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# Floods in Bihar : The devastating effects on Humanity and Prosperity (2000-2008)

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**Abstract :** *India is a land of various natural and cultural diversities where natural calamities like floods, storms, earth quakes, landslides are very natural occurrences. The problem of inundation (floods) that has destroyed thousands of human lives occurs when a gently flowing river suddenly overflows its edges during monsoon. The demonic flow of the huge stream has devastated the entire northern Bihar which has always been its victim over the years.*

*The Kosi river in north Bihar plains, eastern India presents a challenge in terms of long and recurring floodhazard.*

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*Despite a long history of flood control management in the basin for more than 5 decades, the river conditions bring a lot of misery through extensive flooding. This paper revisits the flood problem in the Kosi river basin and presents an in-depth analysis of flood hydrology. Typical hydrological characteristics of the kosi river include very high discharge variability, and high sediment flux from an uplifting hinterland. The low-lying tracts of the alluvium plains are extensively inundated year after year. Our flood risk analysis follows a multi-parametric approach using Analytical Hierarchy Process (AHP) and integrates geomorphological, land cover, topographic and social (population density) parameters to propose a flood Risk index (FRI). The flood risk map is validated with long-term inundation maps and offers a cost-effective solution for planning mitigation measures in flood-prone areas. This paper is a micro, yet analytical scrutiny of the northern Bihar in particular touching it with historical perspective.*

**Key words :** Bihar, floods, inundation, disaster, monsoon, Flood Risk Analysis, AHP, flood management, river basin.

## Introduction :

Many states in our country are flood prone due to heavy rain or otherwise. Bihar also comes under these flood prone states. The occurrence of flood has been almost an annual feature in North Bihar. In recent years the incidence of floods has been severe in south Bihar as well as flood havocs have always brought misery to millions of people particularly in rural areas. In villages, wells, the chief source of drinking water, are flooded with dirty water causing, acute scarcity of drinking water. Some times water may remain standing over large areas for over a month and these may hamper the cultivation of the rabi crops and even kharif in some places. It causes famine condition which may be as serious as those resulting from drought.

Bihar is India's most flood prone state, with 76% of the population in North Bihar living under the recurring threat of flood devastation. According to some historical data 16.5% of the total flood affected area in India is located in Bihar while 22.1% of the flood affected population in India lives in Bihar. Floods in Bihar is a recurring disaster, which on an annual basis destroys thousands of human lives apart from livestock and assets worth millions.

Flood is not unique to our country. Floods are an ugly part of our system. We can't ignore or wish them away. The only way to fight the floods is to try to predict the flood, prepare for it, train and educate people, identify areas, which are flood prone.



## Objectives :

The purpose of this research is to make the people aware:

- About the harmful effects of flood, and
- How to tackle the situation during flood.

## Methodology :

1. Various books concerning floods in Bihar.
2. Information collected from the reports of the Water Resources Department of the State Government.
3. Study from different journals and magazines, audio and visual documents (television) and internet etc.
4. From the study of thesis submitted by research scholars of the B.N.U. University and past seminar report concerning the issue.

## Tools and Techniques :

1. Pictures from several websites.
2. Study of the various journals and consultancy with Water Resources department.
3. Study of books.

## Causes :

- **Low Gradient of the stream :** Low gradient of the stream over the North Bihar plain which is generally 2 to 4 miles does not allow speedy flow of water. Due to snow melting over the Himalayan region followed by monsoon rain, these snow fed streams have increased volume of water before and soon after the rainy season. Because of low gradient it is difficult for the stream to carry the excess water within its valley. As a result the water spreads over the surrounding areas causing flood.
- **Ganga :** Ganga does not join the Ganga at acute angles, because of the obstruction caused by the Ganga levee. Rainfed streams are in spate or swell during the rainy season. At that time the Ganga also is in

spate and is unable to accommodate excess water brought by its tributaries. Therefore the excess water spreads over the South Bihar plain.

- **Siltaton** : Silting up of the channels in the sub-plateau tract by the formation of alluvium fans.
- **Deforestation** : Deforestation in the catchment area resulting in certain rush of water overloaded with sediments.
- **Cloud burst** : The cloud burst is a localised weather phenomena representing highly concentrated rainfall over a small area lasting for few hours. This leads to flash flood/landslide.

#### **History of flood disaster in Bihar :**

The plains of Bihar are drained by a number of rivers that have their catchments in the steep and geologically nascent Himalayas. Kosi, Gandak, Burhi Gandak, Bagmati, Kamla Balan, Mahananda and Adhwara Group of rivers originate in Nepal. Koshi, Darbhanga, Tirhut, and Bhagalpur Naugachhiya zones are regularly devastated by flood. In the years 1978, 1987, 1998, 2004 and 2007 Bihar witnessed high magnitudes of flood. The total area affected by floods have also increased during these years. The flood of 2004 demonstrates the severity of the flood problem when a vast area of 23490 Sq Km was badly affected by the flooding of Bagmati, Kamla, & Adhwara groups of rivers causing loss of about 800 human lives, even when Ganga, the master drain was flowing low.

#### **Flood highlights during 2000–2008 :**

**2000** : During the year 2000 Kamla Balan and Bhutahi Balan catchments received heavy rainfall during first and last week of July resulting in unexpected rise of water level. In the first week of August 2000 Eastern Kosi Afflux Bund was punctured. 12351 villages were affected

and crops worth approximately INR 8303.70 lacs were damaged.

**2001** : North Bihar was badly affected by floods due to heavy rain in Nepal portion of catchments of rivers. Western Kosi embankments, Bhutahi Balan right embankment, Bagmati left embankment and Burhi Gandak left embankment were partially damaged. Crops of approximately INR 26721.79 lacs and public property worth approximately INR 18353.78 lacs were damaged.

**2002** : During this year North Bihar experienced serious floods and overtopping reported in Kamla Balan left embankment and Khiroi right embankment. 489 persons died. Crop damage of INR 51149.61 lacs and public property damage of approximately INR 40892.19 lacs were reported.

**2003** : High flood level at Bhagalpur surpassed the 1978 record of 34.18m and at Gandhighat, Patna the High flood level surpassed the 1994 record of 50.27m in river Ganga. The status of flood in other rivers except Ganga and Gandak remained normal.

**2004** : Catchments area of North Bihar rivers received heavy rainfall in the first week of July itself which not only broke last three years flood record but also surpassed the 1987 flood. Crop damage of approximately INR 52205.64 lacs public property damage of approximately INR 103049.64 lacs and death of 855 persons were reported.

**2005 & 2006** : Flood situation remained normal during 2005 & 2006.

**2007** : In the year 2007 the flood situation was serious in North Bihar due to heavy rainfall in catchments of almost all rivers. In Burhi Gandak and in Bagmati river basins there has been regular rainfall in July and August which kept the river water level continuously rising. Almost whole of the North Bihar was badly

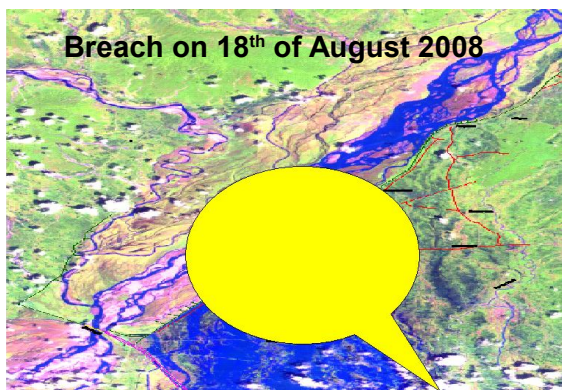
affected and heavy losses of crops and public property occurred.

### **The most disastrous flood of Bihar : Flood of 2008 :**

The 2008 flood of Bihar was one of the most disastrous floods in the history of Bihar which is an impoverished and densely populated state in India. A breach in the Kosi embankment near the India-Nepal border (at Kusha in Nepal) occurred on 18th August 2008 . The river had changed course and inundated floods in earlier decades. The flood affected over 2.3 million people in the Northern Bihar.

#### **Incident :**

On 18 AUGUST 2008, heavy monsoon rains & poor maintenance caused a breach in the Kosi embankment. Water passed through the breach at an estimated 129800 m<sup>3</sup>/s , inundating hundreds of villages in northern Bihar. The flood submerged most of the Kosi alluvial fan area, which is very fertile, with a dense agrarian population.



#### **Affected areas :**

Floods occurred throughout the Kosi river valley in northern Bihar in the districts of Supaul, Araria, Saharsa, Madhepura, Bhagalpur, West Champaran and Purnea. The southeast Tarai eco region of Nepal was also affected.

The flood killed 250 people and forced nearly 3 million people to leave their homes. More than 300,000 houses were destroyed and

at least 340,000 hectares of crops were damaged. Villagers in Bihar ate raw rice and flour mixed with polluted water. Hunger and disease were wide spread. The Supaul district was the worst hit, surging water swamped 1,000 square kilometers of farmlands destroying crops.

#### **Rehabilitation & Relief work :**

The response to the disaster widely reported as the region's worst flood in 50 years. Nitish Kumar, the Chief Minister of Bihar, met Indian Prime Minister Manmohan Singh to seek his help in dealing with the catastrophe.

The Prime Minister declared a "National Calamity" on 28 AUG 2008 and earmarked US \$230 million in aid for the region. Rescue operations were carried out by the Indian Army. National Disaster Response Force (NDRF) and Non Government organisations. Indian Air Force (IAF) helicopters dropped relief supplies in the worst hit districts. Mumbai Fire Brigade sent a 22 member disaster management team to help in relief work.

Chief Minister Nitish Kumar requested a rehabilitation package of Rs 14,500 crore from the central government for the flood ravaged Kosi region.

On 1<sup>st</sup> September describing the floods as a disaster "The Dalai Lama" gave 1 lakh rupees to the Bihar government for relief work. The government of Bihar initiated Kosi Reconstruction & Rehabilitation Programme covering 30,000 affected families in Saharsa, Supaul, and Madhepura district based on a pilot project implemented by ODR collaborative ,a network of organization supporting the government and an owner driven reconstruction policy was formulated to support each family with Rs 55000 to construct their own house.



**Effects of flood :** Floods have multipronged effects on human life. A more frightening fact is that floods are becoming more damaging as their frequency, intensity and magnitude increases with the passage of time.

**Primary Effects :**

- **Physical damage** – Physical damage can range anywhere from bridges, sewer systems, roadways, canals and any other type of structure.
- **Casualties** – People and livestock die due to drowning. It can also lead to epidemics and diseases.

**Secondary Effects :**

- **Water supplies** – Contamination of water. Clean drinking water becomes scarce.
- **Diseases** – Unhygienic conditions. Spread of water borne diseases.
- **Crops and food supplies** – Shortage of food crops can be caused due to loss of entire harvest.
- **Trees** – Non-tolerant species can die from suffocation.

**Tertiary-long-terms Effects :**

- **Economic** – Economic hardship, due to temporary decline in tourism, rebuilding costs, food shortage leading to price increases, etc especially to the poor.

**FLOOD SAFETY**

**Before a flash flood :**

- Carry a portable radio on, at all times so that you can listen to emergency updates.

- If you are trapped inside your house, climb to the highest place and wait for rescuers to find you. Do not swim outside.
- Store water in jugs, sinks, etc.
- Place valuables in the highest level of your house.
- Bring outdoor furniture and toys indoors and secure them.
- Turn off all utilities and close the main gas valve.

**During flood :**

- Do not travel in flooded areas.
- Do not go near power lines and electrical wires.
- Beware of wild animals.

**After a flood :**

- Make sure your house is safe before entering.
- Do not use fire when reentering the house. Use a flashlight.
- Do not turn on your power until an electrician deems it safe.
- Boil all water before use until officials proclaim its safety.
- Beware of sharp debris and slippery floors.
- Throw out all foods contaminated with flood water.
- Make sure all property is safe again.

**Flood control programmes and policies :**

After the devastating floods in 1954, the Government of India announced a National Flood Management Programme. The programme was divided into three phases-immediate, short-term and long term.

- (a) **Immediate phase** : the immediate phase was devoted to collection of data. Hydrologic data, construction of embankment,



urgent spures improvement of river channel and raising of villages above flood level. It was extending over a period of 2 years.

- (b) **Short term measures:** covering next 4 to 5 years consists of improvement of surface shifting of villages, flood level construction of building channel diversions, more embankments and construction of raised platform to be used during times of flood emergency.
- (c) **Long term phase:** Construction of storages, reservoir for flood protection and soil conservation in the catchment area.

**Interview with Mr. Satyanaryan, Additional secretary of Emergency Department :**

**Q.** What steps are taken to control the floods?

**Ans.** For this we organise a meeting which is conducted by the emergency department. Under this meeting we discuss the relief work like which type of relief work is needed, where it is needed & when it should be reached to the affected area. Than we implement all these things in the flood affected areas

**Q.** Why don't you give the information of coming flood as soon as possible, at least loss of human life and property will occur less.

**Ans.** We try to alert the people before coming flood and we are also finding new techniques for better results.

***Thank you for your cooperation***



**Site Visiting :**

We visited the flooded area namely Panapura in Diyara region of Danapur.



**Personal Experience :**

We learned a lot of things during working on our project and we came to know about the real face and facts of our government and administration. Flood which is not the problem of one particular state but it is an international problem and usually known as Natural Calamities. Many steps were taken in order to save the lives and property of people from this dangerous calamity but many faults do exist in these measures and because of these faults, this natural disaster is not stopped completely. At present many states are afflicted by floods but in order to stop it no strong steps have been taken till now. And this disturbs the whole routine life of general masses and every day people have to "lay a wager their life".

**Suggestions :**

- Construct small dams on the helping rivers of Kosi like Asam, Sune and Tamar in order to reduce and control the matter of main stream of Kosi.
- The work of land protection on the above rivers should be given priority and the problem of silting should be controlled.

- The alertness situation should be consolidated in order to tackle the flood so that there should be less loss of property and human lives.
- In every flood season the government must check the embankment and strengthen it.
- There should be complete construction of embankment and those which are left incomplete must be completed by the government.
- New technique like dragging system, which is use to control the flow of river, must be introduced by the government. In order to reduce the harmful effects of flood.

**Findings :**

- Flood always poses threat.
- It creates a lot of destruction and devastation.
- There is no good cooperation between people and government.
- There is no good coordination between two countries.
- Government is taking long time to implement any new techniques or methods in order to reduce its effects.
- People are not well aware about how to tackle the problem of flood due to lack of knowledge.
- The leaders of the flooded area do not live in the affected areas so they have very little knowledge of the flood disaster and its consequences. Even the ministers come only to the edge of the river and are not willing to know the entire problem of the affected people or visit the affected areas.
- Most of the people are not participating in the government programmes and are also not availing of the facilities provided by the Government.

**Conclusion :**

At last we can conclude that flood is the most disastrous problem of Bihar which creates havoc and terror in the heart of people and not only this, it also immensely affects the culture, society and economy of the state. This is not only the duty of the government or the social institutions like Disaster or Emergency Department, but it is also the duty and responsibility of each and every people who reside in the state. Yet government is working to curb the problem of flood but this is not in a proper way. Without the support of the people no one can do anything perfect. We the people, the humanity, each and every one must cooperate. So we must work together on it.

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