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FLOOD MITIGATION AND MANAGEMENT

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I. INTRODUCTION

India experiences flood every year in some parts of the country or other. The impact of flood was not, perhaps, felt to the same extent in the past as it is felt now. The rapid increase in population and consequent increase in activities all around, has led to occupation of the flood plains resulting in increased flood damage. Actually man has gone to the flood and not the other way. Deforestation, reclaiming areas for occupation and shifting cultivation, all have added to the fury of floods. Thus, in spite of the increased expenditure in the flood sector during the past five decades, there has been no significant decrease in losses.

II. FLOOD PRONE AREA

The Rashtriya Barh Ayog (1980) has assessed the area prone to flood as 45.60 m.ha, of which 32m.ha. could be provided with reasonable protection. It has been observed that a number of areas not hit her to considered as liable to floods have been affected. Further, areas protected may be affected due to failure of flood management works already completed. 18.22 m hectares has been provided remarkable protection.

II. REVIEW OF PROGRESS OF FLOOD MANAGEMENT WORKS

Structural measures, mainly in the form of embankment for protection against inundation, have been existing for centuries. As these embankments were constructed on small scale and in a piece meal manner to give relief to specific localities, these were neither systematically planned nor scientifically designed. After the disastrous floods experienced in the country in 1954, a National Programme of Flood Management was launched. During the last 40 years, different methods of flood protection, both long term and short term, have been adapted in different states depending upon the nature of problems and local conditions.

The Flood Management works carried out so far has provided reasonable degree of protection to an area of 18.22 m hectare up to March 2009. The works consist of embankments, drainage channels, town protection works and raising of 4124 villages above flood levels.

Reservoirs constructed on the Damodar river, across Mahanadi (at Hirakud), Sutlej (at Bhakra), Brahmini (at Rengali) and Tapi (at Ukai) as also on a number of other major and medium reservoirs, have helped greatly in reducing the intensity of flood in the flood plains.

The flood forecasting and warning of incoming floods has played a significant role in reducing the loss of life and movable property. The Central Water Commission issues forecasts from 157 forecasting stations covering all the major inter- state rivers.

Another important non- structural measure for mitigating damages from floods is ‘Flood Plain Zoning’. Out of 1,06,000 sq.km programmed for surveys I n the country, about 75,000 sq.km of flood prone are was surveyed up

to march, 2009, by the Survey of India for preparation of large scale maps of 1:15,000 with contour intervals of 0.3 to 0.5m. The maps have to be used by the state governments demarcate flood plains and to prepare 'Flood Risk Maps' for introducing suitable regulatory measures in the flood plains.

Similarly, Flood proofing, considered as one of the important non- structural measures for mitigating damages from floods, has been initiated in the north Bihar area.

IV. PREPARATION OF MASTER PLANS

Preparation of a basin wise master plan for management of floods is a prerequisite for tackling the problems of floods. The Brahmaputra Board was contributed in December,1981 to prepare a master plan for the Brahmaputra basin and other states in the North East.

Ganga Flood Control Commission was established in April, 1972 to look at the flood problems of the Ganga basin states specifically, as the Ganga created critical flood related conditions and damages almost every year. State Governments of Gujrat, Karnatka, Kerala, Tamil Nadu and West Bengal have prepared Master Plans on coastal protection measures. Central Water Commission has prepared the ' National Coastal Protection Project ' based on the proposals received from the maritime States.

V. APPROACH AND STRATEGIES FOR FLOOD MANAGEMENT

Government of India had set up Rashtriya Barh Ayog (RBA) in 1976 to carry out a review of the flood protection measures and to evolve a comprehensive approach to the problem of floods in the country. The Ayog submitted its report in 1980, which contains policy and guide lines for control of floods along with all related aspects. The report of the RBA contained 207 recommendations covering the entire gamut of flood management activities.

Various approaches for flood management can be broadly categorised as under:

- Modify the floods in order to keep the flood waters away from developments and populated areas by decreasing runoff, by increasing channel capacity or by containing, diverting or storing flood waters.
- Modify the susceptibility of flood damage by keeping people and development subject to damage, out of the flood hazard areas or by making such developments resistant to damage.
- Modify the loss burden by reducing the financial and social impact of flood through such measures as post flood assistance and insurance.
- Bearing the losses, i.e. living with floods.

The flood controls measures generally adopted, so far, are structural measures like reservoirs, embankments, drainage improvement works, anti-erosion works, etc. and non structural measures like flood plains zoning, flood forecasting, flood proofing, flood insurance ,etc. Though, a combination of structural and non structural measures would be required to provide reasonable degree of protection, it would become imperative to depend more on non- structural measures. The strategies are given below:

5.1 Reservoirs

The reservoirs are more effective for flood management if, apart from incidental moderation available for any type of storage on a river, specific flood space is provided. The moderated flood outflow should also take into

account the activity of the downstream area. A combination of the storage reservoir and embankments become an optimum solution in most of the cases. However, construction of reservoirs is becoming increasingly difficult due to environmental issues, primarily displacement of the people from the submergence area.

5.2 Embankments

Embankments (including, ring bunds and town protection works) confine the flood flows and prevent spilling, thereby reducing the damage. These are generally the cheapest, the quickest and the most popular method of flood protection have been constructed extensively in the past. These have given considerable protection to large areas in the lower reaches of large rivers. Embankments are the only feasible method of preventing inundation. The main advantage of embankments is their flexibility to protect either a specific site or a large area.

5.3 Coastal Protection/ Anti Erosion Works

Scientific approach with proper planning will be required for anti- erosion works at vulnerable reaches.

5.4 Drainage Improvements

Maximum damage due to floods, especially to crops, is on account of drainage congestion. The quicker the drainage, the lesser will be the losses. Highest priority in flood prone areas should be given to increase the capacities of road and rail bridges, culverts, cross-drainage works, drainage channels, etc

5.5 Flood Forecasting

Flood Forecasting activities established by CWC may be extended further to the areas yet not covered and the existing set up modernised. With the pressure of population increasing on the flood plains, more attention should be required to this non-structural method.

5.6 Flood Proofing

The flood proofing programme should be extended to all flood prone areas. The programme should cover the following thrust areas.

(i) Creating some raised platforms in flood prone areas for evacuation and shelter for the people.
(ii) Quick drainage facilities.
(iii) Potable drinking water, sanitary arrangements and education.
(iv) Human dwellings and animals shelters.
(v) Storage facilities for food and fodder and other essential commodities.
(vi) Communication links- telephone/ wireless/ road/ rail / boat.

5.7 Flood Palin Zoning

The states must demarcate flood plains, prepare flood zoning and flood risk maps and enact flood plain regulation acts to restrict the economic activity/ dwellings on the flood plains.

5.8 Flood Insurance

Flood insurance acts as a positive catalyst towards mitigation of flood damages. This has to come into vogue sooner than later.

5.9 Soil Conservation

The effectiveness of soil and water conservation measures on reduction of runoff from the catchment to reduce peak flow into the river systems has not been of significant achievement. The major effect of improved watershed management on reducing peak flow is limited to the small floods, that too only for small catchments and ineffective in reducing it to a lower degree for large catchments. The evaluation studies, so far, carried out also support the above view.

VI. CONCLUSION

Man has experienced flood since time immemorial and he has learnt to live with the floods. However, there was ample space always at higher elevation for evacuation. The population pressure on the flood plains may deprive this advantage, though he may get a warning on the time of the impending flood. Future planning should be directed towards quick and effective drainage of flood water and non – structural flood proofing methods. Embankments can only be an exception to the rule.

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