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A STUDY ON SUSTAINABLE FLOOD MANAGEMENT

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Abstract – Flood management is in many countries a major expense, and while the return on this investment, in terms of risk reduction, are also high, the process of choosing and developing between management option is of critical importance. Flooding can have severe impacts on the water supply services and adaptation responses for the provision of high-quality water supplies are necessary to cope with the risks exacerbated by climate change. This paper explores the planning process for adaptation, keeping in view the pre-activity flood and post activity flood. Measures immediately after cessation of flood have been also studied in the paper. For evaluating consequences of widespread flooding, information on joint flood probabilities would be relevant, particularly where sites are interconnected. Consequently, it is concluded that the effective conduct of sustainable flood management, cooperation and information sharing about flooding, and social learning and change, all of *which can be achieved through the active participation of stakeholders.*

Keywords- Risk Reduction, Pre-Flood Activity, Post-Flood Activity, Mitigation Measures, Participation Of Stake Holders.

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INTRODUCTION

Flood, a volume of water enters a certain area and it cannot be discharged quickly enough through the river channels proper. As a consequences thereof, water level rises until bankful stage is reached, then bank overspill starts and flooding occurs. Throughout the world floods and flooding occurs as natural phenomena which, in most cases, not much appreciated by the people living in the affected areas. Consequently, flood management and flood control are introduced in many places to prevent the negative consequences of the flood. Sustainable development aims the sustained improvement in the living conditions of all citizens in an environment characterized by equity, security, and freedom of choice. This paper presents the study of sustainable flood management describing the interplay between floods and development process. It takes a look at traditional flood management practices, identifies the major challenges for managers and decision-makers dealing with sustainable development.

GENERAL METHODOLOGY

Human cannot stop the rains or stop flowing surface water from bursting its bamks. These are natural events, but we can do something to prevent them from having great impact.

Sea/coastal defence walls-

Sea walls and tide gates have been built in some places to prevent tidal waves from pushing the waters in some areas too, sand bags are made and placed in stratergic areas to retain floodwaters.``

Retaining walls

In some places, retaining walls levees, dams, lakes reservoirs or retention ponds have been constructed to hold extra water during times of flooding.

Town planning

It is important that builders acquire permission before buildings are erected. This will ensure that waterways are not blocked. Also drainage systems must be covered and kept free from objects that chock them. This way, water can quickly run through if it rains and minimize any chance of town flooding. Drainage systems should also be covered to prevent litter from getting into them.

Vegetation

Trees, shrubs and grass help protect the land from erosion by moving water. People in low-lying areas must be encouraged to use a lot of vegetation to help break the power of moving flood water and also help reduce erosion.

Education

In many developing countries, drainage systems are choked with litter and people have little knowledge of the effects that can have during a rain. When it rains, waterways and culverts are blocked by massive chunks of litter and debris, and water finds its way into streets and into people homes. Education is therefore very important, to inform and caution people on the dangers of floods, what causes floods and what can be done to minimize its impact.

PAST ATTEMPTS AT FLOOD MANAGEMENT-

Beneficial aspects of embankments-

1. The embankments have provided a reasonable degree of protection against small and medium-sized floods.

2. They have provided all weather means of communication in chronically flood prone areas.

3. Large protected areas of flood plains have been brought under assured canal irrigation.

Pre-flood activities-

1. Construction and maintenance of embankments-

Embankments have extensively used for protection against floods of important towns and lands with the participation of the local people. The annual loss of pre-embankment period was of the order of Rs.60 to 100 million depending on the intensity of flooding. This much has been prevented with construction of embankments at the cost of Rs.400 million including the cost of protective measures for embankments.

2. Watershed Management-

The main objectives of watershed management programmes are to:

a. Increase infiltration into the soil

b. Control damaging excess runoff ; and

c. Manage and put runoff to useful purposes.

3. Flood forecasting and warning system-

Flood forecasting as a non- structural measure was brought into operation in 1969 by the Central water commission (CWC). It is considered as the most reliable, cost and time effective measure for loss mitigation, planning evacuation of people, and safeguarding the embankments. The forecasts are formulated after collecting the observed gauge, discharge and rainfall data through wireless and other communications and disseminating them to the administrative and state engineering agencies concerned with flood hazard mitigation. So far, the forecasters of incoming floods have been 98% correct. The flood forecasting and warning activity has proved to be a vital alternative to costly structural measures. It has been expanded and modernized to further mitigate the sufferings of the people in sub-basins. Accurate forecaster are made available efficiently to the authorities engaged in rescue, relief and flood fighting. Proper education of the people on how to react to warning singles to save life and property has top priority.

4. Disaster management and preparedness-

Disaster preparedness can be classified into three categories- actions before, during and after the flood.

Methodology-

Monitoring pre-flood protection works-

The monitoring of flood protection works before flood season is done by an expert group and based on their recommendations, measure are taken. Flood fighting activities are carried out with people participation and in accordance with rules and regulations issued by the flood control department. Flood victims are provide with relief materials such as boats, tarpaulin, food and fodder, drinking water, fuel and clothes. Medical facilities are made available to the sick and the lame and measures taken to prevent the spreads of diseases. Shelter platforms at places higher than the highest flood level are kept ready in advance along with adequate stocks of food and fodder, drinking water and fuel.

5. Drainage congestion improvement-

Improving drainage by building new channels or improving the discharge capacity of the existing drainage system has become an integral part of the flood management programme. Surface water drainage congestion due to inadequate natural or manmade drainage channels damages agriculture crops.

Post-flood activities-

1. Flood insurance-

Flood insurance has several advantages as a means of alleviating the loss burden. It enables property owners to spread an uncertain but potentially large loss uniformly over a long period of time. Insurance does not reduce flood loss potential. Yet, it has advantages for the public and for the government. It places part of the burden on those who enjoy the benefits of flood plain location as well as the losses that are associated with the latter rather than making it the responsibility of the public at large. Insurance of high flood risk zone has to be shared by the government out of the capital invested in the relief and rehabilitation of flood victims.

2. Flood relief / Immediate relief measure-

The immediate relief measures shall include-

-close liaison with defence services;

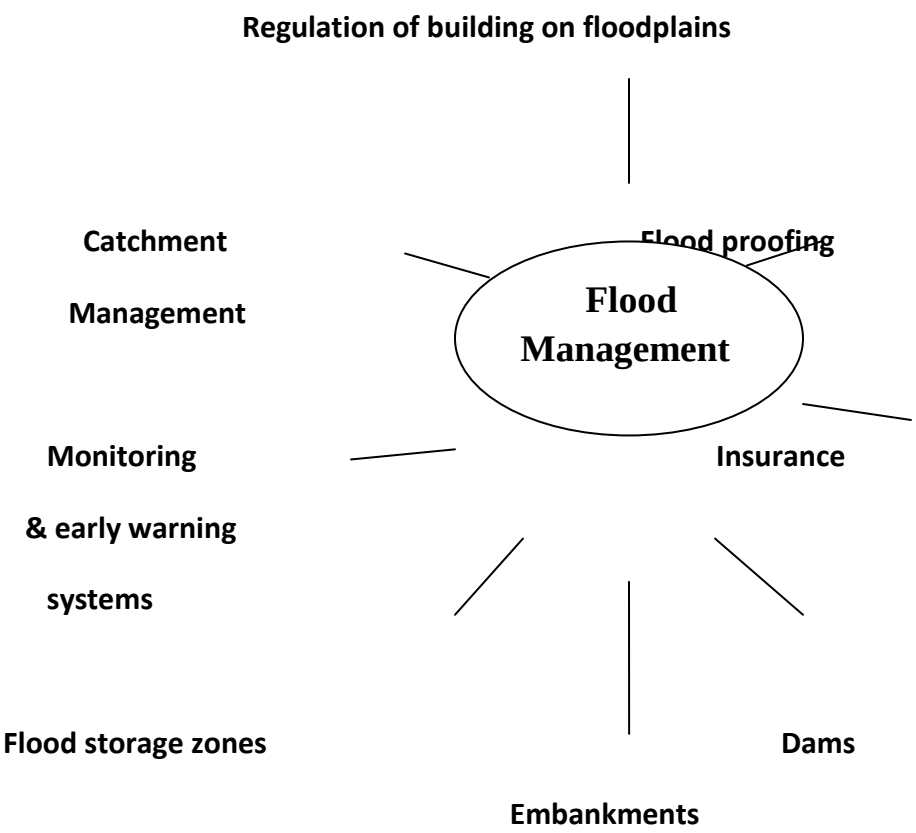
-daily review of flood relief measures;

release of emergency funds to local body and hence to the flood victims;

-supply of fodder and food rations

-first aid and operations

-supply of essential commodities like kerosene, oil, petrol, etc.



FUTURE STRATERGY

Construction of storage-

The studies carried out by numerous experts and organizations conclude that suitably designed and properly operated reservoirs with adequate provision of flood cushion, along with embankments and an efficient.

Participatory flood management

The structural and non- structural measures taken so for the mitigation of hazards and their impact on people`s welfare and the local economy need to be continued to a great extent. Government investment in flood management works has increased from year to year and more areas have been protected. Yet, the estimated value of damage has also increased. When high flood strike, a large number of breaches occur in the embankments mainly because of the lack of maintenance of existing works, and encroachment in the free board due to deposition of silt in riverbeds and the erosive action of river waters.

ACHIEVEMENT IN FLOOD MANAGEMENT

In India, systematic planning for flood management commenced with the five year plan, particularly with the launching of national programme of flood management in 1954. During last 53 years, different methods of flood protection structural as well as non-structural have been adopted in different states depending upon the nature of the problem and local condition. Structural measures include storage reservoirs, flood embankments; anti-erosion works and non-structural measures include flood forecasting, flood plain zoning, flood proofing etc.

Table no-1 Various flood management measures undertaken through successive five year plan-

Flood embankments	**34397.61 km**
Drainage channels	51317.50 km
Towns protection works	2400 Nos.
Village raised	4721 Nos.

In addition, a live storage of 177 billion cubic meter create so far in the various reservoirs for irrigation hydropower generation, drinking water etc. also help in reducing flood intensity by storing part of the flood waters in them.

Table no-2 State-wise physical achievement under flood management of works-

Sr.no	State/ UT'S	Length of embankments (km)	Length of drainage channels(km)	Town/village protection works(nos.)	Village raised protected(nos.)	Area benefit-ted in million (M.ha)
1	Andhra Pradesh	2100	13569	68	21	0.54
2	Bihar	3454	365	47	-	2.949
3	Karnataka	-	-	-	-	0.0008
4	Maharashtra	26	-	26	-	0.0010

MEASURES AFTER CESSETION OF FLOOD

Measures to be taken immediately after cessation of flood will include-

1. Restoration of road / rail links;
2. Restoration of tubewells and other agricultural machinery
3. Restoration of poultries / fisheries and piggeries
4. Free seeds to farmers for sowing
5. Restoration of industries / factory equipments, etc;

Socio economic and environmental aspects of flood management measures-

Flood management works such as embankments, drainage channels and anti-erosion works bring significant changes to the environment on account of loss of plants trees, interference with stream flows, creation of swamps and water- logging, pollution of water bodies by chemicals due to improved agricultural activities in the protected area, and others. Reservoirs involve large-scale deforestation, affect the habitat of the local fauna, induce water-logging due to the rise in the water table, increase health hazards and cause displacement of people.

CONCLUSION

The focus of this paper has been on the managements of floods in the India, as it is of crucial importance for the economic development of the region. The current proposals need careful review. In the mean time, optimum protection of flood-prone areas can be achieved through various measures which has been reviewed in this contribution. In India, flood management is almost entirely done by government agencies. The need to ensure people participation at the planning, implementation and maintenance stages of the fight against floods has been recognized for quite some time, however, and several attempts and experiments in this direction have been made over the years. In such circumstances, the complex rules and regulations of public agencies tend to prevent timely intervention, resulting in huge damage suffered by the community.

BENEFITS OF FLOOD

There are many disruptive effects of flooding on human settlements and economic activities**.** However, floods (in particular the more frequent / smaller floods) can also bring many benefits, such as recharging ground water, making soil more fertile and providing nutrients in which it is

deficient. Flood waters provide much needed water resources in particular arid and semi-arid regions where precipitation events can be very unevenly distributed throughout the year. Freshwater floods in particular play an important role in maintaining ecosystems in river corridors and are a key factor in maintaining floodplain biodiversity. Flooding adds a lot of nutrients to lakes and rivers which leads to improved fisheries for a few years, also because of suitability of a floodplain for spawning. Fish like the weather fish make use of floods to reach new habitats together with fish also birds profit from the boost in production cost by flooding.

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