

# Solutions to Flood and Drought: The Dual Challenges of Bihar

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Assignment-2

CH211-ENVIRONMENTAL SCIENCE AND ENGINEERING

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## Introduction

In Bihar, the people face two formidable challenges - floods and droughts. These aren't mere weather problems; they significantly impact the lives, farms, and livelihoods of the residents. The focus of this assignment is on discovering solutions to navigate through these challenges. The intention is to comprehend how floods and droughts affect the community and to identify strategies for improvement.

The understanding is clear that floods have the potential to wash away fields, and droughts pose difficulties in cultivating crops. This piece serves as a guide, delving into ideas on fortifying Bihar against these challenges. It explores the potential solutions, whether through innovative approaches or drawing wisdom from traditional practices, the goal is to unearth strategies that resonate with Bihar. The endeavour is to collectively explore and implement ways to address these dual challenges and make Bihar more resilient in the face of adversities.

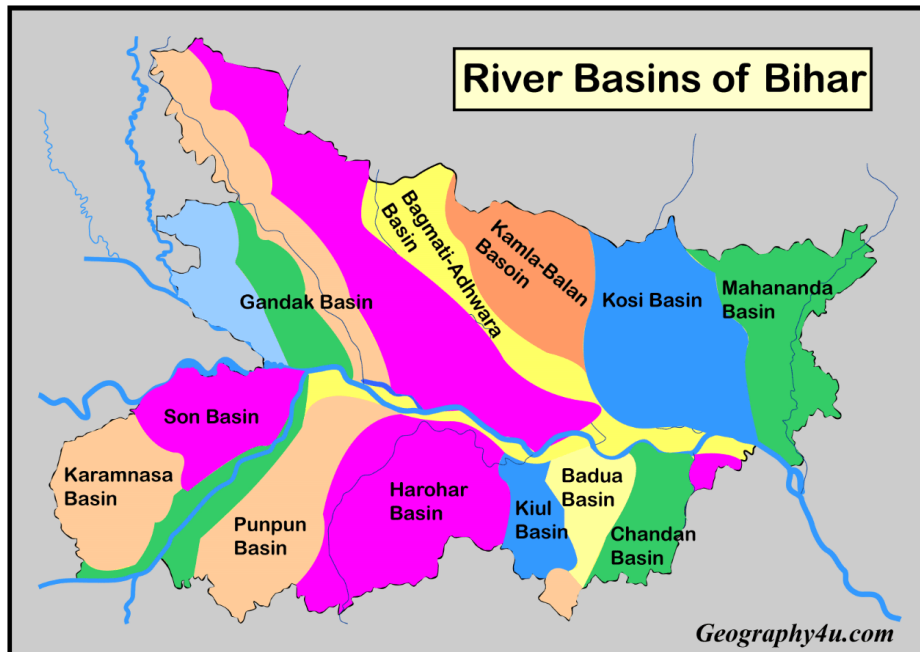
## Possible Solutions to Flood Problems

### Temporary Solutions:

- **Building Embankment:** The flood policy of Bihar in 1954 marked the initiation of building embankments along the flood-prone rivers. Initially spanning 160 km, the embankment length was substantially increased to 3465 km. However, this expansion coincided with a surge in the flood-prone area, growing from 25 lakh hectares to 68.9 lakh hectares by 2004.

Despite these efforts, experts' express reservations about embankments as a permanent solution to Bihar's flood problem. The concern arises from instances where embankments, overloaded during flood events, break, and contribute to even more disastrous floods in the region. The effectiveness and sustainability of embankments as a flood mitigation strategy continue to be debated among experts.

- **River Floor Cleaning:** Proposing an alternative approach, the idea involves annual cleaning of river floors before the onset of rainy seasons. The objective is to augment the carrying capacity of rivers by removing sediment and debris. This proactive measure aims to reduce the risk of riverbed blockages and enhance the rivers' ability to accommodate increased water flow during periods of heavy rainfall. Regular cleaning could potentially contribute to mitigating the impact of floods in the region.



River Basins of Bihar

### Permanent Solutions:

- **Building Dams:** In 1974, an Expert Committee suggested a comprehensive approach to flood control, emphasizing the construction of a large dam in the Barah Region of Nepal. This proposed dam is seen as the only permanent solution to the flood problem. Apart from flood control, the dam could serve dual purposes by providing water for irrigation and generating electricity for both Bihar and Nepal. The recommendation highlights the potential of large-scale infrastructure projects to address multifaceted challenges and foster regional cooperation.
- **Constructing Link Canals in North Bihar:** Another proposed solution for flood control involves the construction of link canals in North Bihar. This approach is viewed as effective and carries multiple benefits. Link canals not only contribute to flood control but also serve as a valuable resource for irrigation. Additionally, they have the potential to enhance the groundwater level,

thereby increasing the availability of water for various human activities.

The suggestion involves the creation of linking canals connecting rivers such as Gandak, Bagmati, Budhi Gandak, Koshi, Mahananda, and others at strategic points, particularly in the upper regions. This comprehensive approach aims to address flooding while promoting sustainable water management and utilization.

- **Decreasing load of Ganga River:** To alleviate the flood risk, a proposed strategy involves reducing the load of the Ganga River. This can be achieved by constructing canals in South Bihar and Uttar Pradesh. These canals would divert excess water from the Ganga, increasing its carrying capacity. Consequently, the enhanced velocity of river flow in North Bihar could decrease the likelihood of floods.

While the idea of constructing canals in South Bihar presents challenges due to the elevated terrain, a solution could involve implementing lift irrigation canals, similar to the Kaleshwaram Lift Irrigation Project in Telangana. This innovative approach not only aids in flood mitigation but also enhances irrigation prospects in the drought-prone regions of South Bihar.

## Possible Solutions to Drought Problems

- **Building Dams:**
  - **Non-perennial Rivers:** Many rivers in this region are non-perennial, flowing only during the rainy season and causing minor floods. Building dams on these rivers can help trap excess water during the monsoon.
  - **Multipurpose Benefits:** Dams offer a multifaceted solution by not only controlling floods but also enhancing

irrigation intensity. Additionally, dams provide cheap electricity, contribute to groundwater level enhancement, and ensure consistent water availability throughout the year in these non-perennial rivers.



**Indrapuri Barrage, Rohtas district**

- **Lift Irrigation Canals:**
  - **Sloping Topography:** South Bihar, with a gradient sloping upwards from the Ganga in the north to the Chhota Nagpur plateau in the south, poses topographical challenges. However, techniques like Lift Irrigation or underground water tunnel systems can overcome these challenges.
  - **Inspiration from Telangana:** Taking inspiration from the ongoing Kaleshwaram Lift Irrigation Project in Telangana, the Bihar government can explore similar lift irrigation projects to transfer water from the Ganga to South and South-West Bihar.
- **Interlinking of River:** Seasonal Rivers in South Bihar: The seasonal nature of rivers in South Bihar can be managed through interlinking, reducing water wastage in the Ganga during the monsoon.

- **Flood Control:** Interlinking can contribute to controlling floods in North Bihar by redistributing water and alleviating the overload in the Ganga during the monsoon.
- **Groundwater Recharge:** The interlinking of rivers can increase the groundwater level in South Bihar, providing a sustainable solution for water availability in the region.
- **Promote Pond/Tank Culture:** Historical Practices: Embracing traditional pond and tank practices that were prevalent in ancient times can aid in water conservation.
  - **Addressing Decline:** Counteracting the significant decline in the number of ponds by encouraging their construction at the village, community, and individual levels.
  - **Alternative Livelihood:** Ponds not only serve as water reservoirs but also offer an alternative livelihood through activities such as fishing (pisciculture), providing vulnerable farmers with additional sources of income.

### **Other Solutions:**

- **Early Warning Systems:** Implementing early warning systems based on long, medium, and short-term forecasts to enable proactive responses to changing weather patterns.
- **Rejuvenating Traditional Rainwater Systems:** Reviving traditional rainwater harvesting systems such as rivers, nalas, tanks, and ponds before the monsoon season to optimize water resources.

- **Promoting Alternative Farming:** Encouraging alternative farming practices, including dry farming, and promoting the cultivation of less water-consuming crops like pulses, oilseeds, maize, and potatoes.
- **Diversification of Livelihoods:** Promoting livestock, animal husbandry, fishing, and poultry farming to reduce dependence on the fragile arid ecosystem and enhance economic resilience.
- **Credit and Crop Insurance:** Ensuring timely availability of credit and crop insurance to farmers to provide financial support during drought-like situations.
- **Land Use Planning:** Promoting appropriate land use planning, including soil mapping, to optimize cropping patterns based on soil characteristics.

## References

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