

Second India Disaster Management Congress

4-6 November 2009

Concept Note on Thematic Session on 'Flood'

A. Introduction:

A flood is an excess of water (or mud) on land that's normally dry and is a SITUATION where inundation is caused by high flow, or overflow of water in an established watercourse, such as a river, stream, or drainage ditch; or ponding of water at or near the point where the rain fell. A flood can strike anywhere without warning, occurs when a large volume of rain falls within a short time.

Floods are recurrent phenomena since time immemorial. Almost every year some parts of the world or the other are affected by the floods of varying magnitude. Even in the same country of the region different parts have different climates and rainfall patterns and, as such, it is also experienced that while some parts are suffering under devastating floods, another part is suffering under drought. With the increase in population and developmental activity, there has been tendency to occupy the flood plains which has resulted in more serious nature of damages over the years. Because of the varying rainfall distribution, many a times, areas which are not traditionally prone to floods also experience severe inundation. The effect of climate change is yet another factor under study in recent times to assess the impact on flood. Flood indeed is the single most frequent disaster faced not only in India but by various part of world including the South Asia region.

Nature and Causes of Flood

Flooding is caused by the inadequate capacity within the banks of the rivers to contain the high flows brought down from the upper catchment due to heavy rainfall. Floods are also caused by delay in the drainage of the rain water due to high stages of the river at the outfall and stagnation of water behind embankments. In coastal areas, floods are caused by cyclones and typhoons. Other causes include backing up of waters in tributaries at their outfalls into the main river often with synchronization of floods in them; ice jams or landslides blocking stream courses resulting in the backwater overflowing river banks. Flash flood occurs in areas near foot hills. However the root cause of flood is excessive rainfall which occurs mainly in the monsoon months of July to September. Floods are also sometimes caused by Glacial Lake Outburst & such floods are called Glacial Lake Outburst Floods (GLOFs). GLOFs can be catastrophic for people living immediately downstream and can cause serious damage to infrastructure and the economy

Floods also occur in areas which have been provided protection against flood. Such floods are caused mainly by breaches or overtopping of embankments or excessive release of water from the reservoirs. In the absence of sluice gates, accumulation of rain water behind the embankments further adds to the problem. Floods in the protected areas cause more havoc than those in the unprotected areas because of the additional land use activities undertaken in such areas. Areas having poor drainage characteristics get flooded by accumulation of water from heavy rainfall.

Floods are categorised as Coastal Flood, River Flood or Urban flood depending on their location. According to duration, it is also sometimes known as Slow-Onset Flood, Rapid-Onset Flood or Flash Flood.

Flood Prone Areas in India:

The annual precipitation including snow fall is estimated at 4000 Billion Cubic Meter (BCM). Out of this, the seasonal rainfall in monsoon is of the order of 3000 BCM. Rainfall in India is mainly dependent on the south-west and north-east monsoons on the cyclonic depressions and disturbances and on violent local storms. Most of the rainfall in India (80%) takes place under the

influence of south-west monsoon between June to September (4 months). Remaining (20%) rainfall is received from north-east monsoon, cyclonic storm, local storms and cloud bursts. The rainfall in India shows great variations, unequal seasonal distribution and frequent departure from the normal. It has been estimated by the National Commission on Flood that the area prone to the floods in the country is of the order of 40 m.ha, out of which it is considered that 32 m.ha could be provided with reasonable degree of protection. Achievement so far attained is for an area of about 18.22 m.ha. The average annual total damage to crops, houses and public utilities during the period 1953-1995 was about Rs.9720 million.

Most of the major rivers causing flood in India flow down the slopes of the Himalayan Mountains which have friable soil mantle. Hence, the flood water flowing through them carry considerable amounts of sediment which result in silt accumulation in reservoirs and in the flood plains. The central India and peninsular rivers, on the other hand rise and flow through geologically more stable areas and receive much less rainfall also. These rivers, therefore, carry less sediment and cause less flood problems.

With reference to flood, India can be divided into four regions.

1. Brahmaputra and Barak Region

2. Ganga River Region along with its numerous **tributaries** like Yamuna, Sone, Ghaghra, Gandak, Kosi, Mahananda,

3. North West River Region consisting of rivers like Sutlej, Ravi, Beas, Jhelum and Ghaggar

4. Central India and Deccan River Region comprising of rivers as Narmada, Tapi, Mahanadi, Godavari, Krishna and Cauvery covering Central and Southern India.

B. Context:

Flood in the above first region, is severe and quite frequent with very high silt charges in the rivers. Some of the rivers like Teesta, Torse and Jaldakha have a tendency to change their courses while in flood. Flooding in the second region is more or less an annual feature which is aggravated by drainage congestion. The major problem in the third region is that of inadequate surface drainage which causes inundation and water logging over vast areas. The fourth region does not have very serious problem of flooding except for some of the rivers in Orissa. The delta areas of some of these rivers on the east coast periodically face flood and drainage problems in the wake of cyclonic storms. Assam, Bihar, West Bengal, U.P. and Orissa are the worst flood affected states. The percentage of flood prone area to total area of the state is highest in Bihar followed by Assam and west Bengal.

Within the overall master plan for the basin & the region, there has to be a well thought of plan as also a contingency plan, in each state involving steps required to be taken before the onset of floods during the floods and post- flood management. This calls for integrated planning to ensure a safe living for all those residing in the flood plain & to become development in these areas indeed sustainable.

Some of the recent disasters have exposed the gap of an effective response capacity that can save valuable lives. The most recent example is 2008 floods. As per EMDAT estimates, approximately 14 million people were affected by floods in South Asia and more than 2700 lost there lives. Contrary, North America had more than 11 million people affected by flood but only 44 lost lives. In East Asia, 7 million were affected due to floods but only 367 lost lives; in south East Asia 4.4 million were affected and 400 died. This necessitates efforts at national & regional levels to mitigate the effect of flood in an effective manner.

C. Objectives – The broad objectives of the session are:

- To discuss the social & economic aspects of flood on the flood affected areas, population affected, consequences & their impact in rural & urban areas
- Effectiveness of measures initiated so far in light of experience gained due to recurrent floods in various parts of the region & the country & the impact thereof.

- Future course of action required to be initiated at various levels for 'Flood Risk Management' in vulnerable areas to develop a sense of security in the mind of population affected by flood.
- To promote studies, research, training, documentation & capacity building to minimize the adverse effect of flood in an effective manner within the given resources to improve the quality of life of people inhabiting in these flood plains.

D. Expected Sub Themes

Second Indian Disaster Management primarily intends to discuss various issues related to 'Flood'. The theme on 'flood' though would represent the broader aspects of floods, their causes, structural & non-structural measures including flood plain zoning to arrest the menace of floods etc, the deliberations can be subdivided into following sub-themes.

- Flood Risk Management
- Flood Protection works
- Advance Flood warning & Flood Forecast Modelling
- Climate Change & its Impact on Flood
- Major Flood Events of recent past & measures adopted
- Urban Flooding

E. Expected Outcome Session Plan

Most of the major floods are caused by rivers which are international or inter-state e.g. flood damage in Bihar is caused mainly from rivers flowing from Nepal such as Kosi, Gandak, Bagmati, Kamala Balan etc. Similarly most of flood damages in Assam are due to rivers coming from China, Bhutan and other states. Yamuna and Ganga which cause damage in UP, Bihar and West Bengal are interstate rivers. International and Interstate Dimensions of the Flood Problem creates hindrance for any provincial government to take up most appropriate measures for moderating floods and adds to the complexity of the flood problem in India. While it is expected that the session will throw light on arresting menace of flood in a long term perspective, it is also emphasized to evolve a general consensus to integrate cooperation of neighboring countries through a proper mechanism in our endeavor to minimize flood related losses.

F. Session Plan

Total duration of the session: 3 hrs divided into two separate sessions. Between the sessions there will be a tea break for 15 minutes or if the chair decides the tea would be served on self service based approach.

Total number of papers for oral presentation would be around 10-12 depending on the quality and the number of abstracts received. The abstract would be reviewed by NIDM and then the same will be sent to the chairperson for his review & final acceptance. The chairperson will decide the final presenters:

Chairman of the session on 'Flood'

Mr. R.C. Jha,
Member (River Management)
Central Water Commission,
2nd Floor, Room No. 212 (S)
Sewa Bhawan, R.K.Puram,
New Delhi-110066
E-mail: mrm@nic.in

Rapporteur : Mr. Chote Lal, Director (FMP), CWC
E.mail: fmp-cwc@nic.in

2nd India Disaster Management Congress 2009

Theme: Flood

Chairperson: Mr.R.C.Jha, Member (RM), CWC

Rapporteur: - Mr. Chote.Lal, Director (FMP), CWC

Session Facilitator: Mr.Shankar Mahto (Specialist- Hyd- met.), SDMC New Delhi

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| Opening Note & Welcome Address | Mr. Chote.Lal |
| Remarks by the Chairperson | Mr.R.C.Jha |
| Key Note Address on International Dimension of Flood cooperation w. r. t shared regional rivers. | Mr. R. Rangachari- Honorary professor ,Centre for Policy Research N.Delhi |
| Innovative methods is River Erosion Control – A case study of erosion of Bhira-Palia Railway line by Sharda River in U. P. | M. U. Ghani, GFCC |
| Cofferdam, An Effective Tool for Emergent Flood Management Works-A case study of kosi barrage afflux bund breach closure | M. U. Ghani, GFCC |
| Kosi Floods 2008: A Call for Cooperation | Sanjay Srivastava, Binod Shakya, .Ranjan Kumar |
| Is Indigenous Knowledge enough to live with floods?? An Assessment in Indo-Nepal Flood Plains | Sanjay Srivastava, Binod Shakya, .Ranjan Kumar |
| Flood Frequency Estimation for a Risk prone river in East Uttar Pradesh | V. Jaysree,B. Venkatesh |
| Incorporating Local needs and capacity for flood risk reduction | Victoria Devi, P. C. Joshi |
| Lessons learnt from Disaster Management of Recent Dam/Embankment Break Events in India | M.K.Sinha, S.M.Narulkar |
| Flood Risk Assessment & Mitigation in Haryana: A Case study of Rohtak District | Nazia Talat, Anil K Gupta and Sreeja Nair |
| Flood Hazard Vulnerability and Risk Assessment of the North India: Assessment of Concurrent Mitigation Options | Sandeep K Pandey and Anil K Gupta |
| Flood Forecasting Network of Mahanadi Basin- A Critical Review | Anil Kumar Kar, A k Lohani NK Goel, G.P. Roy |
| An Experiment Using the High Resolution WRF Model to Predict Heavy Precipitation over India | Anupam Kumar ,D.R.Pattanaik and Y.V.Rama Rao |
| Flood Forecast Technology for Disaster Preparedness in Bangladesh | Seema Gaikwad seema@carebangladesh.org |
| Flood Risk Mitigation and Management practices in Delhi | Mukesh Kumar,Amir Ali Khan,Sirajuddin Ahmed Khalid Mojn |
| Problem of Urban Floods in the developing cities of developing world | R. K. Agrawal shrirkg@gmail.com |
| Key Recommendations | Mr. Chote.Lal |
| Discussion & Concluding Remarks | |
| Vote of Thank | |