Chapter 2

Planning

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The effectiveness of measures taken to address flood risk and mitigation is dependent on coherent planning. In particular, long term strategic planning is required to ensure maximum benefit from limited resources. Flood management in a State calls for a long term and comprehensive approach. Preparation of an integrated plan to address flooding, erosion and drainage problems in flood prone basins and its implementation in a phased and coordinated manner is essential. The deficiencies noted in planning are detailed below:

2.1 Non-preparation of Comprehensive Plan

While the State Governments are responsible for flood control as per priorities within the State with their own resources, Government of India has been rendering technical, advisory and financial assistance to the State Governments through the various Plan schemes. Government of India decided to provide financial assistance because it found flood damages had increased due to non-completion of flood control works and their poor maintenance on account of funds constraints. A plan scheme "Flood Management Programme" (FMP) for providing Central Assistance to the State Governments was taken up at an estimated cost of ₹ 8000.00 crore during 11th Five Year Plan for river management, flood control, anti-erosion, drainage development, flood proofing, restoration of damaged flood management works and anti-sea erosion works; which were considered critical in nature. This programme was appreciated by all the States and 12th Five Year Plan Working Group on "Flood Management and Region Specific Issues" recommended to continue with it in the 12th Five Year Plan period also.

Salient features of FMP

- To avail the Central Assistance, the States have been advised to prepare the schemes of flood management works in an integrated manner covering the entire river/tributary or a major segment. However, in case of emergent situation arising due to high floods, the works in critical reaches are taken up immediately after flood season.
- While submitting a proposal, the State Governments have to ensure acquisition of land required under the scheme and submit a certificate to this effect.
- The State Governments have to ensure inclusion of the scheme in the State Plan and make requisite budget provision towards Central as well as State share on annual basis.
- Subsequent installments of Central Assistance are released on receipt of the Utilization Certificate in FORM GFR-19A submitted by the concerned Chief Engineer and the financial authority; and countersigned by the concerned Secretary of the implementing Department/Finance Secretary of the State Government.
- Actual expenditure incurred by the State Governments from their own resources in the financial year (in which the scheme is approved by the Empowered Committee under FMP) would be reimbursed in the same financial year or, if the Central Assistance is not released in that financial

year, in the next financial year, in which case requirement of budget provision may not be necessary.

Further, Para 1.2 of National Disaster Management Guidelines (January 2008) of National Disaster Management Authority (NDMA), GoI provide for preparation of basin-wise and region-wise comprehensive plans, taking into account all existing developments. This was to also indicate areas prone to floods, which could be provided reasonable protection, broad feasibility study of different methods of flood control and priorities identified *etc*. The Report of the Working Group on Flood Management and Region Specific Issues for 12th Five Year Plan also emphasised the need for an "integrated basin management approach" (Section 7.0).

I&WD stated that GoWB did not prepare any basin-wise/river-wise Master Plan. In the absence of a holistic plan, the Divisions proposed schemes as and when required, considering the vulnerability of specific areas. The Departmental Screening Committee[15] prioritised the works proposed by the Divisions. Further, schemes/projects planned for execution in a particular year mainly depended upon the availability of funds.

As such, flood management projects were taken up at different locations depending on priority and availability of funds without being linked to a comprehensive plan for the management of floods. The impact of the flood protection measures may, thus, have been limited to that extent.

In their reply, I&WD stated that considering the wide variation in hydro-meteorological conditions in different parts of the State, preparation of any long-term flood management plan applicable to the whole State may not be an appropriate solution. Basin-wise comprehensive flood management schemes had, however, been prepared for some critically flood prone areas such as Kaliaghai-Kapaleswari-Baghai (KKB) Basin Project, Sundarban Embankment Re-construction Project, Kandi Master Plan (KMP), Lower Damodar Scheme and Ghatal Master Plan.

While I&WD, West Bengal, has prepared plans for the critically flood prone areas it requires to prepare the schemes of flood management works in an integrated manner covering the entire river/tributary or major segment, which it has not prepared as per the salient feature of the FMP.

2.2 Non-adoption of various structural and non-structural measures

Para 2.2 of the Report of Working Group stipulates that providing absolute protection to all flood prone areas against all magnitude of floods is neither practically possible nor economically viable. It further provides that such an attempt would involve high cost of construction as well as expenditure for maintenance. Hence, a pragmatic approach in flood management is required to provide a reasonable degree of protection against flood damages at economic cost through a combination of structural and non-structural measures. GFCC[16],

[15] *Is a committee comprising the Secretary, I&WD as Chairman, Financial Adviser, Joint Secretary (Works), all Chief Engineers and Deputy Secretary – II (Works).*

[16] *Para 5.4.1 of Guidelines on Flood Management (January 2004) of Ganga Flood Control Commission.*

CWC[17] and Planning Commission recommended for adoption of a combination of structural and non-structural measures for effective management of floods.

Depending upon the manner in which the work is required for flood protection, flood management measures are broadly classified as under:

(a) Engineering/Structural Measures,

(b) Administrative/Non-Structural Measures.

Engineering/Structural Measures:

The engineering measures for flood control which bring relief to the flood prone areas by reducing flood flows and thereby the flood levels are :

(i) Reservoirs: An artificially created reservoir behind a dam across a river.

(ii) Detention basins: A natural depression suitably improved and regulated, if necessary.

(iii) Diversion of flood waters by diversion of a part of the peak flow to another river or basin, where such diversion would not cause appreciable damage.

(iv) Channelization of rivers by constructing a parallel channel by-passing a particular town/reach of the river prone to flooding.

(v) Watershed Management: The watershed management measures include developing and conserving the vegetative and soil covers and also to undertake structural works like check-dams, detention basins, diversion channels, *etc*.

The engineering methods of flood protection, which do not reduce the flood flow but reduce spilling, are:

(vi) Embankments: Embankments which artificially raise the effective river bank and thereby prevent spilling.

(vii) Channel and Drainage improvement: Channel and drainage improvement works, which artificially reduce the flood water level so as to keep the same, confined within the river banks and thus prevent spilling.

Administrative/Non-Structural Measures:

The administrative methods endeavour to mitigate the flood damages by:

(i) Flood Forecasting: Facilitating timely evacuation of the people and shifting of their movable property to safer grounds by having advance warning of incoming flood *i.e.* flood warning in case of threatened inundation

(ii) Flood Plain Zoning: Discouraging creation of valuable assets/settlement of the people in the areas subject to frequent flooding *i.e.* enforcing flood plain zoning regulation.

(iii) Flood Proofing: Consisted in raising a few villages above pre-determined flood levels and connecting them to nearby roads or high lands.

It was, however, observed that I&WD adopted only some of the structural measures related to raising and strengthening of embankments, construction of structures to protect the river banks/embankments from erosion, re-excavation

[17] *Para 1.6.1 and 1.6.2 of CWC Hand book for Flood Protection Anti-erosion and River Training Works.*

of drainage channels and maintenance of existing embankments *etc*. as discussed in subsequent observations. Other structural/engineering measures for flood control which bring relief to the flood prone areas by reducing flood flows and thereby the flood levels were not implemented. Non-structural/administrative measures like Flood Plain Zoning, Flood Proofing were also not adopted. Thus, in the absence of any comprehensive long-term plan, execution of flood control measures with combination of various structural and non-structural measures as recommended by GFCC, CWC as well as Planning Commission were not taken up by I&WD.

In their reply, I&WD stated that the adopted structural methods included construction of new embankment, raising and strengthening of existing embankments, construction of sluices and other regulating structures, construction of dams, barrages *etc.* and non-structural measures like Flood Forecasting was also adopted. I&WD, however, accepted that other structural measures like detention basins, diversion of flood water and non-structural measures like Flood Plain Zoning and Flood Proofing were not adopted.