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## Introduction: High Powered Committee on Disaster Management

The HPC was constituted in August 1999 under the Chairmanship of Shri J.C. Pant. HPC members were drawn from the Ministries, States, NGOs and experts drawn from relevant fields. It was a first attempt, in India towards drawing up a systematic, comprehensive, and holistic approach towards disasters. The original mandate of the HPC was confined to preparation of management plans for natural disasters only. However, it was expanded to include man-made disasters and towards developing an effective plan of action that would encompass disasters of all origins. The establishment of the HPC for the formulation of disaster management plans for the country has been done with the idea to assess the present codes, manuals, plans and the working of the various agencies and departments and avenues for improvement. The need for an effective disaster management strategy to lessen disaster impact was felt in many quarters.

Objectives of HPC are as follows:

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

(ii) Recommend measures for strengthening organizational structures, and

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

Certain important aspects considered by the HPC were:

- Measures for efficient forecasting and warning systems
- Existing systems of response mechanism in the wake of natural and manmade disasters at all levels of government and steps to minimise the response time through effective communication and measures to ensure adequacy of relief operations
- Development programs related to mitigation of disasters in different areas and priorities and strategies for inclusion of disaster reduction components in the ongoing plan/no plan schemes
- Measures for intensive training for building up of human resources to improve disaster awareness
- Public awareness programs to build up society's resilience to disaster
- Pro-active measures for disaster preparedness and mitigation -administrative, financial, legislative
- and techno-legal
- Measures and programs to harness state-of-the-art information technology for effective communication network

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

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## Disasters identified by the High Powered Committee -

### I. Water and Climate related disasters

1. Floods and Drainage Management

2. Cyclones

3. Tornadoes and Hurricanes

4. Hailstorm

5. Cloud Burst

6. Heat Wave and Cold Wave

7. Snow Avalanches

8. Droughts

9. Sea Erosion

10. Thunder and Lightning

### II. Geologically related disasters

1. Landslides and Mudflows

2. Earthquakes

3. Dam Failures/ Dam Bursts

4. Mine Fires

### III. Chemical, Industrial and Nuclear related disasters

1. Chemical and Industrial Disasters

2. Nuclear Disasters

### IV. Accident related disasters

### V. Biologically related disasters

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1. Biological Disasters and Epidemics

2. Pest Attacks

3. Cattle Epidemics

4. Food Poisoning

## 1. Water and Climate Related Disasters

The Sub-Group on Water and Climate Related Disasters, set up by the HPC, looked into a wide variety of meteorological, hydrological and climate phenomena that pose a threat to life, property and the environment. The hydro-meteorological hazards include Floods and Drainage Management, droughts, cyclones, tornadoes, hurricanes, hailstorm, cloudburst, snow avalanches, heat & cold waves, sea erosion, thunder and lightning. The application of meteorological, climatological and hydrological knowledge in the area of disaster management has a very significant role to play in the assessment of risk, land-use planning and the designing of structures which greatly contribute to disaster mitigation.

### Flood

Floods are characterised as long, short or no warning. The main season for floods in India is the south-west monsoon period of June to September though floods occur in some parts of the country in the pre-monsoon season (March-May) and post-monsoon season (October-December) also. While heavy rainfall on successive days in the upper catchment of a river basin is the main cause of the flooding in rivers, there are some hydrological aspects too, which aggravate the flood situation. Where there are poor drainage conditions, heavy rainfall results in local accumulations of the water resulting in local flooding. The inadequacy of the carrying capacity of the river channel is accentuated by erosion and silting of the riverbeds.

The Central Water Commission has established Flood Forecasting Centres (FFCs) in all major river catchments of India covering 62 major inter-state river basins with 132 water level forecasting stations and 25 inflow forecasting stations. Hydrological and hydro-meteorological data from nearly 700 stations in these river catchments are being collected and analysed, and flood forecasting and warning messages are issued, generally 24 to 48 hours in advance.

The problem of flood management revolves around two aspects – structural measures and non-structural measures. Long-term measures are execution of watershed management and major flood control works such as raising of flood control structures, land-use regulations, evacuation, emergency equipment, strengthening of forecasting, monitoring and warning system and public awareness. Medium term measures are bank protection, river training and anti- erosion works. Short-term measures are assessment of vulnerability of the flood control structures, strengthening the existing embankments and other flood control works; cleaning, de-silting, flood plain zoning, mapping, etc.

### Droughts

Any lack of water to satisfy the normal needs of agriculture, livestock, industry or human population may be termed as a drought which could be classified as Meteorological, Hydrological or Agricultural drought. In general the major areas liable to drought are usually well known, periods of drought can be prolonged and there is long warning time.

The primary cause for the occurrence of drought is the deficiency of precipitation. The major part of the country except Tamilnadu receives bulk of the annual precipitation during the southwest monsoon period June to September. October-December constitute the main rainy season for Tamilnadu. Winter precipitation is significant in Jammu & Kashmir, Himachal Pradesh and West Uttar Pradesh hills and its abundance or deficiency constitutes the level of stream flow in the following season.

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Substantial areas of our country periodically experience droughts leading to considerable loss of agricultural production and livestock wealth besides causing misery to people inhibiting these areas. Drought management generally focusses on employment generation, water conservation and power supply, standing crop saving and public distribution supplies of essential commodities.

The long-term solution of drought problems usually rests with national governments and involves major policy decisions. The prediction of drought is carried out mainly based on rainfall predictions. These are long range rainfall prediction, medium range rainfall prediction and short range rainfall predictions. Crop yield predictions are carried out based on rainfall and crop condition information received by the State agriculture department.

**India Meteorological Department** responsible for rainfall monitoring in the country has meteorological observatories at each district headquarters and observe the weather information on daily basis. In addition to rainfall monitoring, agro meteorology wing of IMD generates weekly aridity anomaly maps for the country. Monitoring the water levels in all the medium and major reservoirs are carried out daily by the State irrigation departments and Central Water Commission. A unique feature of the Indian effort is spatial monitoring of drought conditions at the level of sub-district units. Programmes to combat or restore ecological balance through soil and moisture conservation on watershed basis have been in operation for almost two decades. In addition, the construction of major and medium scale dams to ensure irrigation and drinking water contributed to a large extent towards mitigation of drought in the country.

## Cyclones

Tropical cyclones form in the warm tropical oceans where the sea surface temperature is at least 26°C. They may last with destructive power for two weeks or more where a large open sea is available. In the Bay of Bengal and Arabian Sea around India, their normal life span may extend up to 4 to 5 days.

As a result of storm surge associated with cyclones, sea water inundates low lying areas of coastal regions causing heavy floods in the coastal areas, eroding beaches and embankments, destroying vegetation and reducing soil fertility. Very strong winds may damage overhead installations, dwellings, communication systems, trees etc.

IMD has a well-established and time tested monitoring and forecasting organisation for tropical cyclones. A good network of meteorological observatories is operated by IMD for monitoring of cyclone development and movement. The conventional observations are supplemented by observational data from polar orbiting and geostationary satellites. INSAT imageries are obtained at hourly intervals during cyclone situation.

IMD issues cyclone warning messages on the location, intensity and probable track from 6 cyclone warning centres located at Calcutta, Bhubaneswar, Chennai, Mumbai, Vishakhapatnam and Ahmedabad. In addition to existing mode of dissemination of cyclone warnings through high priority telegrams, telephone and telex/telefax by I.M.D, Cyclone Warning Dissemination System (CWDS) using INSAT has been implemented. The most essential aspect of the disaster management of tropical cyclones is the availability of warning information at critical times. The INSAT system could be very effective in monitoring the cyclone movement and assessment of its intensity.

## Local Severe Storms

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

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hail are known as hailstorms. A series of thunderstorms along a line often extending hundreds of kilometre is known as a squall line. The squall lines are therefore more severe convective phenomena than an isolated thunderstorm. Another type of severe convective phenomena is the dust storms/sandstorms that occur over Northwest India during hot weather period. These are basically dry thunderstorms in which the strong downdraft from a Cb cloud raises loose dust or sand from the ground and reduces the visibility to almost zero. The entire life cycle of local severe storms from birth to dissipation is only a few hours. National Disaster Management Authority of India issued Action plan which brought out guidelines regarding the precautionary measures to be taken during such weather hazards.