



FLOODS IN INDIA: CAUSES AND MANAGEMENT

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ABSTRACT:

Flood is considered one of the most common and frequent disasters in the world. Due to its frequent occurrence, economic losses and health damage caused by floods have put more strain on the economy than any other natural disaster. India has also been hit by a series of catastrophic floods that have seriously damaged human life and country's economy. It has been found that occurrence and impact of floods are increasing rapidly, causes could be varied like climate change, cloud eruptions, tsunamis, erosion of river beds, soil, etc. but result is same, increased economic and life loss. Disaster risk management in India has geared up with highly organized and well-structured programs designed by various government bodies and policies but the management and implementation of these programs requires more efficiency. This paper presents the situation and causes of floods in India along with the various programs designed to manage them. It also discusses the challenges faced in implementing them and what can be done to improve same.



KEY WORDS: *Floods, Spatial Pattern, Temporal Pattern, Flood Management.*

INTRODUCTION:

Floods are common, widespread, and catastrophic, leading to significant social, economic and environmental losses in developing and developed countries. Due to the world's heavy rains, landslides, and overcrowding, developing countries and Southeast Asian countries, in particular, are at greater risk of flooding. India is one of the countries most affected by the floods. On average, an estimated 32 million people suffer from floods every year in India. Although rain and floods are sometimes essential as they provide plants with water and can be utilized for irrigation and other purposes, replenish nutrients in the soil, and replenish groundwater. However heavy rainfall and unwanted floods have a negative impact on people by destroying crops, property and in many cases life.

According to the Central Water Commission, 37 million hectares of land are at risk of flooding in the country. Most of India's population is concentrated in coastal plains. Floods in these areas affect a very large number of people and their livelihoods. To achieve flood control objectives, it is important to know the real causes of floods: if there is a change in the frequency and intensity of floods, and whether there is a way to reduce their impact. Heavy rainfall is often considered to be a major cause of these floods. However, due to the varied and large temporal variations in patterns of rainfall, the area affected by the floods varies greatly at different time intervals. Therefore, it is important to analyze and produce long-term records to assess the temporal and local characteristics of floods and storm surges.

SPATIAL PATTERN

According to the Central Water Commission about 37 million hectares (mha) or 11 percent of the world is prone to flooding in the country. Although the area with major flooding is 37 mha, the floods only affect an area of about 7.4 m per year. Over the past fifty years, the area has varied between 1.46 m (1965) and 17.5 m (1978). The number of people affected is very high according to the available statistics. The number has varied from 3.61 million in 1965 to 70 million in 1978.

Most of the flood-hit areas in the Ganga and Brahmaputra valleys (Uttar Pradesh, Bihar, West Bengal, Assam and Orissa). On average, while in Uttar Pradesh and Bihar about 8 percent of the area floods annually, about 10% in West Bengal and 13% in Assam. Other provinces affected by the floods are Haryana, Himachal Pradesh, Orissa, Punjab, Andhra Pradesh and Gujarat.

Floods in Indian rivers are caused by torrential rains. However, there are significant local variations in heavy rainfall even during the normal rainy year; some parts of the country live above normal rainfall. In such areas flooding is inevitable. Thus, in one year, the quantity and distribution of heavy rainfall was largely determined by the spatial distribution and the timing of major floods. However, there are other parts of the country, such as the Brahmaputra and the Ganga Plains, which provide a convenient place to quickly convert rainfall into major floods. Therefore, these areas are the source of endless floods. In recent years, many well-known flood-prone areas have been identified by a number of organizations, such as the Central Water Commission (Flood Atlas of India), the National Atlas and Thematic Organization (India's Natural Disaster Map), and Building Materials and the Vulnerability Atlas of India. These maps and historical records indicate that the areas identified as being most at risk of flooding in the country are:

- i. Sub-Himalayan Region and Ganga plains,
- ii. Brahmaputra Valley,
- iii. Punjab Plains in the Extra-Peninsular region,
- iv. Mahanadi-Godavari-Krishna-Kaveri Delta plains,
- v. Lower Narmada-Tapi-Mahi Valleys, Peninsular region.

The Extra-Peninsular Region, which draws water from the Himalayan rivers and their tributaries, is undoubtedly the most populous region on earth. The relief of the high seas, the steep slopes, the heavy rains, and the tectonic activity are the hallmarks of the floodgates of these rivers. In comparison, floods slightly affect the Peninsular rivers, and the extent of the affected area and their impact is minimal. This is mainly due to the loosening of small holes, and due to the depth and analysis of the river channels. Due to the formation of the canal and the high altitude of the surrounding plains, coastal flow is rare. Therefore, much of the fluvial activity is confined within the banks of the channels. However, in deltaic regions, geomorphic conditions favor bank flows and create floods.

TEMPORAL PATTERN

Floods appear frequently, but the affected areas vary greatly from year to year. This is mainly due to the large fluctuations during the rainy season, which is an important factor in rainfall. Over the years heavy rainfall is not only heavy, but also well distributed during heavy rains. Areas affected by the floods over the years are large. For example, when in 1987, which was the year of the lowest rainfall (-18%), the area affected by the floods was approximately 9 m. However, the following year (1988), the rainfall was above normal (+18%) and the area affected by the floods was estimated at 16 m.

Monsoon conditions vary greatly from year to year. Due to local and time variations in rainfall, the rain-fed part of the country varies greatly from place to place. Although the flood area was very high in the 1960s, the number of years when the flood area was more than 10 meters high was in the 1970s and 1980s. In the last twenty to four decades, the worst floods have occurred - 1978, 1987, 1988 and 1998 the worst and most destructive. Many scientists, environmentalists, and local people point out that the immediate increase in flooding is due to anthropogenic actions.

CAUSES OF EXTREME FLOODING

Prolonged, heavy, and widespread rains are often considered to be the main cause of major floods. However, other factors, such as the pit, the valley, and the position of the stations determine the size of the area and the impact of the floods. The main causes of floods are as follows:

- i. Heavy rain and long lasting
- ii. River flooding due to landslides and river erosion
- iii. Avulsion and channel shift: sudden landslides due to floods, currents, or shifts in the river.
- iv. Failure of natural and man-made dams
- v. Reducing the carrying capacity of rivers in rivers, due to construction within and between canals and floodplains.
- vi. Backlogs and floodwaters in seawater

FLOOD MANAGEMENT IN INDIA

Flood management has two distinct aspects, one related to national water management and the other related to national disaster management. Flood Management as Water Management at the national level is coordinated by the National Water Council and in particular the Department of Water Affairs. Flood Management as Disaster Management is compiled by the National Disaster Management Council and in particular the Department of Disaster Management and Assistance. Both activities are also integrated at local level through the relevant branches. Identification of flood prone areas and the risks associated with each area provides planners with an important guide to designing specific mitigation measures. Remote Sensitivity Satellite Data provides information about actual floods of various magnitude as well as various other global information that may be used to define flood risk areas.

The theme of flood control, in contrast to irrigation, is not found in any of the three lists of laws enshrined in the Indian Constitution. To reduce the impact of floods, appropriate flood control measures should be implemented. These steps can be divided into:

1. Structural measures
2. Non-structural measures

1. Structural measures

In this way practical measures are being taken to prevent the floodwaters from reaching the potential hazards. The main building steps that have been carried out so far in India are as follows:

- i. Buildings and flood walls
- ii. A natural confinement container
- iii. A place to hold
- iv. Dams
- v. Planting of trees

In India, formal planning for flood management began with a five-year plan, mainly with the introduction of the 1954 National Flood Management Plan. Over the past 48 years, various flood protection systems, buildings and non-flood structures have been developed. adopted in different provinces depending on the nature of the problem and local conditions.

2. Non-structural measures

Non-structural measures strive to keep people away from floods. It thinks of the wise use of floods. This process allows for the use of floods by reducing the magnitude of the disaster, while maintaining its beneficial needs. The following are the main steps that are not related to the structure:

- i. Floods on the plains
- ii. Flood protection
- iii. Flood forecast and warning
- iv. Dam management
- v. Flood insurance

Since flood plains can be mapped, the flood zone of the different recession period is used in flood mitigation plans to identify areas where flood risk is significant. Flood risk maps are used to describe global flood-prone areas. Accident maps show flood line based on different sizes of floods with occasional relapses. These maps can be used to control development activities within the floodplain, to minimize damage.

CONCLUSION

Floods are a major natural hazard in India, therefore, many flood control and control systems have been incorporated since independence. As a result of this program, about 14.4 million acres of land have been acquired, and flood damage has also been reduced to some extent. Flood forecast systems, which have been in operation for more than 15 years, have reduced the loss of life and property. Nevertheless, despite these plans, flood risk remains the most devastating natural disaster in India. Some things that should be considered in this regard are:

- i. Lack of long, continuous and reliable water performance records is a major barrier to understanding storm surges, as well as flood risk assessment.
- ii. Lack of scientific data on river response to flooding in various hydro-geomorphic areas of India has also contributed to the failure of the flood control system in some areas.
- iii. Extreme and unpredictable development and rapid population growth in flood plains seems to have contributed to an increase in the risk of flooding.

All the plains in India are increasingly flooded due to misconduct in land use systems. Canals can protect people from floods permanently has been proved false. Newspaper footage of people trapped in floodplain control hills is rare. During the rainy season water collects in all roadblocks and trains and little effort is made to divert them into natural canals. India's biggest challenge to sustainable development will be the way in which it learns to use the Indo-Gangetic plains, which have the potential to supply not only India but large parts of Asia. The model for proper natural water use is yet to be developed, but the region's rich culture must provide useful clues.

In order to facilitate national economic and social development, disaster risk management efforts should be considered important: Legal documents should be developed; disaster response plans must be put in place at all levels, from national to community; and appropriate institutional and technical approaches and fundraising mechanisms must be established. Such preparedness efforts proved efficient when China responded to the Wenchuan earthquake. Similar skills must be developed in all countries in the region to reduce the loss of both material and human lives and to contribute to sustainable social and economic growth in the long term.

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