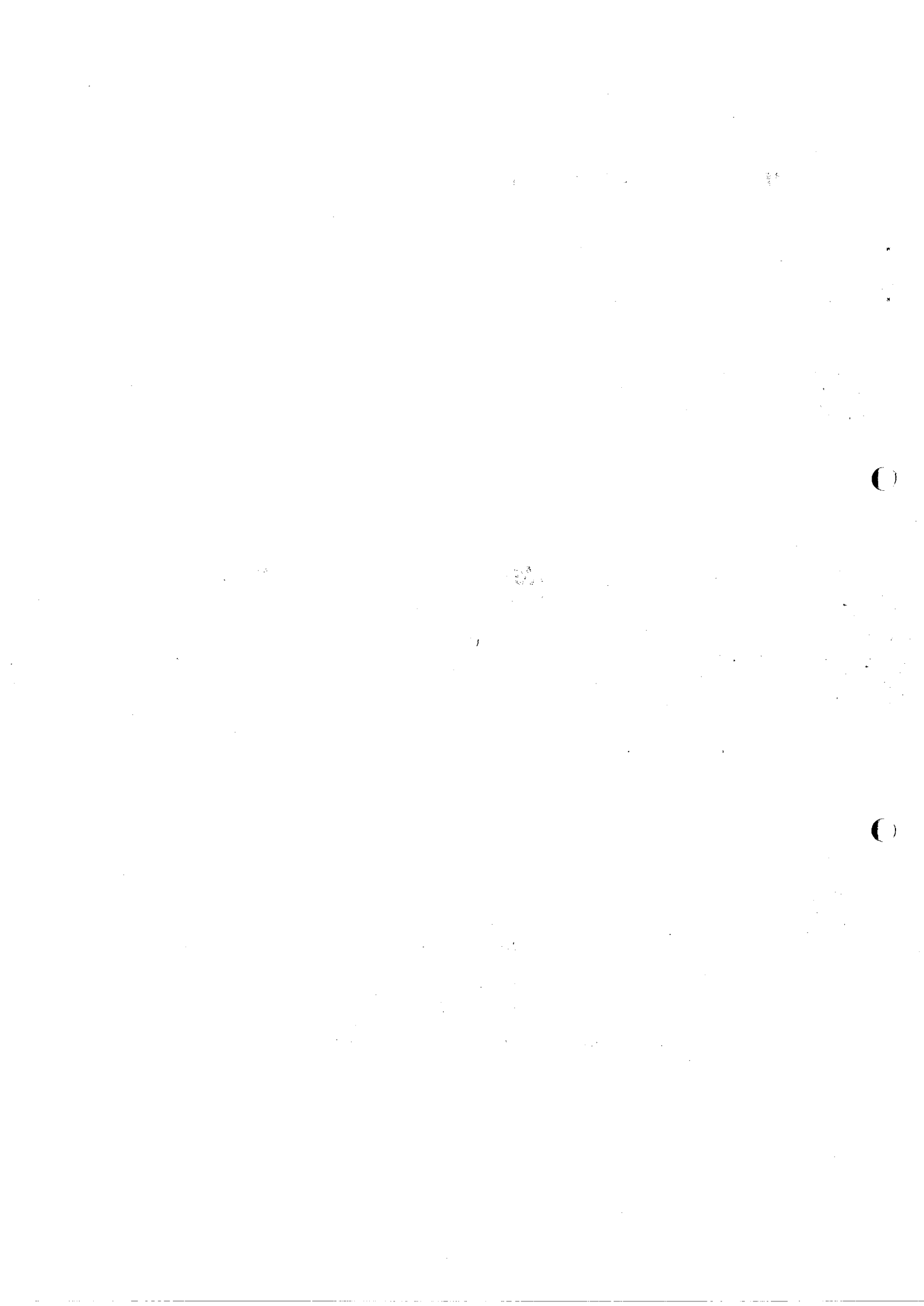


**IDNDR - ESCAP Regional Meeting for Asia
(23-26 February, 1999)
Bangkok, Thailand**

***Natural Disaster Management in India*
(Country Report)**

By

**Bhagat Singh,
Central Relief Commissioner &
Additional Secretary, Government of India
Ministry of Agriculture
(Department of Agriculture & Cooperation)
Krishi Bhawan, New Delhi-110001**



Contents

<u>S.No.</u>	<u>Item</u>	<u>Page no.</u>
1.	Introduction	1-2
2.	Overview of Natural Disasters	2-4
3.	Activities/ Achievements during IDNDR	4-13
	i) Disaster Response	
	ii) Forecasting and warning	
	iii) Preparedness and Mitigation Measures	
	iv) Activities for Long Term Mitigation / Reduction	
4.	Activities at Regional / International Levels	13-14
5.	Disaster Reduction Activities/ Plan for 21st Century	14-16
	i National Level	
	ii) Regional Co-operation	

1000

1000

0

0

1. Introduction

India covers an area of 32,87,263 sq. kms. extending from snow covered Himalayan heights to the tropical rain forests of the South. It is the seventh largest country in the world and is well marked off from the rest of Asia by mountains and the sea which give the country a distinct geographical entity. In the North, it is bounded by the Great Himalayas and stretches southwards tapering off into the Indian ocean between the Bay of Bengal and the Arabian Sea. The main land lies between latitudes 8°4' and 37°6' North and longitudes 68°7' and 97°25' East. It has a land frontier of 15,200 kms. and coastline of about 8,000 kms. It also has groups of islands located both in the Bay of Bengal and the Arabian Sea.

1.2 The main land comprises of four zones, namely, the Great Mountain Zone, Plains of the Ganges and the Indus, Desert Region and the Southern Peninsula. The Himalayan ranges comprised of three parallel ranges interspersed with large plateau and valleys. The mountain wall extends over a distance of 2,400 kms. with a depth varying from 240 to 320 kms.

1.3 The plains of the Ganges and the Indus, about 2,400 Kms. long and 240 to 320 Kms. broad are formed by basins of three distinct river systems, viz.; the Indus, the Ganges and the Brahmaputra. The wide Indo-Gangetic plain lies between the Himalayas in the north and the Deccan Plateau, which occupies most parts of the southern peninsular India. The Western and the Eastern Ghats constitute long mountain ranges, running along the west and the east coasts of the peninsula. These Ghats leave narrow stretches of coastal plains along the Arabian Sea on the west and wider plains on the Bay of Bengal coast on the east. The desert region is clearly delineated in two parts - the Great Desert running beyond Rann of Kutch to Rajasthan - Sindh Frontier and the little desert extending between Jaisalmer and Jodhpur upto the Northern wastes. Between the two deserts is a zone of absolutely sterile region, consisting of rocky land cut up by limestone ridges.

1.4 According to 1991 census, India has a population of 843.93 million consisting of male population of 437.60 million and female population of 406.33 million. The average population density in the country as a whole is 267 persons per sq. km. The literacy rate as per 1991 census is 52.2 percent - 64 percent for males and 39 per cent for females.

1.5 The country is a Union of 25 States and 7 Union Territories. The Union Territories are subject to the direct rule - making powers of the National Parliament and the administrative control of the Union Government. The States have elected Legislatures and Governments, which are fully autonomous in relation to the sphere of activities entrusted to them under the Constitution. The States are further divided into Administrative Units called districts.

1.6 The heavy concentration of rainfall within a span of three months in most of the areas causes heavy run-off and high floods. Non-availability of moisture during most parts of the year, particularly in the arid and semi-arid regions, renders 68 per cent of the land-mass vulnerable to drought. The tectonic plates of Indian sub-continent make it vulnerable to frequent earthquake disturbances.

2. An Overview of Natural Disasters

A natural disaster is an event of nature, which causes sudden disruption to the normal life of a society and causes damage to life and property to such an extent that normal social and economic mechanisms available to the society are inadequate to restore normalcy. Viewed in this manner, a host of natural phenomena causes disasters to a society, whether they are related to an occurrence in micro environment or not. In macro terms, the disasters, which cause widespread damage and disruption in India, are droughts, floods, cyclones and earthquakes.

Floods

2.2 The country receives an annual precipitation of 400 million hectare metres. Of the annual rainfall, 75 per cent is received during four months of monsoon (June - September) and, as a result, almost all the rivers carry heavy discharge during this period. The flood hazard is compounded by the problems of sediment deposition, drainage congestion and synchronisation of river floods with sea tides in the coastal plains. The area liable to floods is 40 million hectares and the average area affected by floods annually is about 8 million hectares. The average annual total damage to crops, houses and public utilities during the period 1953-95 was about Rs. 9720.00 million, while the maximum damage was Rs. 46300.00 million in 1988.

Drought

2.3 Due to erratic behaviour of monsoon, both low (less than 750 mm) and medium (750 - 1125 mm) rainfall regions, which constitute 68 per cent of the total areas, are vulnerable to periodical droughts. The rare droughts of most severe intensity occurred on an average once in 32 years though almost every third year was a drought year.

Cyclones

2.4 On an average, about five to six tropical cyclones form in the Bay of Bengal and Arabian Sea every year, out of which two to three may be severe. There are two distinct cyclone seasons: pre-monsoon (May-June) and post-monsoon (October-November).

Earthquakes

2.5 The Himalayan mountain ranges are considered to be the world's youngest fold mountain ranges. The subterranean Himalayas are, therefore, geologically very active. The Himalayan frontal arc, flanked by the Arakan Yoma fold belt in the east and the Chaman fault in the west constitutes one of the most seismically active regions in the world. Four earthquakes exceeding magnitude 8 + have occurred in this region in the last 100 years.

Landslides

2.6 The Himalayan and the north-eastern hill ranges and the Western Ghats experience considerable landslide activities of varying intensity. The rocks and the debris carried by the rivers like Kosi originating in the Himalayas cause enormous landslides in the valleys. The seismic activity in the Himalayan region also results in considerable landslide movement. The heavy monsoon rainfall, often in association with cyclonic disturbances, results in considerable landslide activity on the slopes of the Western Ghats.

Avalanches

2.7 Avalanches constitute a major hazard in the higher reaches of the Himalayas. Heavy loss of life and property has been reported due to avalanches. Parts of the

Himalayas receive snowfall round the year. Severe snow avalanches are observed during and after snowfalls in the states of Jammu & Kashmir and Himachal Pradesh and the Hills of Western Uttar Pradesh.

3. Activities / Achievements during International Decade for Natural Disaster Reduction (IDNDR)

Declaration of current decade as IDNDR by United Nations has helped substantially in giving more thrust on disaster preparedness and mitigation by the disaster managers in the country. It has also helped in initiating various programmes and activities at different levels to enhance the capability of the country in the area of disaster reduction. The Decade has been instrumental in generating a lot of concern among the various government, non-governmental organisations, scientific and technical institutes and community at large about the adverse impact of disasters.

3.2 During this Decade, India had faced many major disasters, these include cyclones in Andhra Pradesh (1990 and 1996) and Gujarat (1998), earthquakes in Uttarkashi (1991), Latur (1993) and Jabalpur (1997), landslide in Uttar Pradesh (1998), in addition to floods of varying degrees which is an annual feature. On an average, 3000 precious life are lost besides destruction of public and private property in the tune of over Rs. 10,000.00 million.

3.3 On the basis of the objectives of and goals of the Decade as well as experience gained from the natural disasters, many improvements have been made in disaster response, preparedness, mitigation including forecasting and warning. These are summarised below.

i) Disaster Response

3.4 The basic responsibility for undertaking rescue, relief and rehabilitation measures in the event of natural disasters is that of the State Governments concerned. The role of the Central Government is supportive, in terms of physical and financial resources and complementary measures in sectors such as transport, warning and inter-state movement of food grains. Relief Manuals and Codes are available for undertaking emergency operations. However, there is a Crisis Management Group headed by the Cabinet Secretary and consisting of Secretaries of supportive ministries and nodal ministries dealing with various types of disasters. For natural disasters, the Ministry of

Agriculture is the nodal Ministry and the other Ministries play a supportive role. In the event of a disaster, a multi-disciplinary Central Government team, at the invitation of the affected State, carries out disaster assessment and makes recommendation for assistance.

3.5 A broad view of the administrative response at national, state and district levels is given in the subsequent paras.

State Level Organisation

3.6 The subject of disaster preparedness and response in the States is usually delegated to the Relief and Rehabilitation Department or the Department of Revenue. The Crisis Management Group/ Disaster management Committee at the State level is headed by the Chief Secretary of the Government, with participation of all the related agencies.

District Level:

3.7 A District Level Co-ordination and Review Committee in each district is headed by the Collector / District Magistrate/ Deputy Commissioner as Chairman with participation of all other related agencies and departments.

Arrangements for Financing Relief

3.8 Schemes for financing expenditure on relief and rehabilitation in the wake of natural calamities are governed by the recommendations of Finance Commissions appointed by Government of India after every five years. In the beginning of the current decade, the system of financial response underwent a change so as to reduce the time between occurrence of a calamity and the provision of relief to the victims of the calamity. Under the existing scheme for the period 1995-2000, each State has a corpus of funds called Calamity Relief Fund(CRF), administered by a State Level Committee. The size of the corpus is determined having regard to the vulnerability of the State to different natural calamities and the magnitude of expenditure normally incurred by the State on relief operations. The corpus is built by annual contributions of the Union Government and the State Governments concerned. At present, the aggregate accretion in the States' CRF for a period of five years from 1995-2000 amounts to Rs. 63042.70 million. The States are free to draw upon this corpus for providing relief in the event of a natural calamity. In the event of a major disaster warranting intervention at the national level, a provision exists

in the form of National Fund for Calamity Relief with a corpus of Rs. 7000.00 million (for 1995-2000) for the Union Government to supplement the financial resources needed for relief operations.

ii) Forecasting and Warning

3.9 India has over the years and specially in the 1990s developed, upgraded and modernised the monitoring, forecasting and warning systems to deal with cyclones, floods, droughts and earthquakes.

Cyclone

3.10 The India Meteorological Department(IMD) is responsible for cyclone tracking and warning to the concerned user agencies. Cyclone tracking is done through INSAT Satellite and 10 cyclone detection radars deployed at different locations in the coastal areas. Warning is issued to cover ports, fisheries, and aviation departments and vulnerable coastal areas.. The warning system provides for a cyclone alert of 48 hours, and a cyclone warning of 24 hours. There is a special Disaster Warning System (DWS) for dissemination of cyclone warning, in local language, through INSAT Satellite to designated addressees at isolated places .

3.11 The extent of headway made in cyclone warning is evidenced by two situations of 1977 and 1990 in Andhra Pradesh coast which was hit by cyclones accompanied by high storm surges of almost the same intensities. The number of deaths in 1977 was over 10,000 whereas the loss of human life in 1990 was less than 1000. Timely warnings issued by the IMD enabled the administration in evacuating and transporting over half a million people from the affected areas.

Floods

3.12 The Central Water Commission(CWC) has a flood forecasting system covering 62 major rivers in 13 States with 157 stations for transmission of flood warnings on real time basis. In 1995, 8,566 forecasts were issued with a percentage accuracy of 95. There are also 55 hydro-meteorological stations in the 62 river basins.

3.13 The CWC monitors the levels of 60 major reservoirs with weekly reports of water levels and corresponding capacity for the previous year and the average of the previous 10 years. Similar monitoring of smaller reservoirs by the Irrigation Departments of State Governments gives advance warnings of hydrological droughts with below average stream flows, cessation of stream flows and decrease in soil moisture and groundwater levels.

3.14 VHF/HF wireless communication system is used for data collection with micro-computers at the forecasting centres. Hydrological models are increasingly used for inflow and flood forecasting. The forecasts are also communicated to the administrative and the engineering departments for dissemination through fax, e-mail etc..

Droughts

3.15 The IMD has divided the entire country into 35 meteorological sub-divisions. It issues weekly bulletins on rainfall indicating normal, excess and deficient levels and also the percentages of departure from the normal.

3.16 Based on the input from IMD on the rainfall behaviour and the water levels in the reservoirs respectively and the information on crop situations received from the local sources, the National Crop Weather Watch Group monitors the drought conditions.

3.17 Remote sensing techniques are also used for monitoring drought conditions based on vegetative and moisture index status as also for assessing damage caused by floods, cyclones and droughts .

Earthquakes

3.18 On the basis of past earthquakes of magnitude 5 and above on Richter scale and intensities ranging from V to IX superimposed on the magnitude information and also drawing upon tectonic features in the near past, Earthquake Zonation maps have been prepared. IMD operates a network of 36 seismic monitoring stations. After the Maharashtra earthquake of September 1993, a plan to upgrade and modernise the National network of seismological operations equipped with the State-of-art technology instruments is now in progress.

iii) Preparedness and Mitigation Measures

3.19 India, besides evolving effective post-disaster management operations, has also formulated and implemented pre-disaster mitigation programmes and sectoral development programmes to reduce the impact of disasters as well as reduce the socio-economic vulnerabilities. The reconstruction programmes in the aftermath of disasters such as cyclones and earthquakes are also aimed at building disaster resistant structures to withstand the impact of natural hazards in the future.

3.20 India has prepared a Vulnerability Atlas in 1998 with the help of an expert group. Physical vulnerability for floods, cyclones and earthquakes has been depicted for each state and at district level.

Floods

3.21 Structural methods of flood mitigation have attracted an investment of about Rs. 4,0000 million between 1957 and 1995 in construction of new embankments (16200 kms), drainage channels (32000 Km) and raising 4700 critical villages above the flood level. These measures have protected an estimated area of 14.4 million hectares.

3.22 Multi-purpose dams and reservoirs have been built with flood moderation as one of the objectives. Examples of flood moderation through multi-purpose dams are the Damodar Valley system in eastern India, Hirakud Dam in Orissa and the Bhakra Dam on river Sutlej. The Damodar valley system has a flood absorption capacity of 1,867, mcm. which moderates probable floods of 28,300 cusses to 7,075 cusses in the valley.

3.23 The increasing trend in the flood damage observed in India during the seventies led to attempts for the development of flood plains in a regulated manner. A model Bill on flood plain Zoning was circulated to the State Governments as early as 1975 to enact suitable legislation for restricting the encroachment of the flood plains and for their development in regulated manner. The model Bill emphasises on non- structural measures. The main features of the model bill are :

- (a) designating flood zoning authority;
- (b) delineation of flood plain;
- (c) notification of limits of flood plains;
- (d) restrictions on use of flood plains;

- (e) compensation; and
- (f) power to remove un-approved construction.

Droughts

3.24 India has paid adequate attention to irrigation development by harnessing water through the medium reservoirs, developing traditional systems of tanks and exploiting groundwater. The average annual investment on major and medium term irrigation projects rose from 7500.00 million in the First Five Year Plan to Rs. 25000.00 million in the Eighth Five Year Plan creating a total potential of 38.0 million hectares.

3.25 The irrigation potential has not been fully utilised for want of on-farm development works like field channels, land levelling, field drains and absence of appropriate system of water distribution to ensure appropriate water management. The Government of India is now operating a Command Area Development Programme(CADP) to strengthen the water management capabilities and enhance the effectiveness of irrigation water application.

3.26 The Desert Development Programme(DDP) started in 1977-78 aims at controlling the process of desertification and mitigating the adverse effects on drought in the desert areas through such projects as afforestation, sand-dune stabilisation, shelter belt plantation, grassland development and soil and moisture conservation. A similar programme directed at drought prone areas is under implementation since 1973 and is entitled Drought Prone Areas Programme(DPAP). The DPAP is under implementation in 149 districts in 14 States and the DDP in 36 districts in 7 States.

3.27 A programme entitled National Watershed Development Project for Rainfed Areas(NWDPRA) has been devised and is under implementation. The objective of this programme is to achieve conservation of rain water, control of soil erosion, regeneration of green cover and promotion of dryland farming systems including horticulture, agro-forestry, pasture development and livestock management as well as household production systems.

3.28 There are large areas of degraded land of over 100 million hectares in the country which could be reclaimed. A National Wasteland Development Board has been constituted for promoting integrated wasteland development. The National Forest

Conservation Act(1980) is an attempt to bring down the erosion of forest cover all over the country.

3.29 Natural disasters, particularly droughts throw up huge unemployment and under-employment problems in the rural areas. Providing wage employment to the rural poor has been an integral part of rural development efforts. The Jawahar Rozgar Yojana (JRY) envisaged for this purpose is the largest such programme in the country. The objective of the programme is to generate additional gainful employment for the unemployed and under-employed men and women in rural areas. The Employment Assurance Schemes (EAS) are implemented to provide employment opportunities mostly in drought prone areas.

Cyclones

3.30 Measures such as building of cyclone shelters, afforestation in coastal areas, etc. have been undertaken to deal with cyclones. Reconstruction projects have been taken up in areas affected by major calamities by building elements for mitigation of possible future calamities. The Cyclone Reconstruction Project implemented in the coastal Andhra Pradesh during 1990-93 consisted of such components as housing and public infrastructure, drainage and rural water supply. It also included such mitigation efforts as expanding road and communication network, planning of shelter belt plantation and building up of cyclone shelters.

Earthquakes

3.31 Since much loss of life during the past earthquakes in the world has occurred due to the collapse of non-engineered traditional buildings of clay, stones and bricks, and since the bulk of the housing in India consists of such buildings, studies on this problem were started at the University of Roorkee in 1960. Very useful recommendations regarding upgrading of such buildings were available in the Geological Survey of India's memoirs of the 1934 Bihar Earthquake. These efforts resulted in the preparation and publication of IS: 4326 in 1976. After the Koyna Earthquake, the research efforts were devoted to shake-table tests on larger scale specimens for checking the validity of reinforcing recommendations of IS: 4326 and also to further refine the analysis procedures. The monograph published by the International Association of Earthquake Engineering, namely, Basic Concepts of Seismic Codes, Part II, Non-Engineered

Construction, 1980 included many results of the Indian experience, particularly in regard to masonry and wooden buildings. This Monograph has been revised and updated as "Guidelines for Earthquake Resistant Non-Engineered Construction", October, 1986.

3.32 The Department of Science and Technology(DST) is executing a World Bank assisted project on Seismological Instrumentation Upgradation and other Collateral Geophysical studies in the Indian Peninsular region. Major organisations like India Meteorological Department, National Geophysical Research Institute, Survey of India, Geological Survey of India and some academic institutions are participating in the World Bank project. Under the project, it is planned to (i) upgrade 20 existing seismological observatories of IMD, (ii) set up 3 Telemetered Seismic Clusters (iii) establish 10 new Digital Seismic Observatories in the shield region and (iv) provide Strong Motion Instruments both for free field and structural response studies and (v) conduct geodetic studies using GPS technology.

iv) Activities for Long Term Mitigation/Reduction

3.33 To improve disaster management strategy and to enhance our capability to mitigate the impact of disasters in the country in the long-run, the following areas have been identified for implementation:-

i) Intensive training for building up human resource development to improve awareness and capabilities for successful disaster management.

ii) The documentation of events of various natural disasters so as to highlight the lessons learnt in tackling future disasters.

iii) Long-term mitigation measures which will focus on various programmes keeping in view the goals and objectives of IDNDR.

iv) For achieving long-term results there is need to examine critically the development programmes in relation to disaster management in different areas and suggest priorities and strategies for inclusion in the ongoing plans.

v) To create awareness among the general public about the various aspects of disasters and benefits of the counter-measures.

vi) Programmes of undertaking consultancy services, research programmes etc. to increase the level of understanding and evolving appropriate measures to improve the quality of the disaster management.

vii) To have an integrated approach in developing professional disaster management strategy.

viii) Improvement of forecasting, warning and communication system for effective disaster management.

ix) community awareness

x) Modernisation of equipment - introduction of state of art technology

xi) Designs of wind resistant and earthquake resistant houses and amendments to building and town planning laws at city levels.

3.34 A Central Sector Plan Scheme on Natural Disaster Management Programmes (NDMP) has been implemented since December 1993. The main objective of the scheme is to enhance the national capability for disaster reduction, preparedness and mitigation. The programme is also expected to enhance the level of awareness of the members of the community about disasters they are likely to face and prepare them adequately to face the crisis situation.

The components of the programme are:-

- i) Human resource development,
- ii) Activities under IDNDR,
- iii) Research and consultancy services,
- iv) Documentation of major events,
- v) strengthening of NDM administration,
- vi) Establishment and strengthening of National Centre for Disaster Management (NCDM) at the Centre and the Natural Disaster Management Faculties in States.

3.35 The major achievements of the programme so far are :-

i) Setting up of the National Centre for Disaster Management in the Indian Institute of Public Administration , New Delhi, in 1995.

ii) Setting up of separate Disaster Management Faculties in Training Institutes in 16 out of 25 States in the country,

iii) Documentation of major events like Uttarkashi and Latur earthquakes, research studies on land-slides in Kerala , Sikkim and Uttar Pradesh, droughts in Rajasthan and cyclone mitigation in Andhra Pradesh.

iv) Preparation of source book for use of trainees of the Lal Bahadur Shastri National Academy of Administration,

v) Organising/ sponsoring of training programmes/ seminars on various aspects of natural disaster management,

vi) Public education and community awareness campaign through newspapers, postal stationery, observation of World Disaster Reduction Day and films,

vii) Reprinting of 45000 copies of IDNDR publication for children in English and Hindi for distribution among school children.

4. Activities at Regional / International Levels

India is committed to the goals and objectives of the International Decade for Natural Disaster Reduction. A strong delegation led by Agriculture Minister participated in the World Conference on Natural Disaster Reduction held in Japan in 1994. Every year world Disaster Reduction Day (2nd Wednesday of October) is observed in a befitting manner. State Governments, State Level Training Institutes and some organisations observe this day by organising various activities of public awareness.

i) India hosted the 4th Session of the Scientific and Technical Committee of IDNDR during February, 1-5, 1993.

ii) Government of India hosted on 30th March and 2nd April, 1994, a workshop on Natural Disaster Reduction in the South-Asian Region under the auspices of the SAARC. The Workshop reviewed the status of Natural Disaster Reduction Programme in the Region and finalised a common approach on various issues in the context of the May, 1994 World Conference on Disaster Reduction held in Yokohama, Japan.

iii) A delegation led by Agriculture Minister participated in the World Conference on Natural Disaster Reduction in May, 1994.

iv) Government of India hosted the two day Seminar in New Delhi on 28th & 29th September, 1994 on Comprehensive Flood Loss Prevention & Management organised by ESCAP.

v) India has recently accepted the membership of Asian Disaster Reduction Centre at Kobe, Japan.

5. Disaster Reduction Activities / Plan for 21st Century

i) National Level

In spite of initiating various disaster mitigation measures, the trend of losses is not indicating any sign of improvement. Population pressure, environmental degradation, migration and unplanned urbanisation are some of the major factors contributing to increased vulnerability. As such need has been felt to accelerate the pace of disaster mitigation efforts in the country. It is planned to lay more emphasis on the following areas

:-

- linkage of disaster mitigation with development plans,
- effective communication system,
- use of latest information technology,
- insurance in all relevant sectors,
- extensive public awareness and education campaigns particularly in the rural areas
- legal and legislative support,
- involvement of private sector,
- greater involvement of non governmental organisations

- strengthening of institutional mechanism including Natural Disaster Management Division in the nodal Ministry of Agriculture, international co-operation at regional and bi-lateral level

ii) Regional Co-operation

5.2 Most of the worlds worst disasters tend to occur between the Tropic of Cancer and Tropic of Capricorn. Coincidentally, this covers most of the Asian countries and some of them are among the poorest countries of the world. The disasters cause enormous destruction and human suffering in the developing countries . Some of the natural disasters like floods and cyclones cause havoc in more than one country simultaneously. The excessive rain in catchment area of Nepal rivers cause extensive flood damage in India as well. Similarly cyclone formation in Bay of Bengal needs Regional co-operation in information dissemination and early warning. It underlines the necessity for co-ordinated international action in order to strengthen all aspects of disaster management wherever possible by learning from one another and by sharing experiences.

5.3 Regional co-operation for effective disaster management system is needed broadly in the following areas :-

- Hazard and vulnerability analysis
- Human resource development
- Exchange of information through inter-net
- Disaster management network at the regional level
- Networking of the regional institutes

5.4 India over the years has evolved a well tested disaster relief and rehabilitation mechanism. Relief manuals and codes backed by contingency action plan along with the allocation of resources, facilitates the emergency management operations. A Plan scheme has been initiated with the objective of enhancing the national capability for disaster reduction and preparedness. The institutional mechanism has been strengthened by establishing the disaster management centres at the national and state levels.

5.5 The National Centre for Disaster Management , New Delhi is working in the area of natural disaster management for human resource development, creation of a data base, documentation of disasters, research studies and networking of the institutions at national and international level. In addition, small Centres on disaster management are

also operating in the state level training institutes. A large number of institute already engaged in the activities related to disaster reduction activities. Some of these are:-

- Department of Earthquake Engineering, University of Roorkee,
- Building Material Technology Promotion Council, New Delhi.
- Central Building Research Institute, Roorkee.
- National Civil Defence College, Nagpur.
- National Institute of Rural Development, Hyderabad.
- Indian Institutes of Technology, Delhi, Kanpur, Mumbai.
- Structural Engineering Research Centres, Hyderabad.
- Central Road Research Institute, New Delhi.
- Council for Scientific and Industrial Research, New Delhi.
- Anna University, Chennai.
- Indra Gandhi National Open University, New Delhi.
- SEEDS, Delhi.
- DMI ,Ahmadabad.

5.6 India will be happy to provide the available expertise for disaster relief and rehabilitation, human resource development , preparation of relief manuals and codes , contingency action plans , post disaster evaluation and information technology as also to join hands with other countries in the region in these and other related fields.
