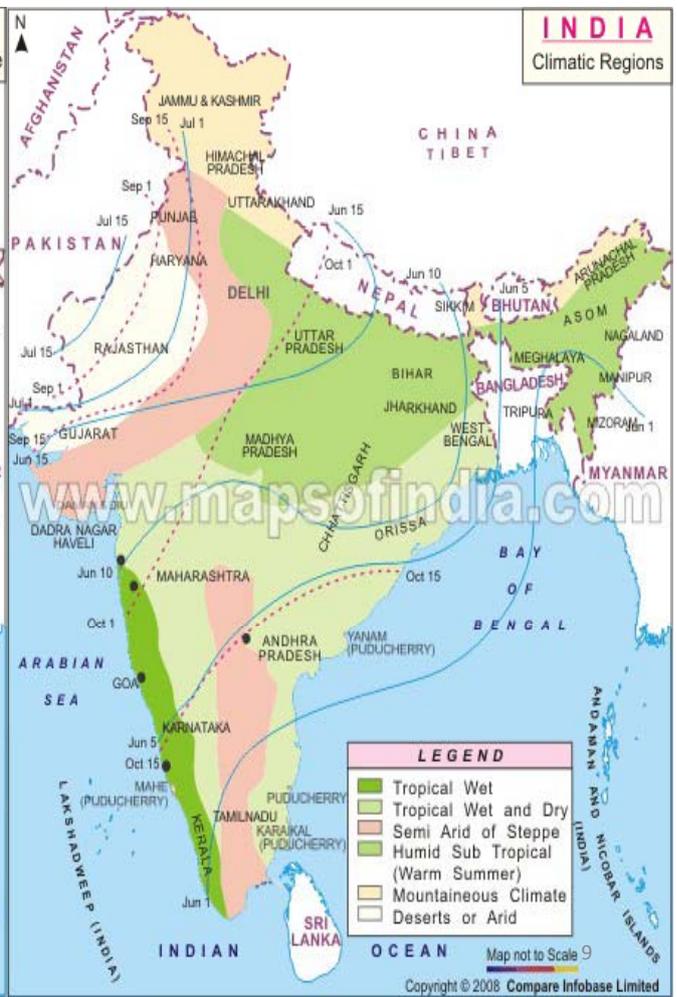
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Indian River System

- **Ganges River System** – West to East (at least 10 Major River system)
- **Indus River System** (at least 6 Major River Systems)
- **Peninsular River System** (at least 11 major River systems)
- EWS With CWC and harvesting and management jointly by the Centre and State Govt.
- Small streams/ rivulets managed by the States

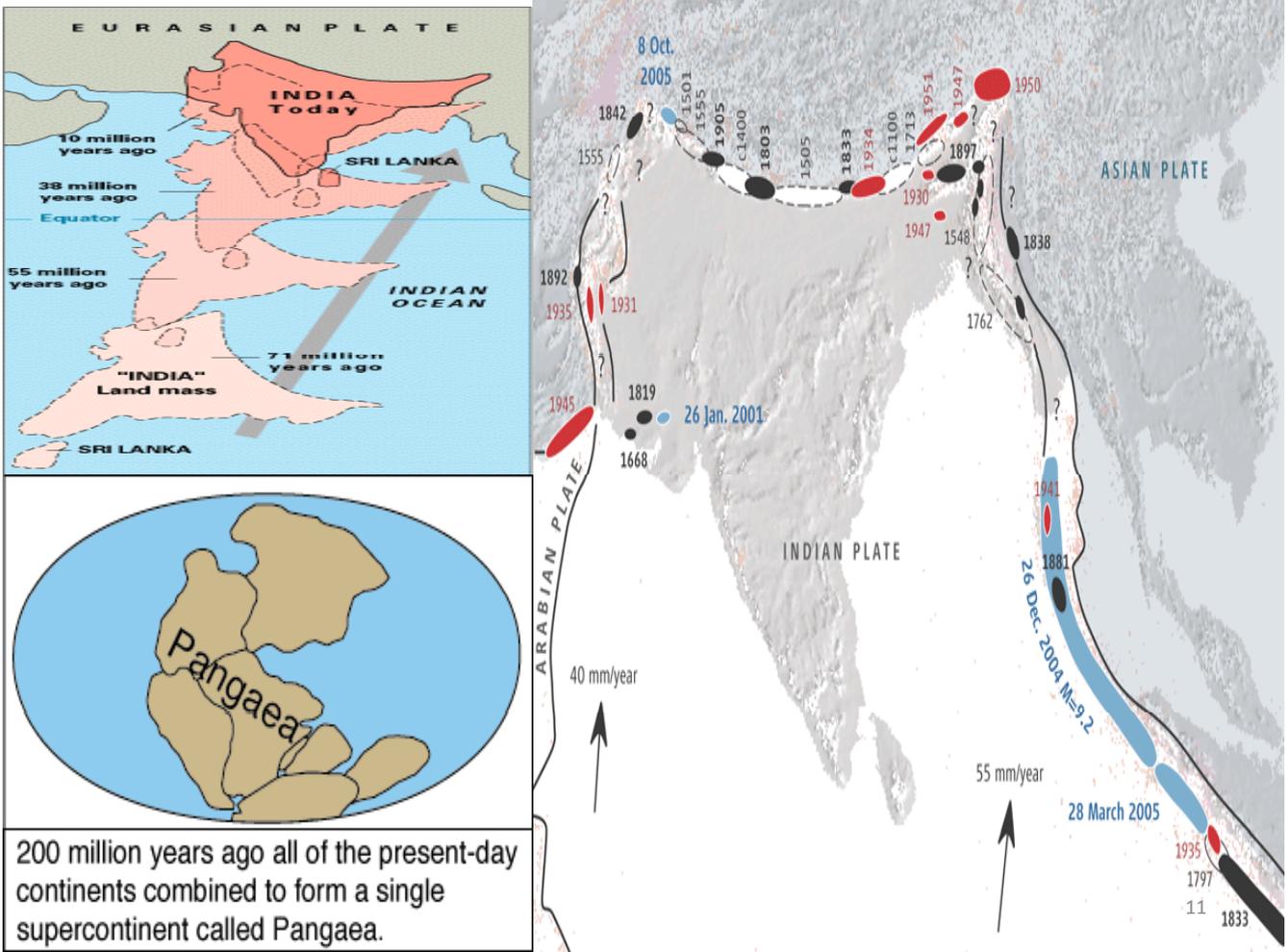


River System of India										
Indus	Indus	Indus	Indus	Indus				Penganga	Penganga	Godavari
Chenab	Chenab							Godavari	Godavari	Godavari
Jhelum	Jhelum	Chenab	Chenab							
Kishenganga										
Ravi	Ravi	Ravi								
Satluj	Satluj	Satluj	Satluj							
Beas	Beas									
Yamuna	Yamuna	Yamuna	Ganga	Ganga	Ganga	Ganga	Ganga	Ganga	Hugli	Hugli
Chambal										
Betwa	Betwa									
Ganga	Ganga	Ganga								
Gomati	Gomati	Gomati	Gomati							
Ghaghra	Ghaghra	Ghaghra	Ghaghra	Ghaghra						
Son	Son	Son	Son	Son	Son					
Gandak	Gandak	Gandak	Gandak	Gandak	Gandak					
Kosi	Kosi	Kosi	Kosi	Kosi	Kosi	Kosi	Kosi			
Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra	Brahmaputra
Luni	Sabarmati	Mahi	Narmada	Tapti	Mahanadi	Pennar	Cauveri	Vaigai	Brahmani	Saryu



Season	Months	Percentage of Distribution
Pre-monsoon	March-May	10.4
South-west monsoon	June-September	73.4
Post-monsoon	October-December	13.3
Winter rains	January-February	2.9

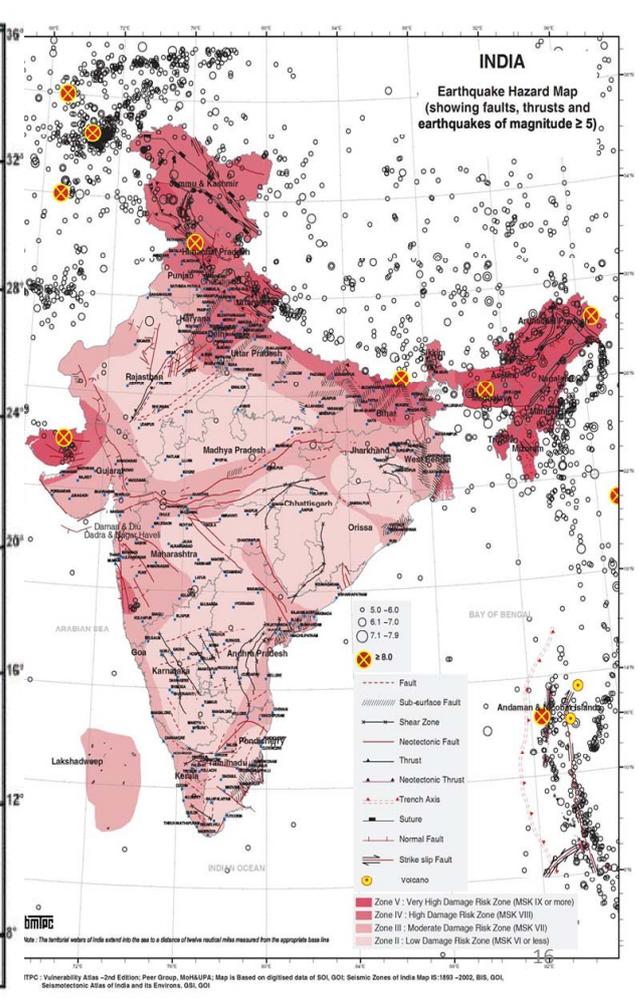
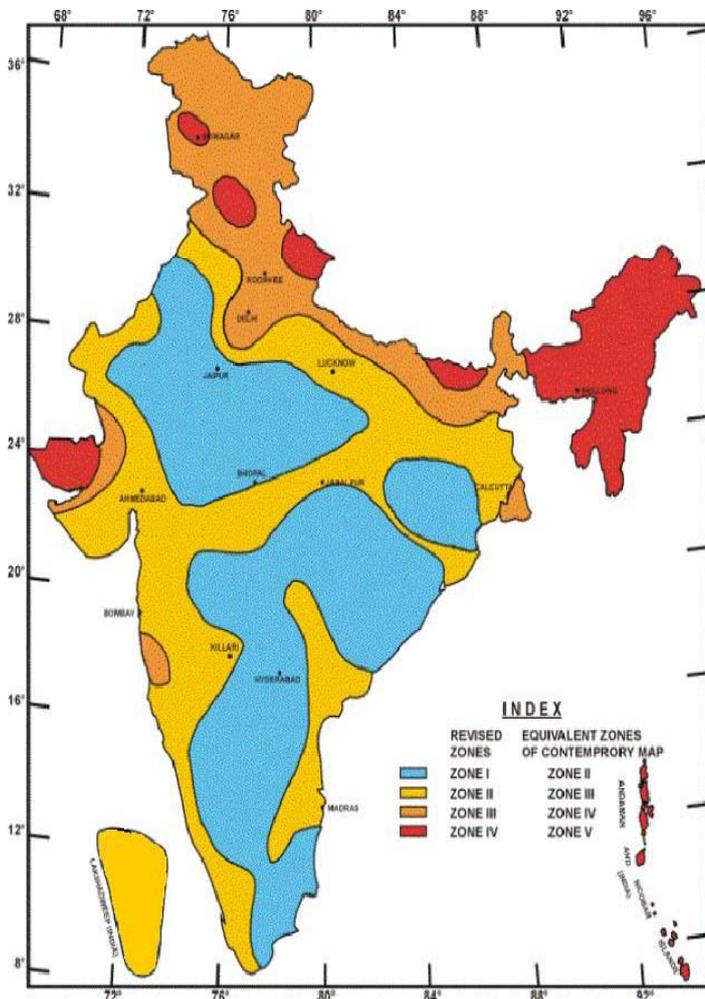
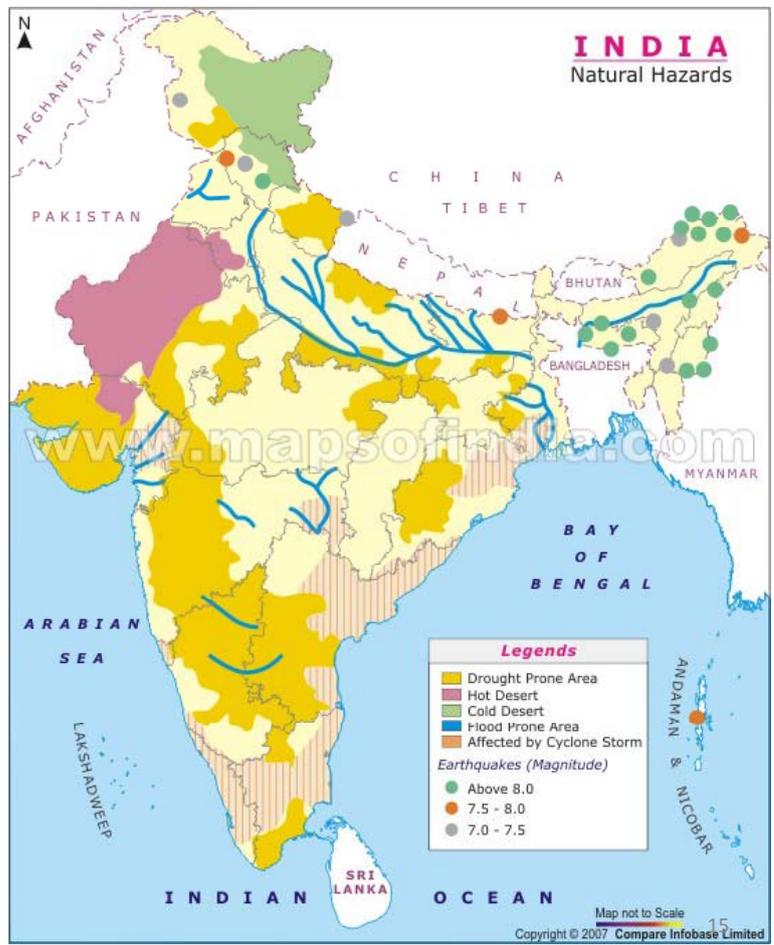
Source: India Meteorological Department, Government of India.



Natural Hazard & Vulnerability Profile of India

Frequency of Disasters

- Severe floods – every year
- Severe droughts – every 2-3 years
- Earthquakes ?



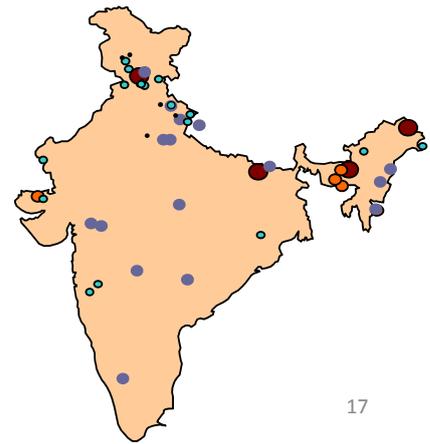
IPCC: Vulnerability Atlas - 2nd Edition, Peer Group, MontekUPA. Map is Based on digitised data of SOI, DOI. Seismic Zones of India Map 05-1893-2002, BIS, DOI, Geotectonic Area of India and its Environs, GSI, DOI

Indian Seismicity

- Several large earthquakes in Himalaya in last 200 years

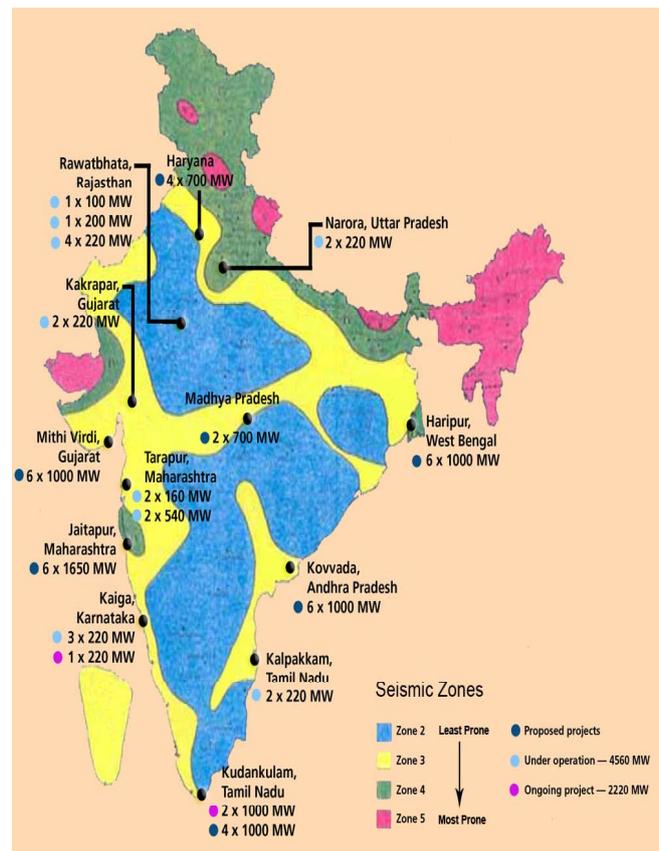
- M8+ Kumaon earthquake, 1803
- M7.7 Kathmandu earthquake, 1833
- M8.1 Shillong earthquake, 1897
- M7.8 Kangra earthquake, 1905
- M8.2 Bihar-Nepal earthquake, 1934
- M8.5 Arunachal Pradesh earthquake, 1950

- But, none during the last 60 years...



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Earthquake Risk and Nuclear Power Plants in India

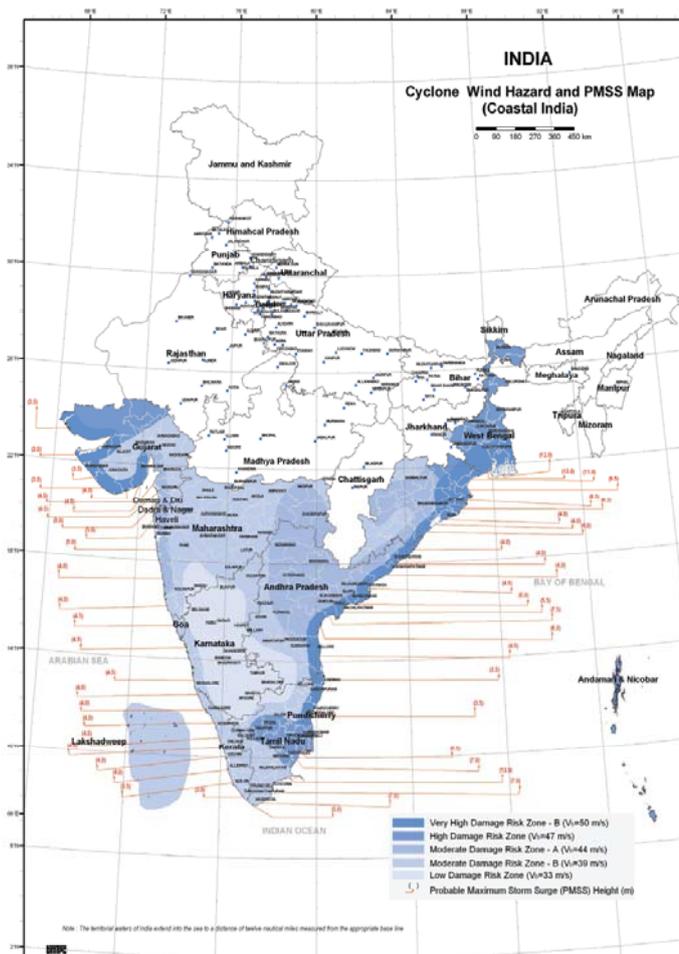


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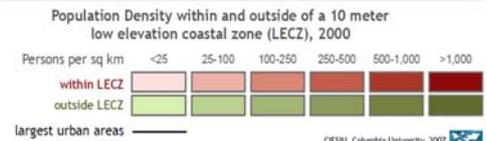
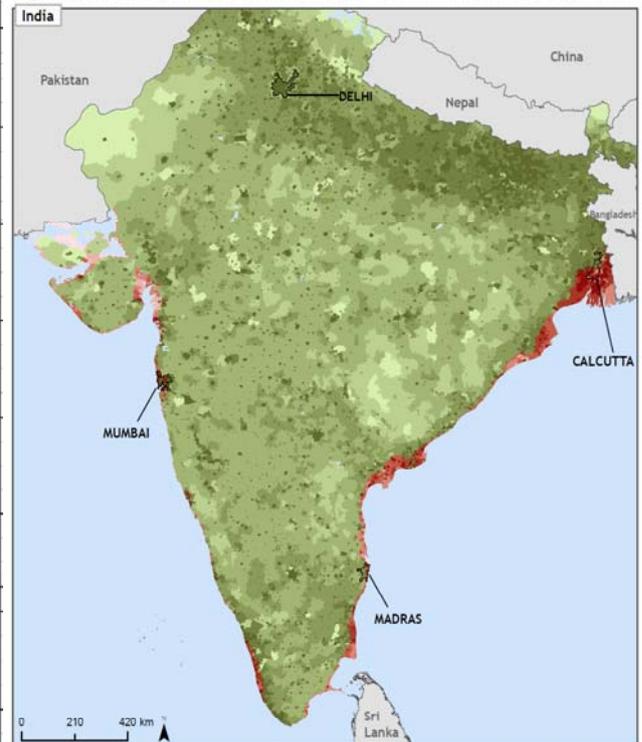
History of Tsunami in India

S.No.	Year	Remarks
1	326 B.C.	First recorded tsunami Alexander the Great
2	Between 1st April and 27th May 1008	Tsunami on the Indian coast from a local earthquake
3	12th April 1762	Earthquake in the Bay of Bengal generated tsunami wave of 1.8 m in coastal Bangladesh
4	19th August 1868	Earthquake Mw 7.5 in the Bay of Bengal. Tsunami wave run-up level at Port Blair, Andaman Island 4.0 m.
5	31st December 1881	Earthquake of magnitude Ms 7.9 in the Bay of Bengal, reported tsunami run-up level of 0.76m at Car Nicobar, 0.3m at Dublat , 0.3 m at Nagapattinam and 1.22 m at Port Blair in Andaman & Nicobar Islands
6	1883	Karakatau, volcanic explosion in Indonesia. 1.5 m tsunami at Chennai, 0.6 m at Nagapattinam and also surges at Calcutta harbour.
7	1884	Earthquake in the western part of the Bay of Bengal. Tsunamis at Port Blair & mouth of Hooghly River
8	26th June 1941	Earthquake of magnitude MW 8.1 in the Andaman Sea at 12.90 N,92.50 E. No reliable data on the resultant tsunamis on the east coast of India. Although there is some unverifiable reports, no press reports of any tsunami related damage from East Coast.
9	27th November 1945	Makran Earthquake (Magnitude Ms 8.3). 12 to 15 M wave height in Ormara, 13 m at Pasni, and 1.37 m at Karachi (Pakistan) . In Gulf of Cambay of Gujarat wave height of 11.0 m was estimated, and 2 m at Mumbai, where boats were taken away from their moorings.
10	26th December 2004	An earthquake of high Magnitude (MW 9.3) generated giant tsunami waves in North Indian Ocean. Tsunami made extensive damage to many coastal areas of Indonesia, India, Malaysia, Maldives, Sri Lanka and Thailand. More than 200,000 people lost their lives in 14 countries in the Indian Ocean region.

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Population Density within and outside of a 10m Low Elevation Coastal Zone



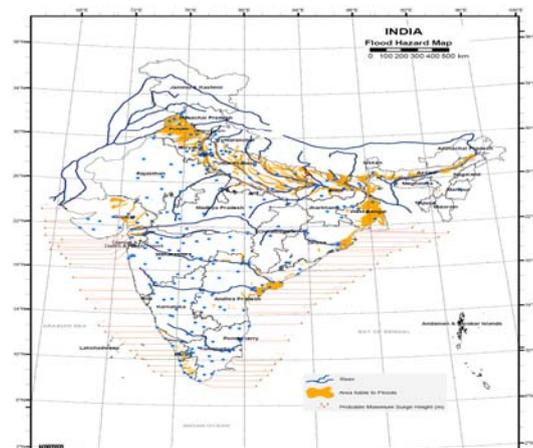
ICESR, Columbia University, 2007
<http://sedac.ciesr.columbia.edu/gis/lecz.jsp>, 1/15/05

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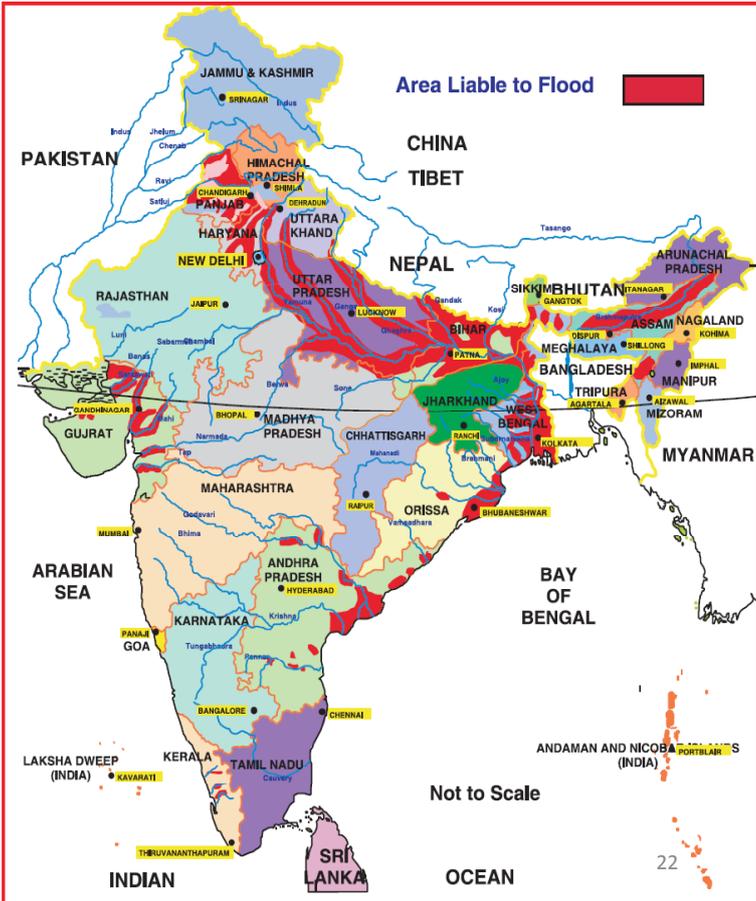
Major Tropical Cyclone Disasters

Sl. No.	Year	Country	Deaths
1	1737	Hooghly, West Bengal, India	300,000
2	1779	Machilipatnam, Andhra Pradesh, India	20,000
3	1782	Coringa, Andhra Pradesh, India	20,000
4	1787	Coringa, Andhra Pradesh, India	20,000
5	1788	The Antilles, Carribean Islands, West Indies	22,000
6	1822	Barisal/Backergunj, Bangladesh	50,000
7	1831	Balasore, Orissa, India	22,000
8	1833	Sagar Island, West Bengal, India	30,000
9	1839	Coringa, Andhra Pradesh, India	20,000
10	1864	Machilipatnam, Andhra Pradesh, India	30,000
11	1867	Contai, West Bengal, India	50,000
12	1876	Backergunj, Bangladesh	200,000–250,000
13	1881	China	300,000
14	1897	Bangladesh	175,000
15	1942	Contai, West Bengal, India	15,000
16	1961	Bangladesh	11,468
17	1963	Bangladesh	11,520
18	1965	Bangladesh	19,229
19	1970	Bangladesh	300,000
20	1971	Paradip, Orissa, India	10,000
21	1977	Divi Seema, Andhra Pradesh, India	10000
22	1991	Bangladesh	138,000
23	1999	South of Paradip, Orissa, India	9,893 *

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AREA LIABLE TO FLOODS



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Flood Damages in India

Sl No.	Item	Unit	Average During (1953- 2004)	Years	Maximum Damage (Year)
1	Area Affected	Million Hectare	7.63	1978	17.50
2	Population affected	Million	32.92	1978	70.45
3	Human Lives Lost	No.	1597	1977	11316
4	Cattle Lost	In thousands	94	1979	618
5	Cropped Area Affected	Million Hectare	3.56	1988	10.15
6	Value of Damage Crops	₹ Crore	708.57	2000	4246.6
7	Houses Damaged	Th. No.	1235.61	1978	3508
8	Value of Damage Houses	₹ Crore	251.05	1995	1307.9
9	Value of Damage Public Utilities	₹ Crore	813.69	2001	5604
10	Value of total Damage to Houses, Crops and Public Utilities	₹ Crore	1817.07	2000	8864

Source: Central Water Commission (FMP Directorate)

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Drought prone districts - irrigation commission

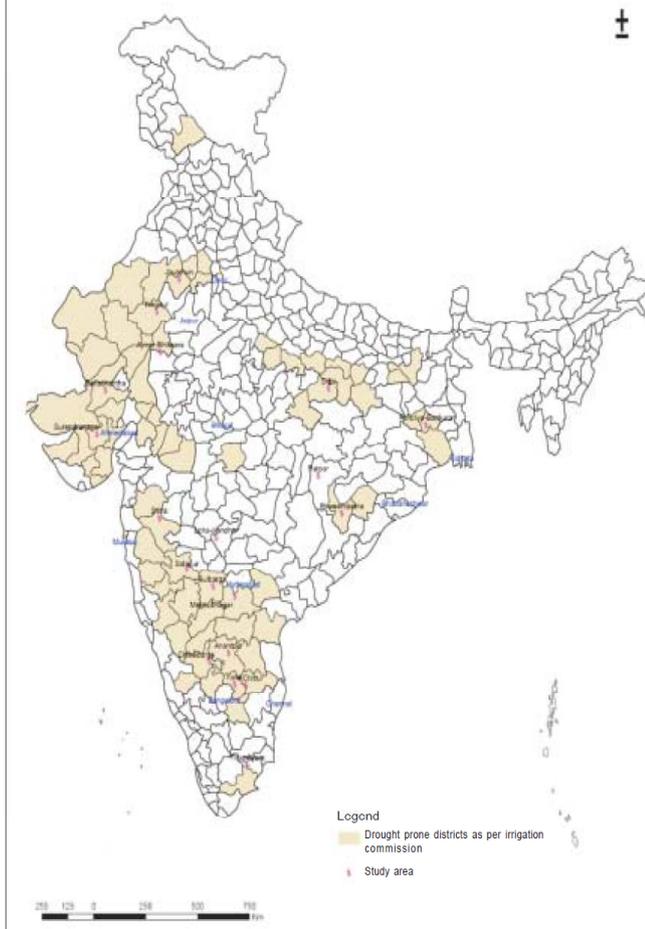


Table 7: Administrative Districts Chronically affected by Drought Conditions

State	Districts
Andhra Pradesh	Anantpur, Chittoor, Cuddapah, Hyderabad, Kurnool, Mehboobnagar, Nalgonda, Prakasam
Bihar	Munger, Nawadah, Rohtas, Bhojpur, Aurangabad, Gaya
Gujarat	Ahmedabad, Amreli, Banaskantha, Bhavnagar, Bharuch, Jamnagar, Kheda, Kutch, Mehsana, Panchmahal, Rajkot, Surendranagar
Haryana	Bhiwani, Gurgaon, Mahendranagar, Rohtak
Jammu and Kashmir	Doda, Udhampur
Karnataka	Bangalore, Belgaum, Bellary, Bijapur, Chitradurga, Chickmagalur, Dharwad, Gulbarga, Hassan, Kolar, Mandya, Mysore, Raichur, Tumkur
Madhya Pradesh	Betul, Datia, Dewas, Dhar, Jhabua, Khandak, Shahdol, Shahjapur, Sidhi, Ujjain
Maharashtra	Ahmednagar, Aurangabad, Beed, Nanded, Nashik, Osmanabad, Pune, Parbhani, Sangli, Satara, Solapur
Orissa	Phulbani, Kalahandi, Bolangir, Kendrapada
Rajasthan	Ajmer, Banswada, Barmer, Churu, Dungarpur, Jaisalmer, Jalore, Jhunjunu, Jodhpur, Nagaur, Pali, Udaipur
Tamil Nadu	Coimbatore, Dharmapuri, Madurai, Ramanathapuram, Salem, Tiruchirapali, Tirunelveli, Kanyakumari
Uttar Pradesh	Allahabad, Banda, Hamirpur, Jalana, Mirzapur, Varanasi
West Bengal	Bankura, Midnapore, Purulia
Jharkhand	Palamau
Chhattisgarh	Khargaon

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History of Drought in India

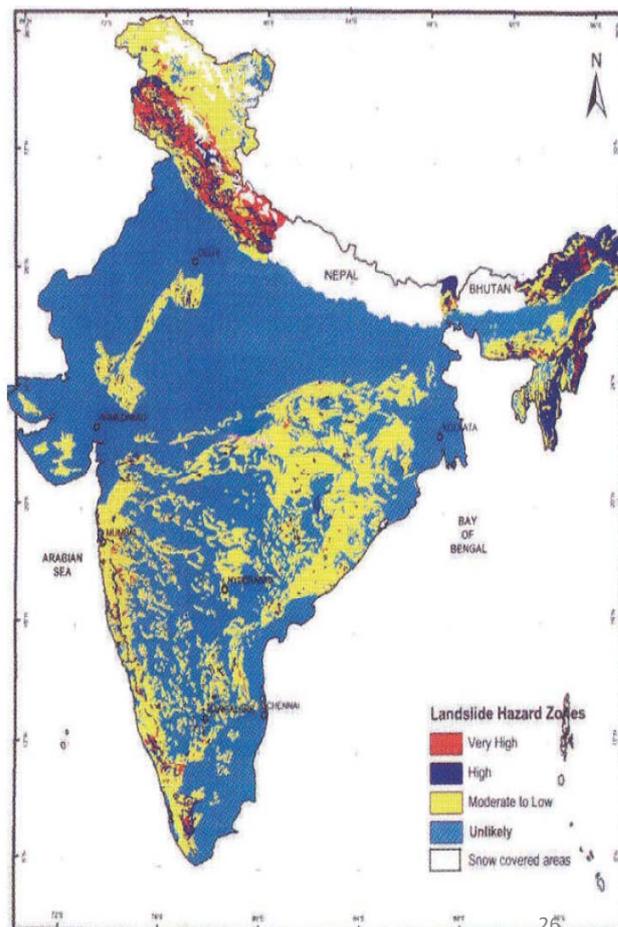
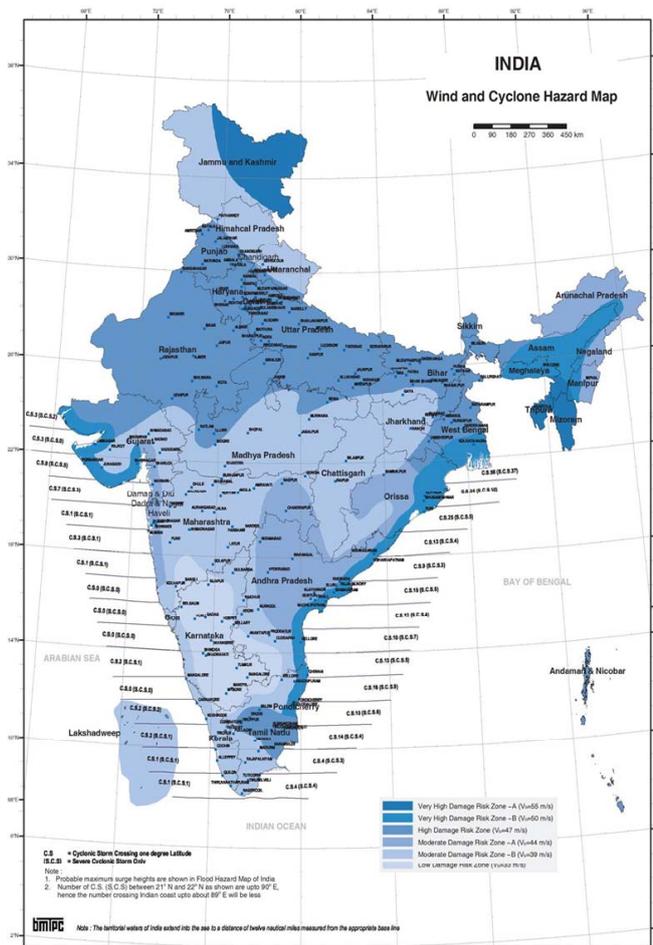
• Period	• Drought years	• No. of years
• 1801-25	• 1801,04,06,12,19,25	• 6
• 1826-50	• 1832,33,37	• 3
• 1851-75	• 1853,60,62,66,68,73	• 6
• 1876-1900	• 1877*,91,99*+	• 3
• 1901-25	• 1901*,04,05*,07,11, 13,15,18*+,20,25	• 10
• 1926-50	• 1939,41*	• 2
• 1951-75	• 1951,65*,66,68, 72*+,74	• 6
• 1976-09	• 1979*,82,85,87+, 2002*, 2009*	• 6

*Severe drought years = 10 (>39.5% area affected)

+Phenomenal drought years = 5 (>49.5% area)

Source: Drought Research Unit (DRU), India Meteorological Department (IMD), Pune

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Number of Heat & Cold Waves in India

Heat Waves

State	Epochs				
	1911-67	1968-77	1978-99	2000-2009**	1911-2009
West Bengal	31	2	28	6	67
Bihar	76	9	28	4	117
Uttar Pradesh	105	6	23	-	134
Rajasthan	27	3	42	14	56
Gujarat, Saurashtra & Kutch	43	1	7	2	53
Punjab	-	2	-	6	8
Himachal Pradesh	-	1	-	1	2
Jammu & Kashmir	-	-	-	-	-
Maharashtra	26	5	35	12	78
Madhya Pradesh	32	4	15	5	56
Orissa	25	8	18	22	73
Andhra Pradesh	21	-	3	2	26
Assam	-	4	19	-	23
Haryana, Delhi & Chandigarh	-	1	2	2	5
Tamil Nadu	5	-	2	1	8
Karnataka	-	-	-	1	-

Note: Epoch is defined as number of events.

Source: IMD Disastrous weather Events annual reports; EMDAT

Cold Waves

State	Epochs					
	1901-10	1911-67	1968-77	1978-99	2000-2009**	1901-2009
West Bengal	2	14	3	28	7	54
Bihar	7	27	8	67	12	121
Uttar Pradesh	21	51	8	47	13	140
Rajasthan	11	124	7	53	12	207
Gujarat, Saurashtra & Kutch	2	85	6	6	-	99
Punjab	3	34	4	19	10	70
Himachal Pradesh	-	-	4	18	4	26
Jammu & Kashmir	1	189	6	15	2	213
Maharashtra	-	60	4	18	1	83
Madhya Pradesh	9	88	7	12	1	117
Orissa	4	5	-	-	3	15
Andhra Pradesh	2	-	-	-	-	2
Assam	1	1	-	-	2	4
Haryana, Delhi & Chandigarh	-	-	4	15	15	34
Tamil Nadu	-	-	-	-	-	-
Karnataka	-	10	-	-	-	10
Jharkhand	-	-	-	-	1	1

Source: IMD Disastrous weather Events annual reports; EMDAT

Note: Epoch is defined as number of events.

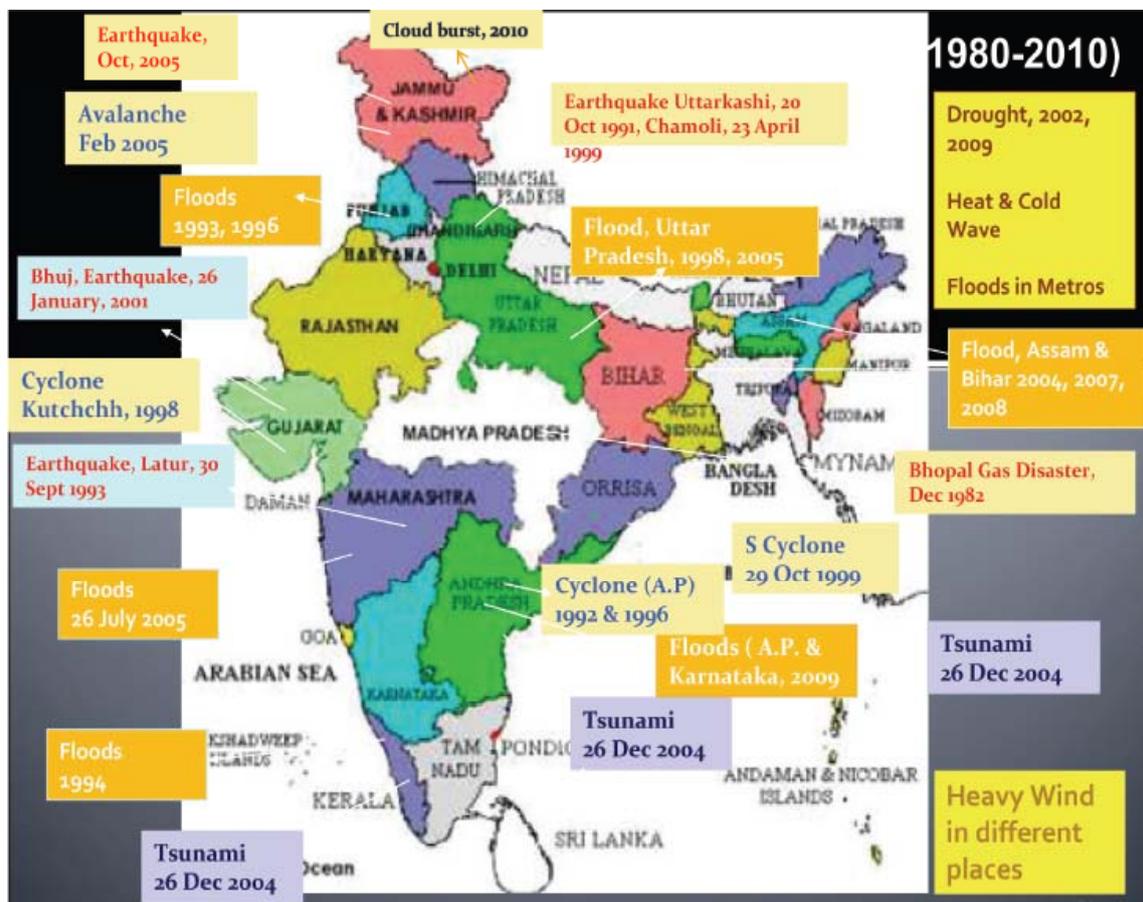
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Past Incidents of Tornadoes

Sl.No	Event	Date and years	Place	Loss of life	Injured	Homeless
1	Tornado	19 th April 1963	Cooch Bihar, West Bengal, India	139	-	3760
2.	Tornado	1 st April 1977	Dhaka, Bangladesh	500	6000	-
3.	Tornado	12 April 1983	Gaighata, West Bengal, India	28	500	-
4.	Tornado	19 th October 1987	Chapra, India	20	517	-
5.	Tornado	9 th April 1993	Kanthi in WB, India	50	180	-

Source: IMD Disastrous weather Events annual reports

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Source: NIDM

Top 10 Natural Disasters in India for the period 1900 to 2013 sorted by numbers of killed:

Top 10 Natural Disasters in India for the period 1900 to 2013 sorted by numbers of total affected people:

Disaster	Date	No Killed	Disaster	Date	No Total Affected
Epidemic	1920	2,000,000	Drought	Jul-2002	300,000,000
Drought	1965	1,500,000	Drought	May-1987	300,000,000
Drought	1942	1,500,000	Drought	1972	200,000,000
Epidemic	1907	1,300,000	Flood	8-Jul-1993	128,000,000
Drought	1900	1,250,000	Drought	Jun-1982	100,000,000
Epidemic	1920	500,000	Drought	1965	100,000,000
Epidemic	1926	423,000	Drought	Apr-2000	50,000,000
Epidemic	1924	300,000	Flood	21-Jun-2002	42,000,000
Storm	1935	60,000	Flood	Jul-1975	34,000,000
Storm	14-Oct-1942	40,000	Flood	Aug-1982	33,500,000

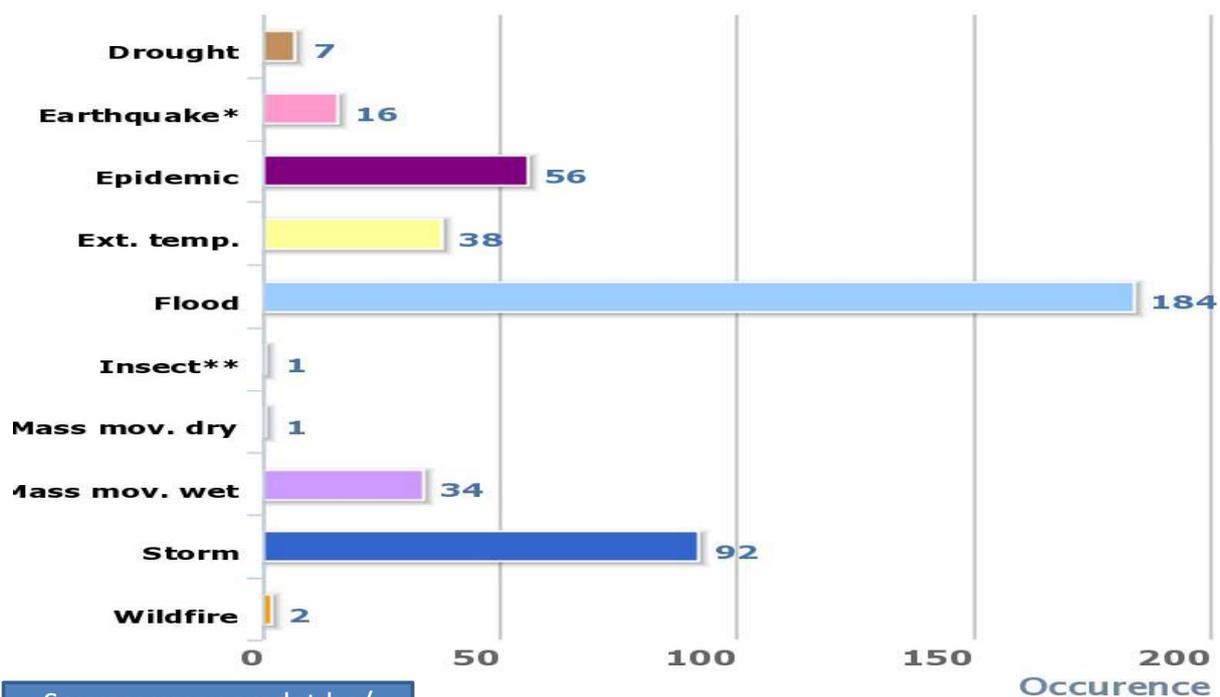
Source: www.emdat.be/

Top 10 Natural Disasters in India for the period 1900 to 2013 sorted by economic damage costs

Disaster	Date	Damage (000 US\$)
Flood	8-Jul-1993	7,000,000
Flood	28-Jul-2006	3,390,000
Flood	24-Jul-2005	3,330,000
Earthquake	26-Jan-2001	2,623,000
Storm	28-Oct-1999	2,500,000
Flood	20-Jun-2004	2,500,000
Flood	28-Jun-2005	2,300,000
Storm	25-Aug-1990	2,200,000
Flood	25-Sep-2009	2,150,000
Flood	18-Sep-2010	1,680,000

Source: www.emdat.be/

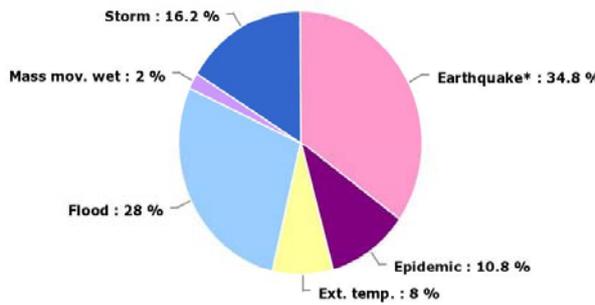
Natural Disaster Occurrence Reported (1980-2010)



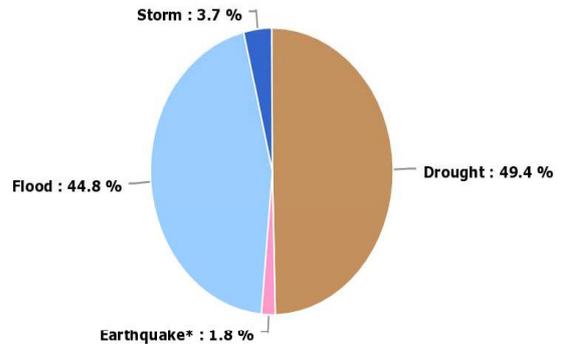
Source: www.emdat.be/

Impact of Disasters (1980-2010)

% age of People Reported Killed by Disaster Type

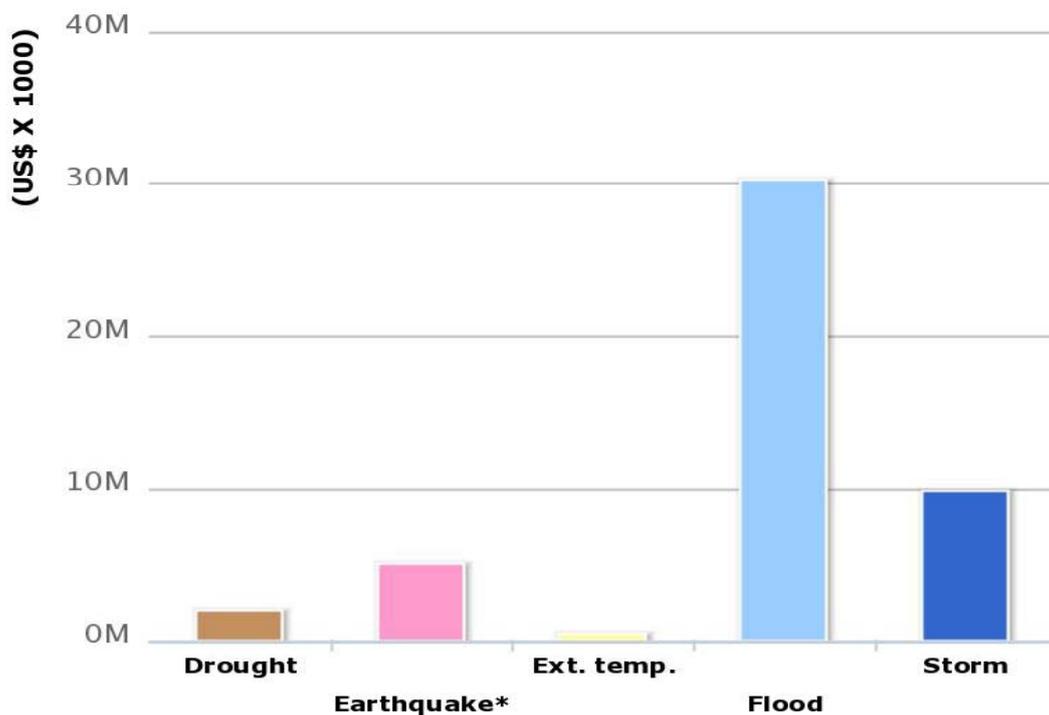


% age of People affected by Disaster Type



Source: www.emdat.be/

Estimated Economic Damages reported by disaster type (1980-2010)



Source: www.emdat.be/

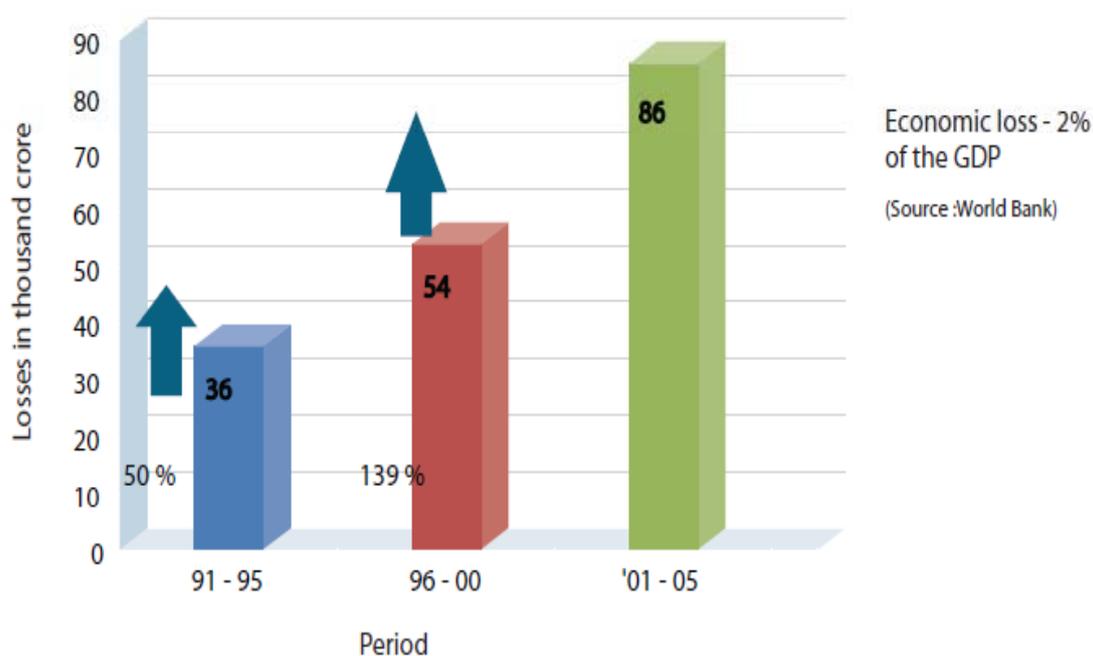
Year-wise damage caused by floods, cyclones storms, landslides, etc.

Year	Live Lost human (In No.)	Cattle Lost (In No.)	Houses damaged (In No.)	Cropped areas affected (In Lakh hectares)
2001-02	834	21,269	3,46,878	18.72
2002-03	898	3,729	4,62,700	21.00
2003-04	1,992	25,393	6,82,209	31.98
2004-05	1,995	12,389	16,03,300	32.53
2005-06	2,698	1,10,997	21,20,012	35.52
2006-07	2,402	4,55,619	19,34,680	70.87
2007-08	3,764	1,19,218	35,27,041	85.13
2008-09	3,405	53,833	16,46,905	35.56
2009-10	1,677	1,28,452	13,59,726	47.13
2010-11	2,310	48,778	13,38,619	46.25

Source: Ministry of Home Affairs (MHA)

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Losses due to disasters

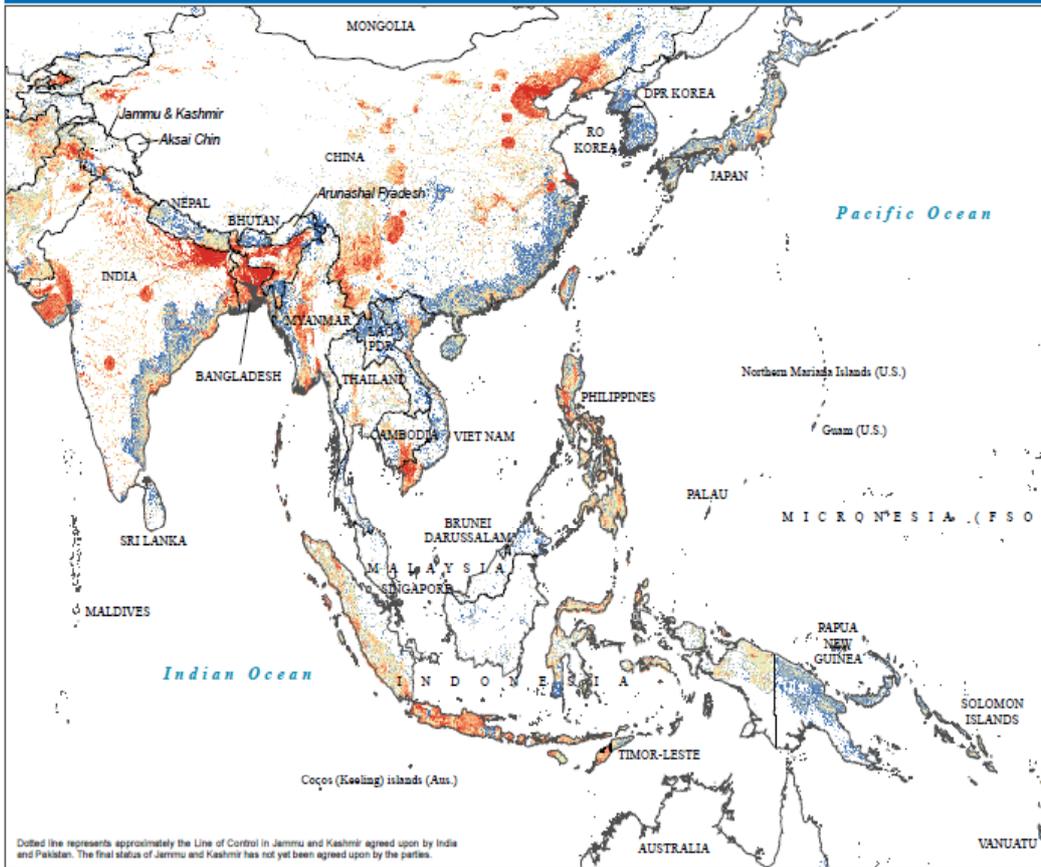


Source: NDMA

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Estimated Risk Index for Multiple Hazards - Asia-Pacific Region

Issued: 1 June 2011



This map shows the estimate of the global risk induced by multiple hazards (tropical cyclone, earthquake, flood and landslide induced by precipitations)

Multiple Risk (Classes)

- Not Null
- Very Low
- Low
- Medium Low
- Medium
- Medium High
- High
- Very High
- Major
- Extreme

Map Doc Name: OCHA_ROAP_MultiHazardRisk_v3_110802

Creation Date: 1 June 2011
 Projection/Date: Baltimore
 Web Resources: <http://ochaonline.un.org/roap>

0 800 1600
Kilometers

Map data source(s): UNEP/GRID-Europe, UN Cartographic Section, Global Discovery

Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

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Human Exposure

Modelled number of people present in hazard zones that are thereby subject to potential losses.

Hazard type	Population exposed	Percentage of population	Country ranking
Cyclone	7,607,821		4th out of 89
Drought	58,912,300		2nd out of 184
Flood	15,859,640		2nd out of 162
Landslide	180,254		2nd out of 162
Earthquake	3,349,237		8th out of 153
Tsunami	1,114,388		4th out of 76

Legend:

Tropical Cyclones (Saffir-Simpson categories)
 Cat1 Cat2 Cat3 Cat4 Cat5

Earthquake (modified Mercalli scale classes)
 V & VI VII VIII IX to XII

Economic Exposure

Modelled amount of GDP (Gross Domestic Product) present in hazard zones that are thereby subject to potential losses.

Hazard type	GDP exposed (billions-US\$)	Percentage of GDP	Country ranking
Cyclone	5.78		9th out of 89
Flood	9.39		4th out of 162
Landslide	1.07		9th out of 162
Earthquake	21.00		25th out of 153
Tsunami	0.64		16th out of 76

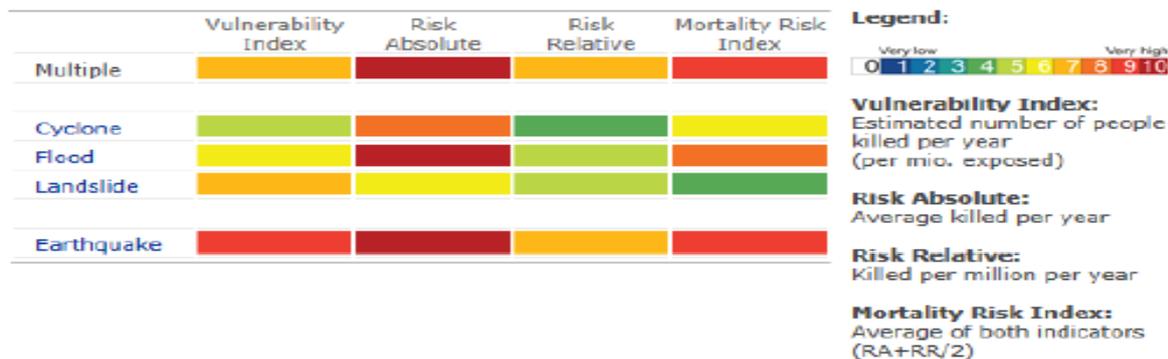
Legend:

Tropical Cyclones (Saffir-Simpson categories)
 Cat1 Cat2 Cat3 Cat4 Cat5

Earthquake (modified Mercalli scale classes)
 V & VI VII VIII IX to XII

Vulnerability and Risk

The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard.

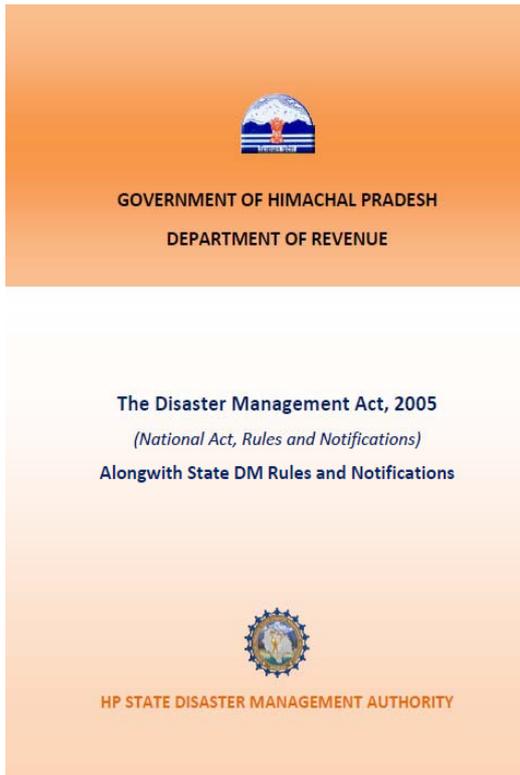


Type of Vulnerability/Risk	Class	Number/Degree
Vulnerability Index	7	300
Absolute Risk	10	> 3000
Relative Risk	7	10-30
Mortality Risk Index	9	Major

Source: www.preventionweb.net

Current System of DRM in India

Legal Framework



- Activity based reactive set-up to a proactive institutionalized set-up;
- From single faculty domain to a multi-stakeholder set-up;
- From a relief based approach to a 'multi-dimensional pro-active holistic approach for reducing risk'.

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Disaster Management Structure

Authorities

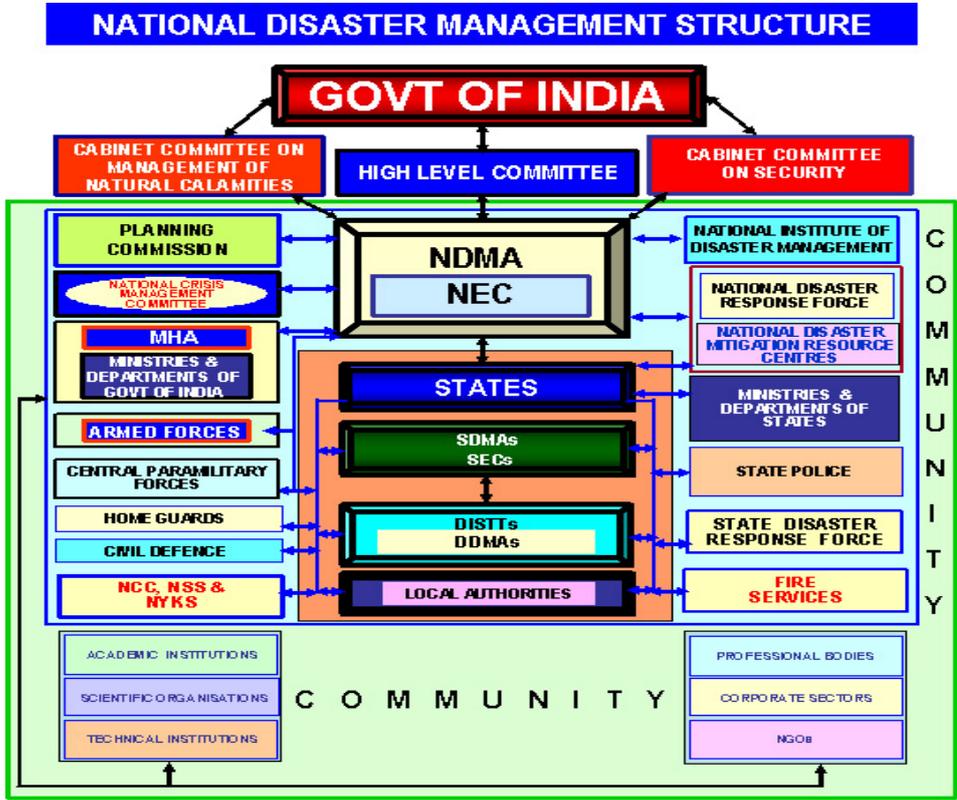
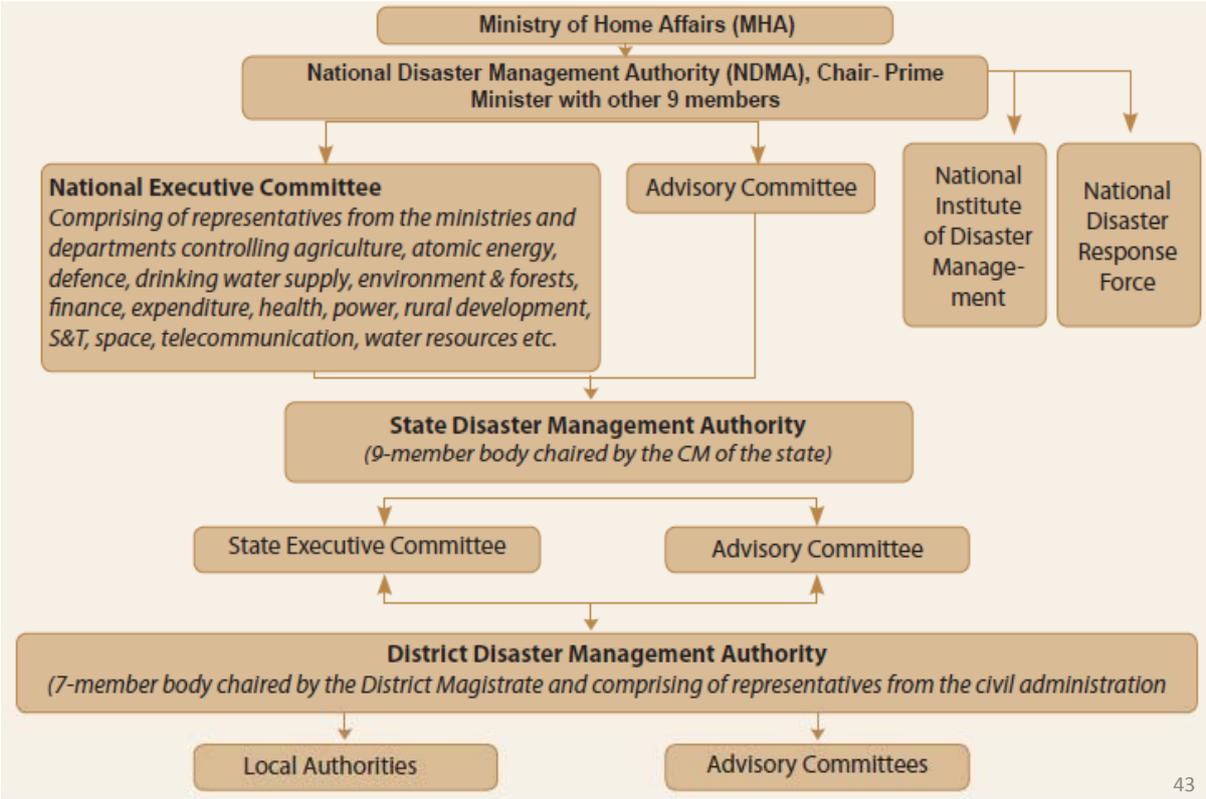
- National Authority – NDMA
- Advisory Committee
- National Executive Committee
- Sub-Committees
- NIDM
- NDRF
- State Authority – SDMA
- State Executive Committee
- District Authority – DDMA
- Local Authority

Levels of Disasters

- L1 – Local/district level
- L2 – State response
- L3 – National response

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Disaster Management Structure in India



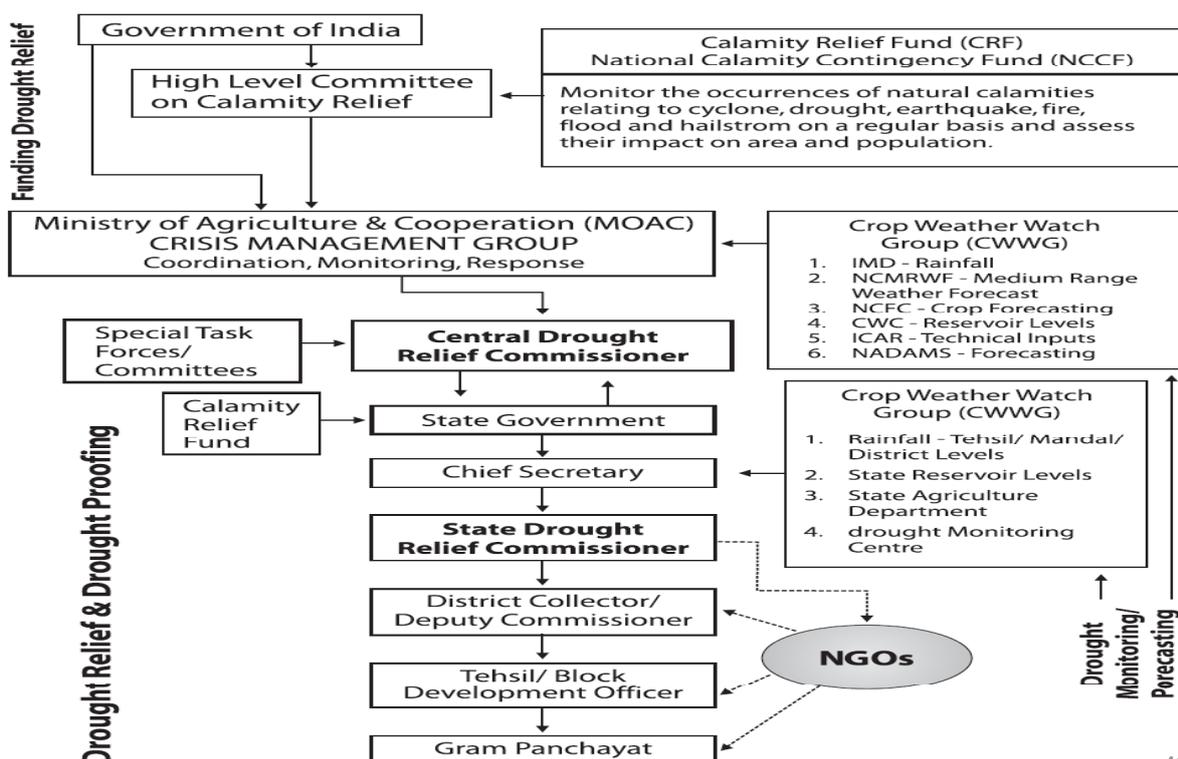
- Notes:**
1. This diagram reflects interactive linkages for synergised management of disasters and not a hierarchical structure.
 2. Backward and forward linkages, especially at the functional level, are with a view to optimise efficiency.
 3. Participation of the Community is a crucial factor.

Ministries Responsible for Various Kinds of Disasters

Earthquake and Tsunami	MHA/Ministry of Earth Sciences/IMD
Floods	MHA/Ministry of Water Resources/CWC
Cyclones	MHA/Ministry of Earth Sciences/IMD
Drought	Ministry of Agriculture
Biological Disasters	Ministry of Health and Family Welfare
Chemical Disasters	Ministry of Environment and Forests
Nuclear Disasters	Ministry of Atomic Energy
Air Accidents	Ministry of Civil Aviation
Railway Accidents	Ministry of Railways

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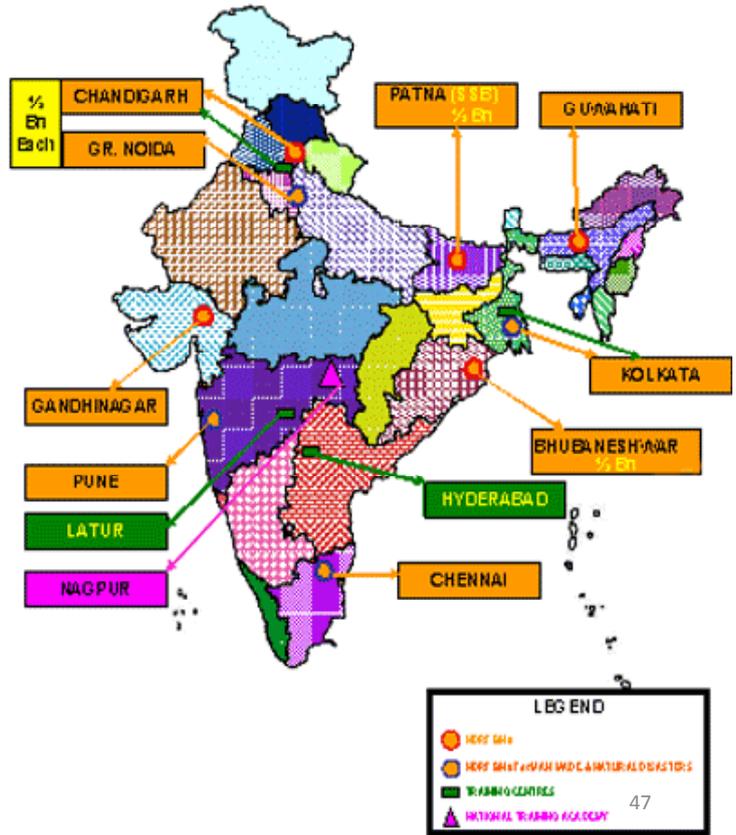
Institutional Framework at Ministerial Level, GOI (Drought Management)



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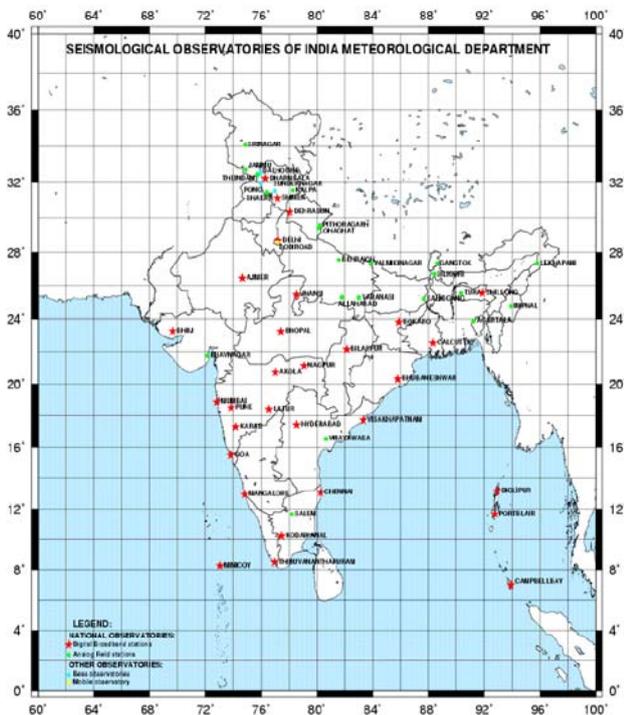


NATIONAL DISASTER RESPONSE BATTALIONS AND TRAINING CENTRES



Monitoring of Hazards (An Example)

National Seismic Network (55)

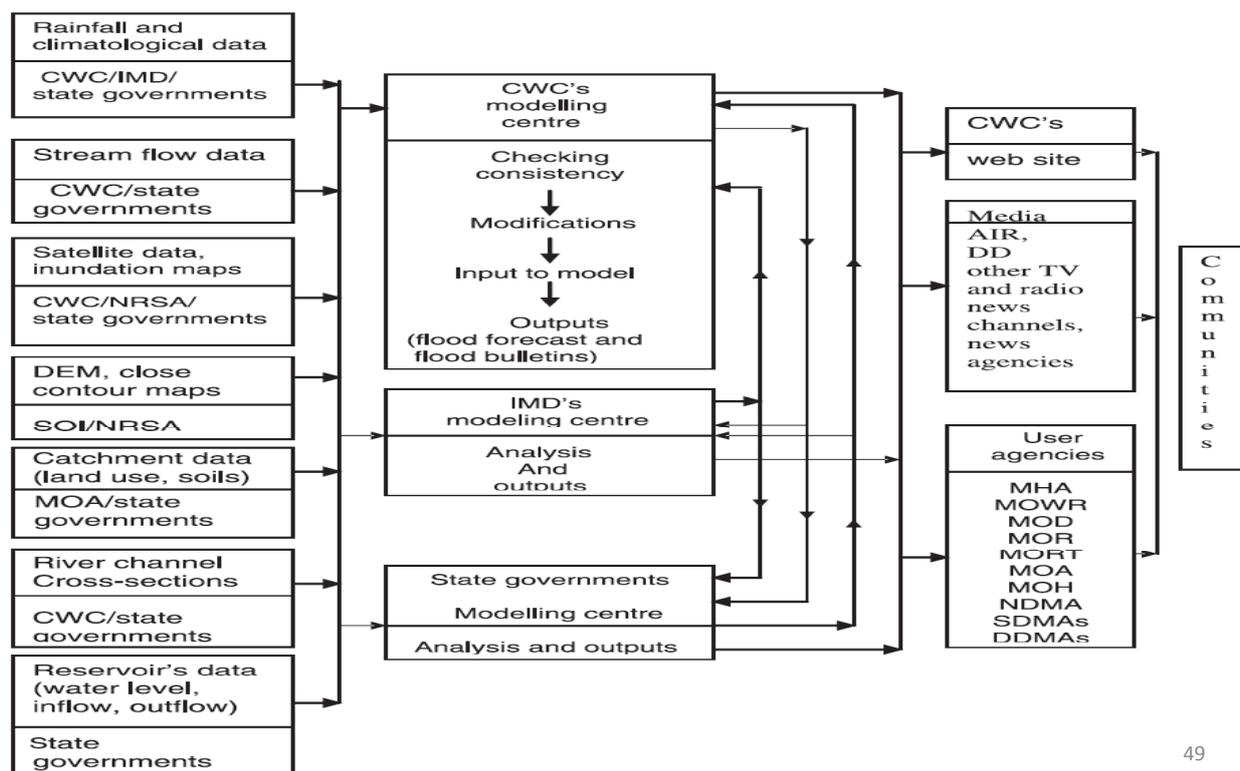


River Basin- wise Distribution of FF Stations

Sl. No	River System	No. of FF stations
1.	Ganga and its tributaries	87
2.	Brahmaputra, and its tributaries	27
3.	Barak and its tributaries	05
4.	Eastern rivers	09
5.	Mahanadi basin	04
6.	Godavari basin	18
7.	Krishna basin	09
8.	West flowing rivers	15
9.	Pennar	01
Total		175

Forecasting and Early Warning (An Example)

Flowchart for Flood Forecasting and Early Warning



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Major DRR Project/Schemes

Sr. No.	Name of the Project/Scheme	Budget (in Million US \$)
1.	Training and Capacity Building for Disaster Response (FC-XIII)	105
2.	Strengthening of Fire Services	94
3.	Revamping of Civil Defence System	20
4.	Disaster Response Fund	6717
5.	Allocation to Hazard Proofing Sectoral Development Investments (e.g. Transport, Agriculture, Infrastructure, etc.)	265
6.	National Cyclone Risk Mitigation Project	300
7.	GOI-UNDP Disaster Risk Reduction Programme (2009-12)	20
8.	Strengthening of Fire Services	40
9.	National School Safety Programme	51
10.	Disaster Management Support Programme (ISRO) & USAID funded DRM	9.7
11.	National Emergency Communication Plan for NDRF	15
12.	Flood Management Programme	3200

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My Organization and Job Responsibilities

- Himachal Pradesh – a State of Indian Republic
- DM through SDMA and DDMA's and Departments
- I belong to Himachal Administrative Services (HAS)
- Presently posted as Joint Secretary to the Govt. of HP in HP Secretariat, Shimla (the State Capital).
- My Role – Policy and Planning.
- My Topic: Current ERS in the Country and Model ERS based on International Best Practices.

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Thanks

Suggestions/Comments?

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