

FLOOD : RISK AND VULNERABILITY OF INDIA

Following the enactment of the Disaster Management Act, 2005, (DM Act, 2005) the Government of India (GOI) constituted the National Disaster Management Authority (NDMA) as the apex body for Disaster Management (DM) in India with the mandate, inter alia, for laying down policies and guidelines on DM. At the national level, there is to be a paradigm shift from the erstwhile relief-centric and post-event syndrome to pro-active prevention-, mitigation- and preparedness-driven DM. These efforts will conserve developmental gains and also minimise loss of lives, livelihood systems and property. These Guidelines have been evolved by the NDMA, through a nine-step process. This approach ensures that all contemporary knowledge, experience and information are taken on board, clear destinations are identified, and road maps drawn with milestones duly marked off through a wide consultative process, involving all the stakeholders. Recognising the gravity of the risk and vulnerability of India to floods, the NDMA, soon after its constitution initiated a series of consultations with the various stakeholders to develop Guidelines for strengthening the existing arrangements for flood preparedness, mitigation, and post-flood emergency response, relief, rehabilitation and reconstruction.

Vulnerability to Floods

Floods have been a recurrent phenomenon in India and cause huge losses to lives, properties, livelihood systems, infrastructure and public utilities. India's high risk and vulnerability is highlighted by the fact that 40 million hectares out of a geographical area of 3290 lakh hectares is prone to floods. On an average every year, 75 lakh hectares of land is affected, 1600 lives are lost and the damage caused to crops, houses and public utilities is Rs. 1805 crores due to floods. The maximum number of lives (11,316) were lost in the year 1977. The frequency of major floods is more than once in five years. Floods have also occurred in areas, which were earlier not considered flood prone. An effort has been made in these Guidelines to cover the entire gamut of Flood Management. Eighty per cent of the precipitation takes place in the monsoon months from June to September. The rivers bring heavy sediment load from the catchments. These, coupled with inadequate carrying capacity of the rivers are responsible for causing floods, drainage congestion and erosion of river-banks. Cyclones, cyclonic circulations and cloud bursts cause flash floods and lead to huge losses. The fact that some of the rivers causing damage in India originate in neighboring countries, adds another complex dimension to the problem. Continuing and largescale loss of lives and damage to public and private property due to floods indicate that we are still to develop an effective response to floods. These Guidelines have been prepared to enable the various implementers and stakeholder agencies to address effectively the critical areas for minimizing flood damages.

Urban Flooding

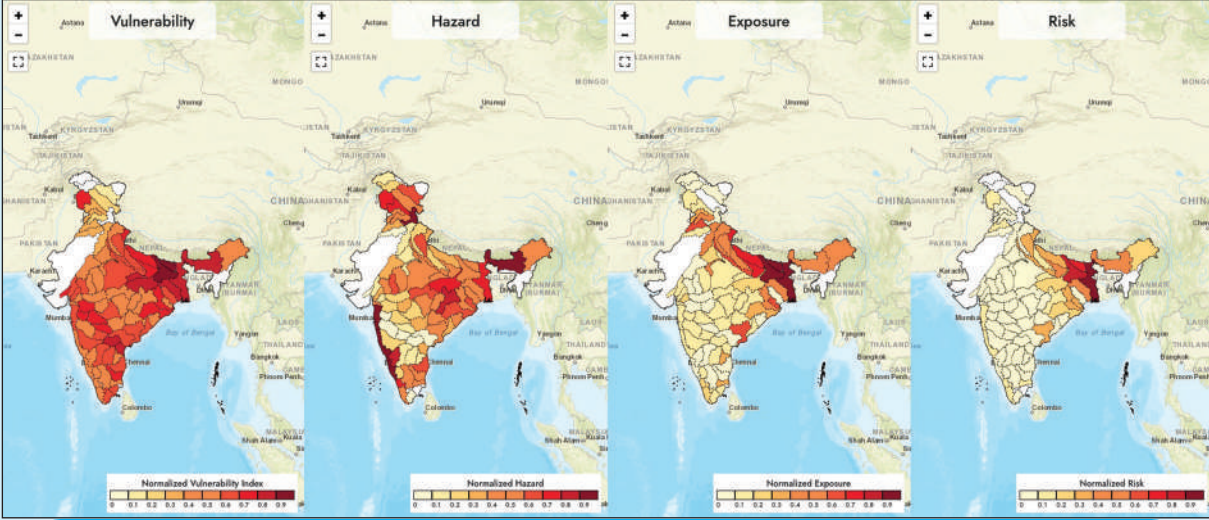
Flooding in the cities and the towns is a recent phenomenon caused by increasing incidence of heavy rainfall in a short period of time, indiscriminate encroachment of waterways, inadequate capacity of drains and lack of maintenance of the drainage infrastructure. Keeping in view the fact that the problem is becoming more severe and losses are mounting every year, the subject of urban flooding has been recognised by the NDMA as one meriting exclusive attention and separate guidelines for its management are being prepared and will be issued soon.

Action Plans at Various Levels

These Guidelines have been drawn up in the context of a rigorous risk management framework to ensure the effectiveness of action plans that are developed by various agencies. All key agencies, including the central ministries, and departments, state governments, local bodies including Panchayati Raj Institutions (PRIs), and Urban Local Bodies (ULBs) like metropolitan development authorities, municipal corporations, municipal councils and district authorities will develop detailed FMPs based on these Guidelines. State governments and local authorities will play an important role in the formulation and effective implementation of such action plans. The communities and other stakeholders will play an important part in ensuring compliance to the regulations and their effective enforcement. The State Disaster Management Authorities (SDMAs) will be responsible for reviewing and monitoring the implementation of the action plans at the state-level.

The Objectives of the Guidelines

- These Guidelines rest on the following objectives aimed at increasing the efficacy of the FMPs, which will be prepared at various levels:
- Shifting the focus to preparedness by implementing, in a time-bound manner, an optimal combination of technoeconomically viable, socially acceptable and eco-friendly structural and nonstructural measures of FM.
 - Ensuring regular monitoring of the effectiveness and sustainability of various structures and taking appropriate measures for their restoration and strengthening.
 - Continuous modernisation of flood forecasting, early warning and decision support systems.
 - Ensuring the incorporation of flood resistant features in the design and construction of new structures in the flood prone areas.
 - Drawing up time-bound plans for the flood proofing of strategic and public utility structures in flood prone



areas.

- Improving the awareness and preparedness of all stakeholders in the flood prone areas.
 - Introducing appropriate capacity development interventions for effective FM (including education, training, capacity building, research and development, and documentation.)
 - Improving the compliance regime through appropriate mechanisms.
 - Strengthening the emergency response capabilities.
- Earlier Initiatives of the Government of India**
- Following the unprecedented floods of 1954, the then Union Minister for Planning, Irrigation and Power placed before Parliament on 3 September 1954, the statements on floods which set the objective of reducing the menace of floods. Later on, in a subsequent statement in Parliament on 27 July 1956, the emphasis was laid on doing all that was possible to contain floods in the country. Since then the government has taken various initiatives and set up a number of committees to study the problem and recommend several remedial measures. The most important ones are the High Level Committee on Floods (1957), the Ministers Committee on Flood Control (1964), the Rashtriya Barh Ayog (1980) and Task Force on Flood Management/Erosion Control (2004).

Institutional Framework

As per the constitutional provisions, FM is a state subject and as such the primary responsibility for flood management lies with the states. The central government has taken various initiatives and set up a number of organisations dealing with the floods. The most notable one is the enactment of the National Disaster Management Act, December 2005 and setting up of the NDMA, which has been assigned to deal with all types of disasters including the floods. The National Executive Committee (NEC) with the Secretary of GOI of the ministry or department having administrative control of the subject of the DM as the Chairman and Secretaries of other ministries concerned and the Chief of the Integrated Defence Staff to the Chairman Chiefs of the Staff Committee (CISC) as Members, will assist the NDMA in the discharge of its functions and ensure compliance of the directions issued by the central government apart from preparing the National Disaster Management Plan. The state governments are to set up State Disaster Management Authorities (SDMAs) and State Executive Committees (SECs) to perform similar functions at the state level. These are in addition to existing organisations dealing with the floods in the states. There is a need to set up a central rganization to lay down policy and implement FM measures in consultation with the states and other stakeholders as floods are not confined to one state and flooding in one state leads to flooding in adjoining states.

Accordingly, it has been proposed to set up River Basin Organisations to deal with the management of water resources at river basin level. It is also proposed to set up a National Flood Management Institute (NFMI) at an appropriate location in one of the flood prone states, to impart training to engineers, administrators, personnel of the police departments, Non-governmental Organisations (NGOs) and Community Based Organisations (CBOs) etc.

Flood Prevention, Preparedness and Mitigation

Floods being the most common natural disaster, people have, out of experience, devised many ways of coping with them. However, encroachments into the flood plains over the years has aggravated the flood problem and a need to take effective and sustained FM measures has been felt. Various measures, structural and nonstructural, have been taken by the central and state governments and as a result, considerable protection has been provided to the people. However, more efforts are required in this direc-

tion and there is a need to put in place a techno-legal regime to make structures flood-proof and regulate the activities in the flood plains of the rivers. Flood forecasting and warning and Decision Support System (DSS) will be established on a scientific basis taking into account the latest technological developments in the world.

Capacity Development and Flood Response

The central government and the state governments are required to take steps for capacity development for taking effective and sustainable preventive, preparatory and mitigative measures in pre-floods stage and effective and prompt response during- and post-floods stages. Appropriate recommendations have been made in this regard.

Activities for Minimising Flood Risk and Losses

The activities proposed to be undertaken aim at minimising the flood risk and losses and are to be implemented in three phases in addition to recurring activities.

Phase-I

These activities include identification and marking of flood prone areas on maps, preparation of close contour and flood vulnerability maps, formulating plans for expansion and modernisation of flood forecasting and warning systems, identification of priority flood protection and drainage improvement works, identification of reservoirs for review and modification of operation manuals and rule curves and undertaking special studies on problems of river erosion. These will be initiated immediately and efforts will be made to complete them in a phased manner with the last of these activities scheduled for completion by January 2010.

Phase-II

These include implementation of he chemes for expansion and modernisation of the flood forecasting and warning network, execution of flood protection and drainage improvement schemes, modification and adoption of revised reservoir operation manuals, enactment and enforcement of flood plain zoning regulations and planning and preparation of Detailed Project Reports (DPRs) for storage reservoirs and implementation of the schemes for real-time collection of hydrometeorological data on rivers in Nepal, Bhutan and China. These activities, which aim at implementation of FMPs, will commence immediately after the completion of the link activities of Phase-I and will be completed by March 2012.

Phase-III

Implementation of activities, which include construction of dams and catchment area treatment (CAT) works in India as well as neighboring countries, is likely to take considerable time as they entail major environmental, social, inter-state and international implications. These need careful study and interaction with the stakeholders. It is envisaged that all feasible schemes will be completed by the year 2025.

Recurring Activities

These activities which include inspection of dams, embankments and other structural measures, execution of restoration and strengthening works and expansion and modernisation of flood forecasting and warning systems, are to be taken on a regular basis for ensuring the effectiveness and sustainability of various measures for minimizing flood risk.

The relevance and status of various activities will be continuously monitored and reviewed. The activities will be modified, if felt necessary. The preparedness of the central ministries and departments concerned and the state governments will be reviewed in April/May every year and appropriate corrective measures will be taken before the commencement of the monsoon. A post-monsoon review will be held every year in November/December so as to finalise the action plan for preparatory measures to be implemented before the onset of the next monsoon.

Flood Management Plans

It is expected that based on these guidelines the central ministries and departments concerned and the state governments will prepare their FMPs which will be holistic, participatory, inclusive, ecofriendly and gender-sensitive in nature and the implementation of which will result in a flood- resilient India. The plans will focus on the community and the collective efforts of the government and NGOs.

The national vision is to minimise the vulnerability to floods and the consequent loss of lives, livelihood systems, property and damage to infrastructure and public utilities and to build a safer India by developing a holistic, proactive, multidisaster and technology driven strategy for DM. This is to be achieved through a combination of preventive, mitigative and preparatory measures to generate a prompt and efficient response after the occurrence of floods. The entire process will focus on the community and will be sustained through the collective efforts of the government and NGOs.

The value of these guidelines will lie essentially, in the efficacy of the FMPs that will consequently be made and implemented by the central ministries and departments and the state governments. The central government and the state governments will provide necessary resources, both financial and managerial for creating adequate structures at all levels to take measures required to minimise risk and vulnerability to floods Floods and famines have ravaged mankind from time immemorial and a vast store of knowledge and experience is available on handling these disasters. An attempt has been made in these Guidelines to build on this precious heritage while, simultaneously, factoring in the benefits of modern technology and scientific advantages apart from emphasising the value of concerted action and sustained efforts at mitigation.

India is highly vulnerable to floods. Out of the total geographical area of 329 million hectares (mha), more than 40 mha is flood prone. Floods are a recurrent phenomenon, which cause huge loss of lives and damage to livelihood systems, property, infrastructure and public utilities. It is a cause for concern that flood related damages show an increasing trend. The average annual flood damage in the last 10 years period from 1996 to 2005 was Rs. 4745 crore as compared to Rs. 1805 crore, the corresponding average for the previous 53 years. This can be attributed to many reasons including a steep increase in population, rapid urbanization growing developmental and economic activities in flood plains coupled with global warming.

An average every year, 75 lakh hectares of land is affected, 1600 lives are lost and the damage caused to crops, houses and public utilities is Rs.1805 crores due to floods. The maximum number of lives (11,316) was lost in the year 1977. The frequency of major floods is more than once in five years.

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FLOODS: DO'S & DON'TS

What to do before a flood

To prepare for a flood, you should:

- Avoid building in flood prone areas unless you elevate and reinforce your home.
 - Elevate the furnace, water heater, and electric panel if susceptible to flooding.
 - Install "Check Valves" in sewer traps to prevent floodwater from backing up into the drains of your home.
 - Contact community officials to find out if they are planning to construct barriers (levees, beams and floodwalls) to stop floodwater from entering the homes in your area.
 - Seal the walls in your basement with waterproofing compounds to avoid seepage.
- If a flood is likely to hit your area, you should:**
- Listen to the radio or television for information.
 - Be aware that flash flooding can occur. If there is any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
 - Be aware of streams, drainage channels, canyons, and other areas known to flood suddenly. Flash floods can occur in these areas with or without such typical warnings as rain clouds or heavy rain.
- If you must prepare to evacuate, you should:**
- Secure your home. If you have time, bring in outdoor furniture. Move essential items to an upper floor.
 - Turn off utilities at the main switches or valves if instructed to do so. Disconnect electrical appliances. Do not touch electrical equipment if you are wet or standing in water.
- If you have to leave your home, remember these evacuation tips:**
- Do not walk through moving water. Six inches of moving water can make you fall. If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you.
 - Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely. You and the vehicle can be quickly swept away.