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RESEARCH ARTICLE

RIVERS- INDIA'S LIFELINES

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ABSTRACT

Today, India's Rivers, reverine biodiversity and river dependent communities are facing major threats from large dams, pollution, encroachment, sand mining, deforestation and bad management practices. These factors are impacting all aspects of rivers: ecological, social, cultural, religious, aesthetic, tourism related and economic. Currently the CBD fails to influence any aspect of India's decision making and management of its rivers which is proving fatal to biodiversity and livelihoods. There are various kinds of approaches. One measure that a lot of states have taken so far is to build check dams, often turning the river into a string of ponds. Another one is digging pits in the river and filling it with boulders so that the water percolates and wells around are replenished this is a sure death knell for the river. These kinds of approaches aim at exploiting the rivers, not saving them. A naturally flowing river has a completely different ecology. When the land was covered by rain forest, the precipitation gathered in the streams and rivers, and they were in full flow. In order to feed the rivers, the soil around them needs to be wet. Today, the whole land is ploughed. Without sufficient amount of shade and constant replenishment through organic material such as leaves and animal droppings, the top layer of the soil leaches out and turns to sand over a period of time. Trees are reduced: animals are slaughtered – there is no replenishment of the soil. Maintaining a substantial number of trees for at least one kilometer width along the riverside's has vast environmental, social and economic benefits for nation and society. Such large-scale, long-term action can only be sustained through government policy. This will ensure our rivers are fed through the year by the moist soil. This will also reduce floods, drought and soil loss, and increase farmers' incomes.

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INTRODUCTION

The rivers are called as the lifelines of India because they have always been important to humans and many of the world's ancient and greatest civilizations were established near rivers. Even today, the capitals of several countries are situated on riverbanks. Rivers benefit communities in ways that are easily recognizable: they are a source of water for domestic, agricultural and industrial purposes and of food and livelihoods; they can be used for transformation; those that are amenable to damming are used to supply energy needs; and they are often used for recreational and religious activities. They are feeding and spawning areas for fish and other aquatic biota and can purify water as they have the ability to break down or absorb pollutants. A properly maintained river system can act as a drainage area and help in flood management.

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Because the water table is at or close to the surface in river basins and because sand retains water, rivers perform the important functions of water storage and groundwater replenishment. The last two functions are applicable to dry rivers as well as those with perennial flows (<http://www.frontline.in/cover-story/rivers-the-lifelines-of-the-land/article7391605.ece>).

In India, rivers are classified mainly of two types based on their geographical locations and origin.

- a) Himalayan rivers
- b) Peninsular rivers

The Himalayan rivers of the country constitute three major rivers, The Ganga, Brahmaputra, and Indus. Among peninsular rivers majority of them are east coast rivers, namely Mahanadi, Krishna, Godavari and Cauvery ; while a few others i.e., west coast rivers like Narmada, Tapi, Sabarmathi. All the peninsular rivers are entirely dependent on monsoons and display from

very poor water flow to heavy flood and according to these conditional they exhibit the fluctuating ecological and biological conditions. Almost all the Indian rivers are undergoing drastic change. Due to over population and urbanization our perennial rivers are becoming seasonal. Many of the smaller rivers are already dried. Flood as well as drought are becoming increasingly frequent as rivers over flow during the monsoon and dried up once the rainy season is over. Water is widely regarded as the most essential of natural resources, yet freshwater systems are directly threatened by human activities (Meybeck, 2003; World Water Assessment programme. UNESCO, 2009; Vorosmarty, 2005) and stand to be further affected by anthropogenic climate change (Karl *et al*, 2009). Many anthropogenic modifications of river water are the result of despoliation caused by many sectors; but most prominent among them are-

- River pollution throughout the country caused by untreated urban sewage, industrial effluents, agricultural runoff, mining wastes, religious ceremonies and navigational operations.
- Indiscriminate destruction of drainage basin because of clearing of respiration zone vegetation which, in turn, is responsible for elevated load of suspended solid and increased magnitude and frequency of flood changing the level of interaction between land and water; and hence affects input of energy source.
- River regulation, lift irrigation and water allocation without considering the ecological consequences

Have influenced much adversely to the density, diversity and productivity of aquatic bioresources. Further, population of migratory fishes is also negatively affected (V.K. Srivastava, 2007). So far, a few notable review papers have been published on the present status of rivers in India. As it is difficult to go through all the works done throughout the country, but the significant publications and reports given have been taken in to consideration.

Present status of Indian Rivers

River Ganga

River length: 2525 km; Basin area: 861,000 sq km; Population in basin: 329 million

Major cities using water

New Delhi (Population: 11million), Kolkata (Population: 4.5 million), Varanasi (Population: 1.million), Allahabad (Population: 1.1 million)

River depletion

- Water depletion: 44%
- Dry season drought risk: Low
- Monsoon flood risk: Extremely high
- Total tree cover loss: 78%
- Seasonal variability of water levels: High

Economic and environmental significance

- The Gangetic region is one of the most fertile agricultural areas on the planet. Over 5,65,000 sq km

are cultivated in this region in India, representing almost a third of the agricultural area in India.

- The Ganga was once an important navigational route. Even today, West Bengal uses the river to transport jute, tea, grain and other agricultural products.
- The Kolkata port, one of the major ports in India, is located on the Hooghly, a distributary of the Ganga.

Two major species facing extinction are the gharial – a species of crocodile – and the Ganges Dolphin – one of only 7 freshwater dolphin species in the world. There are only about 200 gharials and 2000 Ganges Dolphin left.



Gangetic fresh water Dolphin, Source: <https://www.thebetterindia.com>

Recent disasters

- The Ganga is one of the most endangered rivers in the world, according to WWF.
- As with almost all Indian rivers, the Ganga is increasingly alternating between flood and drought. In May 2016, the Ganga was so dry at Prayag, Uttar Pradesh that people were walking across the river bed.
- Just three months later, during August 2016, the river's monsoon floods touched record levels in Bihar and Uttar Pradesh, affecting 4 million and displacing 6,50,000 people from their homes. The flood coming immediately after drought had a catastrophic effect on agriculture (www.isha.sadguru.org/rally-for-rivers/).

River Brahmaputra

River length:3848 km; Basin area: 194,000 sq km (in India); Population in basin:17.7 million (in India, 2001)

Major cities using water

Guwahati (Population:957,352), Siliguri (Population:705,600), Dibrugarh (Population:154,019), Shillong (Population:143,229), Tezpur (Population:102,505)

River depletion

- Dry season drought risk: Low to Medium
- Monsoon flood risk: Extremely high
- Total tree cover loss: 78%
- Seasonal variability of water levels: High

Economic and environmental significance

- The Brahmaputra basin has an installed hydropower capacity of 2120 MW, with another 3000 MW under construction.
- The forests around the Brahmaputra and its tributaries are of immense environmental significance and our biodiversity hotspots. The Kaziranga National Park, one of the last refuges of the endangered Indian rhinoceros is a UNESCO World Heritage Site. The Manas National Park, along the Manas river – a Brahmaputra tributary – is another UNESCO World Heritage Site. It is home to India's only species of ape, the hoolock gibbon. It is also home to four big cats – the tiger, leopard, clouded leopard and snow leopard.

Recent disasters

Deforestation in the Brahmaputra basin has resulted in increased siltation levels in the river, flash floods and soil erosion. Massive flooding causes huge losses to crops, life, and property. The recent floods during august-2017 in Assam have claimed the lives of 124 animals among them 9 were rhinos, in Kaziranga National Park when the river waters submerged 85 percent of the World heritage site (<http://www.newindianexpress.com/nation/2017/aug/04/assam-floods-9-rhinos-among-124-animals-dead-in-kaziranga-national-park-1638360.html>)



Rhinos with a calf at a highland during floods at the Kaziranga national Park in Nagaon district in Assam . (Source: <http://www.newindianexpress.com>)

River Godavari

River length:1465 km; Basin area:313,812 sq;Population:142 million

Major cities using water

Hyderabad (Population: 6.8million), Nashik (Population: 1.5million), Aurangabad (Population: 1.2 million)

River depletion

- Water depletion: 20%
- Dry season drought risk: Medium
- Monsoon flood risk: High
- Total tree cover loss: 88%
- Seasonal variability of water levels: Extremely high

Economic significance

- Being the largest peninsular river, Godavari is especially significant for agriculture in the area.

- The Godavari and Krishna deltas are very close to each other. Together, they support almost 1 crore people in an area of 12,700 sq km.
- The Godavari is also an important inland waterway, and is considered a National Waterway.

Recent disasters

- In 2016, the Godavari flooded not once, but twice – in June and July. Flooding occurred in all three states that the river passes through. In Andhra alone, floods forced 5,43,000 people from their homes. Before two months to this, the Godavari was going dry at its very source in Nashik. During the Kumbh Mela at Nashik, ground water had to be pumped into the river for devotees to take a dip.
- During the summer of 2017, Andhra Pradesh and Telangana were almost in drought as both Krishna and Godavari were at low levels. Such alternating flood and drought situations are present in almost all of India's major rivers.

River Krishna

River length:1400 km; Basin area: 258,948 sq km; Population in basin:135 million

Major cities using water

Chennai (Population: 7 million), Hyderabad (Population: 6million), Vijayawada (Population: 1 million)

River depletion

- Water depletion: 61%
- Dry season drought risk: Medium
- Monsoon flood risk: High
- Total tree cover loss: 97%
- Seasonal variability of water levels: High

Economic and Environmental Significance

- The Krishna river region is a place of intensive agricultural activity. Over 75% of the land area is agricultural.
- The Krishna and Godavari deltas are very close to each other. Together, they support almost 10 million people in an area of 12,700 sq km.
- The Krishna Wildlife Sanctuary, located where the Krishna meets the Bay of Bengal, contains one of the last remnants of mangrove forests in South India. It is home to a unique ecosystem that includes estuarine crocodiles, smooth-coated otters and serpent eagles.
- The Great Indian Bustard Sanctuary is one of the last refuges of the Great Indian Bustard. There are only about 250 of these birds left in the wild. The sanctuary is located near Sholapur, near the Bhima river, a tributary of the Krishna.

Recent disasters

- In October 2009, Andhra Pradesh moved from drought to flood as the Krishna recorded its highest flood levels in a

century, marooning 350 villages and leaving millions homeless.

- This happened just six years after a prolonged drought from 2001 to 2003 reduced the Krishna to a trickle. It barely reached the ocean during this entire three-year period.



Source: <http://traveltwosome.com/great-indian-bustard-sanctuary-nannaj/>

Great Indian Bustard Sanctuary at Sholapur

River Kaveri

River length: 802 km; Basin area: 88,000 sq km; Population in basin: 73 million

Major cities using water

Chennai (Population: 7 million), Bengaluru (Population: 8.4 million)

River depletion

- Water depletion: 39%
- Dry season drought risk: Low to medium
- Monsoon flood risk: High
- Total tree cover loss: 87%
- Seasonal variability of water levels: Medium

Economic significance

- The very name “Kaveri” manifests its significance. “Kaveri” comes from Ka and viri, and means “one who brings abundance where she flows.”
- The Kaveri delta is one of South India’s rice bowls and supports 4.4 million people.
- The Kaveri basin contributes 40% of the food grain in Tamil Nadu and 26% in Karnataka.
- Asia’s first hydroelectric dam was built across the Kaveri at Shivanasamudra. The dam provides electricity to Bengaluru.

Recent disasters

- In 2016, the Kaveri went dry at its source as rainfall fell by 40-70%. Ironically, Tamil Nadu had suffered some of its worst floods a few months earlier in 2015. Five hundred people lost their lives. Estimates of the damage ranged from 20,000-1,60,000 crores. And a year later in the summer of 2017, once again, Tamil Nadu faced drought – the worst in 140 years, while Karnataka stares at a 36% shortfall in food grain production.

- The growing trend of alternating flood-drought cycles is becoming apparent in almost all major rivers in India.

River-Yamuna

River length: 1376 km; Basin area: 366,223 sq km; Population in basin: 128 million (2001)

Major cities using water

- New Delhi (Population: 19 million), Agra (Population: 1 million), Allahabad (Population: 1 million), Mathura (Pop: 349,336)

River depletion

- Water depletion: 60% (estimation from World Bank report)
- Dry season drought risk: Low-Medium
- Monsoon flood risk: High
- Tree cover loss: 11% (1985-2005)
- Seasonal variability of water levels: Extremely High

Economic and environmental significance

- Almost 27 billion liters are extracted every day from the river for 70% of Delhi’s water supplies.
- It irrigates 6 million hectares of agricultural land and provides about 400 MW of hydroelectricity.

Rivers depletion and its effects

- Estimates reveal that 65% of our water needs are met by rivers.
- Today, Rivers are depleting at such a rate that they will become seasonal in 20 years time.
- Each person’s average water requirement is 1.1 million liters a year.
- Two out of three major Indian cities already deal with daily water shortage. Many urban residents pay ten times the normal amount for a can of water.
- People consume water not only for drinking or domestic purposes, 80% of water is used to grow the crops. Flood, drought and rivers turning seasonal are increasingly leading to crop failure across the country.
- Climate change is expected to cause worse floods and droughts within the next 25-50 years. During the monsoon, rivers will flood. The rest of the year, drought will follow. This situation is already began (www.isha.sadguru.org/rally-for-rivers/)

Conclusion

- If we run out of water and the ability to generate food for our population, we will have a serious calamity on our hands. A broader solution which starts by creating an awareness about what we are doing to the rivers and what we should do instead.
- River conservation programmes will be effective only if the ecological, economic, technological and social dimensions of the problem are seen in a comprehensive manner.

These conservation programmes must take a larger perspective of pollution. At the moment, a major source of pollution - that is, pollution from agricultural fields in the form of chemical fertilizers and pesticides - is not being tackled at all.

- We need to understand that because of trees, there is water. So along the sides of the rivers for certain distance, we need to grow trees to build a green cover. In land belonging to the Government, we have to plan for afforestation to bring enormous amount of land under green cover. Government have to create River friendly policies. The government must, therefore, encourage farmers to move towards organic farming, failing which they must be encouraged to use biological pesticides or safer chemical pesticides and undertake integrated pest management to reduce the use of pesticides. In other words, we need comprehensive river basin pollution control programmes.
- In private land farmers should go for horticulture and tree based farming. In this way we will invite the monsoons to be regular and will stop the erosion of our soil.
- It is our land and rivers that sustain us, so we need to protect them.

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