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RIVER INTERLINKING IN INDIA: DREAM, DILEMMA OR DISASTER ?

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ABSTRACT

India faces a dual challenge of water abundance and water scarcity due to the uneven distribution of rainfall and the seasonal nature of its river systems. While floods ravage some areas during the monsoon season, other regions face persistent drought. In this context, the idea of river interlinking has been proposed as a potential long-term solution to redistribute water across different basins. The river interlinking project in India aims to connect surplus rivers to deficit regions through a network of canals, reservoirs, and pipelines. This paper explores the conceptual foundation, historical background, and scholarly perspectives on the river interlinking initiative. It presents a detailed review of literature from engineering, environmental, legal, and socio-economic standpoints. The paper emphasizes that although the interlinking of rivers holds the promise of enhancing irrigation, drinking water supply, and hydroelectric power, it also raises significant concerns related to ecological degradation, displacement of people, and interstate disputes. A balanced and evidence-based assessment is necessary to ensure that these projects align with India's developmental and environmental goals.

1. INTRODUCTION

Water is one of the most important natural resources for any country, and in India, its role is even more critical due to the country's agricultural dependence, high population, and climatic variations. India receives approximately 4,000 billion cubic meters (BCM) of rainfall annually, but due to uneven geographic distribution, only a portion of it is available for effective use. As a result, while some parts of the country suffer from floods during the monsoon, others regularly

face drought and water scarcity. The idea of redistributing water from surplus to deficit regions through the interlinking of rivers has been a recurring proposition since the 20th century.

The concept of interlinking rivers in India was first proposed by Dr. K.L. Rao in 1972. He envisioned a National Water Grid that could connect major rivers to address both flood and drought problems. This was followed by Captain Dastur's "Garland Canal" plan in 1977, which suggested a more elaborate network of canals surrounding the Indian mainland[1]. These early ideas were criticized for their lack of technical detail and feasibility. Nonetheless, the concept was revived with the formation of the National Water Development Agency (NWDA) in 1982 under the Ministry of Jal Shakti. The NWDA identified 30 potential links—14 under the Himalayan Component and 16 under the Peninsular Component—that could form part of a National Perspective Plan (NPP) for inter-basin water transfer[2].

One of the most prominent among these is the Ken-Betwa Link Project (KBLP), which proposes to divert surplus water from the Ken River in Madhya Pradesh to the Betwa River in Uttar Pradesh to provide irrigation, drinking water, and hydroelectric power. The project is expected to benefit the drought-prone Bundelkhand region but has also faced opposition due to concerns about forest loss and wildlife displacement, especially affecting the Panna Tiger Reserve[3].

Despite its ambitious scale, the interlinking of rivers in India has been a topic of both hope and concern. Supporters argue that it can solve India's water woes, while critics highlight ecological, legal, and social risks. This paper aims to explore the historical, technical, and academic perspectives on the subject. It begins with a comprehensive review of literature covering various dimensions of the river interlinking debate.

2. REVIEW OF LITERATURE

[1] K.L. Rao, India's Water Wealth: Its Assessment, Uses and Projections (1975).

[2] National Water Development Agency, Government of India, https://nwda.gov.in (last visited May 7, 2025)

[3] Ken-Betwa Link Project: PFR, National Water Development Agency (2015).

The scholarly and policy literature on river interlinking in India can be grouped into several categories: historical and institutional development, technical feasibility, environmental impact, legal and constitutional issues, and socio-economic implications.

2.1 HISTORICAL AND INSTITUTIONAL DEVELOPMENT

The idea of water transfer between river basins is not new. During the British colonial period, irrigation engineer Arthur Cotton envisioned linking rivers in South India to manage floods and improve navigation. However, it was in independent India that formal plans were made. Dr. K.L. Rao's proposal for a Ganga-Cauvery link and Captain Dastur's Garland Canal plan are often cited as the earliest national-level efforts to conceptualize interlinking[4].

The NWDA, created in 1982, was mandated to conduct feasibility studies for the proposed links. By the early 2000s, the idea gained political traction, and in 2002, the Supreme Court of India directed the Union Government to set up a task force for implementation, stressing the urgency of the project[5]. The task force led to the development of the National Perspective Plan (NPP), which identified the Himalayan and Peninsular components for the inter-basin transfer of water.

2.2 TECHNICAL AND ENGINEERING FEASIBILITY

Numerous studies have evaluated the engineering feasibility of river interlinking. The Central Water Commission (CWC) estimated that 174 BCM of water could be transferred annually through inter-basin links[6]. These projects would require the construction of dams, reservoirs, canals, tunnels, and pumping stations across the country. While the technical possibility has been affirmed in multiple feasibility reports by NWDA, concerns remain over the long-term sustainability and accuracy of hydrological data, particularly in the face of climate change and erratic rainfall patterns[7].

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[4] R. Rangachari et al., Interlinking of Rivers: Need and Relevance (2005).

[5] In re Networking of Rivers, (2002) 6 S.C.C. 1 (India)

[6] Central Water Commission, Water and Related Statistics 2019, available at https://cwc.gov.in.

[7] A.K. Gosain & Sandhya Rao, Climate Change Impact Assessment on Hydrology of Indian River Basins, 90 Current Sci. 346 (2006).

One major technical concern is the energy requirement for lifting and transferring water, particularly in regions with varied elevations. For example, the Ken-Betwa project involves significant energy costs due to its lifting component. Further, construction of large infrastructure projects can lead to sedimentation, salinization, and waterlogging over time, which may undermine their intended benefits[8].

2.3 ENVIRONMENTAL AND ECOLOGICAL CONCERNS

One of the most significant criticisms of river interlinking comes from environmentalists and ecologists. River systems are natural ecosystems with unique flora and fauna, seasonal flows, and ecological balance. Interfering with their natural flow through diversions can harm biodiversity, deplete aquifers, and reduce downstream water availability.

Jayanta Bandyopadhyay has argued that rivers are not simply water channels but ecological entities. Disrupting their flow could have serious consequences for wetlands, forests, and aquatic life[9]. For instance, the Ken-Betwa Link Project has raised concerns about the Panna Tiger Reserve, with estimates suggesting a loss of over 4,000 hectares of forest land and the displacement of endangered species[10].

Moreover, many Environmental Impact Assessment (EIA) reports related to ILR projects have been criticized for inadequate stakeholder consultation and poor quality of data. The Wildlife Institute of India (WII) warned that the ecological damage from the Ken-Betwa project could be irreversible if mitigation strategies are not properly implemented.

2.4 LEGAL AND CONSTITUTIONAL DIMENSIONS

Water is listed under the State List (Entry 17) of the Indian Constitution, which means that states have significant control over water resources. However, when rivers flow across states or inter-basin transfers are involved, the Union Government can intervene under certain conditions. This

[8] World Bank, The Challenge of Water Infrastructure Development (2020), available at https://worldbank.org.

[9] Jayanta Bandyopadhyay, Interlinking of Rivers in India: Assessing the Justifications, 42 Econ. & Pol. Wkly. 1072 (2007).

[10] Wildlife Institute of India, Environmental Appraisal of Ken-Betwa Link Project (2017).

makes the legal framework for river interlinking complicated, as it requires cooperation among states.

Several water-sharing disputes—such as the Cauvery, Krishna, and Yamuna—demonstrate how contentious inter-state water issues can be. In 2002, the Supreme Court's judgment directing the

central government to initiate ILR was a landmark step, but it also highlighted the need for a coherent legal framework that balances state rights with national interests[11].

Ramaswamy Iyer, a renowned water policy expert, has argued that a top-down, technocratic approach to water governance is insufficient. He advocates for participatory and decentralized models that consider local needs and ecosystem constraints[12].

2.5 SOCIO-ECONOMIC IMPLICATIONS

From an economic perspective, the interlinking of rivers could boost agricultural productivity, enhance drinking water supply, and generate hydroelectric power. According to NITI Aayog, if implemented efficiently, ILR projects could irrigate up to 35 million hectares and produce 34,000 megawatts (MW) of hydropower[13].

However, the social costs of such projects must not be ignored. Displacement of communities, loss of livelihood, and inadequate rehabilitation have been persistent problems in similar large-scale infrastructure projects like the Sardar Sarovar Dam. Critics argue that the cost-benefit analysis of ILR projects often underestimates social and environmental costs[14]. A holistic evaluation of river interlinking must therefore include not just economic output, but also social justice and ecological sustainability.

3. METHODOLOGY AND ANALYSIS

[11] In re Networking of Rivers, (2002) 6 S.C.C. 1 (India).

12. Ramaswamy R. Iyer, Towards Water Wisdom: Limits, Justice, Harmony (2007).

[13] NITI Aayog, Water Resource Management and Development (2020), https://niti.gov.in.

[14] Arundhati Roy, The Greater Common Good, Frontline (June 1999).

This research uses a mixed-method approach that includes qualitative and quantitative data from secondary sources. The study relies on government reports, environmental impact assessments (EIA), policy documents, journal articles, and case studies, particularly focusing on the Ken-Betwa Link Project (KBLP), which is India's most advanced river interlinking initiative.

Primary sources such as feasibility reports published by the National Water Development Agency (NWDA), judgments of the Supreme Court, and official statistics from the Central Water Commission (CWC) are utilized to evaluate the infrastructural, ecological, and economic aspects of river interlinking. Secondary sources include academic research, environmental critiques, and expert opinions published in reputed journals and policy think-tanks.

The analysis is organized under three dimensions:

1. Technical and environmental feasibility.
2. Socio-economic impact on local communities.
3. Legal and intergovernmental coordination mechanisms.

The Ken-Betwa project serves as a case study because it has passed several administrative stages, including approvals from the Union Cabinet and environmental authorities. Analyzing this project allows the identification of broader trends, potential challenges, and lessons for other proposed interlinking schemes.

4. RESULTS AND DISCUSSION

4.1 TECHNICAL AND ENVIRONMENTAL ASSESSMENT

The Ken-Betwa Link Project Phase-I includes the construction of the Daudhan Dam on the Ken River and a 221 km canal to transfer surplus water to the Betwa basin. The projected benefits include irrigation for 1.06 million hectares, drinking water for 6.2 million people, and 103 MW of hydropower generation[15].

[15] National Water Development Agency, Detailed Project Report of Ken-Betwa Link Project Phase-I (2020), available at https://nwda.gov.in.

However, several environmental concerns persist. The project is expected to submerge 9,000 hectares of land, including about 4,141 hectares of the Panna Tiger Reserve, which is home to several endangered species[16]. The Wildlife Institute of India has warned that the loss of core forest areas could impact tiger corridors, leading to long-term ecological imbalance.

Additionally, studies have shown that interlinking projects could disrupt the natural flow of rivers, affecting sediment transport, groundwater recharge, and downstream ecosystems[17].While mitigation plans such as afforestation and wildlife corridors have been proposed, environmentalists argue that such steps may not be adequate or effectively implemented.

Climate variability also raises questions about the sustainability of surplus water calculations. If rainfall patterns change significantly due to climate change, river basins currently considered "surplus" may not have adequate water for transfer in the future[18]. This makes long-term planning for ILR projects highly uncertain.

4.2 SOCIO-ECONOMIC IMPACT

The socio-economic effects of river interlinking are both positive and negative. On the one hand, the KBLP promises to bring water to the drought-prone Bundelkhand region, potentially improving agricultural productivity, food security, and employment opportunities. Government estimates claim that up to 100,000 jobs could be created during the construction phase alone[19].

However, displacement and rehabilitation remain key concerns. The Ken-Betwa project is expected to displace over 20,000 people, many of whom belong to tribal and marginalized communities[20]. Past experiences from large dam projects like Sardar Sarovar show that

[16] Wildlife Institute of India, Environmental Appraisal of Ken-Betwa Link Project (2017)

[17] Jayanta Bandyopadhyay, A Critical Look at the Interlinking of Rivers in India, 42 Econ. & Pol. Wkly. 1072 (2007).

[18] A.K. Gosain & Sandhya Rao, Climate Change Impact Assessment on Hydrology of Indian River Basins, 90 Current Sci. 346 (2006).

[19] Ministry of Jal Shakti, Ken-Betwa Link Project Brochure (2021), https://jalshakti-dowr.gov.in.

[20] Arundhati Roy, The Greater Common Good, Frontline (June 1999).

resettlement programs are often poorly executed, leaving affected communities without adequate compensation or livelihood options[21].

Further, there is a gender dimension to displacement and water distribution. Women, who are primarily responsible for fetching water in rural areas, are often not consulted in planning or resettlement. This omission undermines the social sustainability of such large-scale infrastructure projects.

Moreover, the high cost of implementation—estimated at ₹44,605 crore for the Ken-Betwa Link Project alone—raises questions about opportunity costs and funding priorities[22].Critics argue that decentralized water management practices like watershed development, rainwater harvesting, and micro-irrigation may offer more cost-effective solutions for water scarcity in India's rural areas[23].

4.3 LEGAL AND FEDERAL COORDINATION

Water is a State subject under Entry 17 of the State List in the Indian Constitution, but inter-state river disputes and water transfers invoke the Union's powers under Article 262 and the Inter-State River Water Disputes Act, 1956[24]. For ILR projects, consensus among participating states is crucial.

In the case of the Ken-Betwa project, both Madhya Pradesh and Uttar Pradesh had to sign a Memorandum of Understanding (MoU) for implementation. Although the MoU was finalized in March 2021, negotiations took over two decades due to concerns about water-sharing ratios, forest clearance, and funding mechanisms[25].

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[21] Nandini Oza, Development Displacement and Rehabilitation: Lessons from the Narmada Project, 39 Econ. & Pol. Wkly. 1999 (2004).

[22] Press Information Bureau, Cabinet Approves Funding for Ken-Betwa Link Project (Dec. 2021), https://pib.gov.in.

[23] Mihir Shah Committee Report, A 21st Century Institutional Architecture for India's Water Reforms (2016), https://niti.gov.in.

[24] The Constitution of India, art. 262; Inter-State River Water Disputes Act, No. 33 of 1956, INDIA CODE.

[25] Memorandum of Agreement Between Madhya Pradesh and Uttar Pradesh on Ken-Betwa Link (2021).

Such delays highlight the need for a more robust legal and institutional framework to manage ILR projects. The absence of a comprehensive national water law makes coordination between states cumbersome and slow. Water expert Ramaswamy Iyer warned that a technocratic, top-down approach without state cooperation and public consensus could result in "legal deadlocks and political friction[26]."

The Supreme Court's 2002 order directing the government to explore interlinking did provide a legal push, but judicial directions alone cannot resolve deep-rooted federal tensions[27]. A National Water Framework Law, which has been under discussion since 2016, could provide guiding principles for equitable water sharing, ecological sustainability, and stakeholder participation[28].

4.4 ROLE OF CIVIL SOCIETY AND PUBLIC PERCEPTION

Public opinion about ILR projects is deeply divided. Proponents often include technocrats, politicians, and construction companies who highlight the potential benefits in terms of water security and economic growth. On the other hand, NGOs, academics, and local communities have voiced strong opposition based on concerns about ecology, displacement, and lack of transparency.

Civil society organizations like South Asia Network on Dams, Rivers and People (SANDRP) have criticized the lack of adequate public consultations and have advocated for decentralized and river-sensitive water management solutions[29].

Media coverage also influences public perception. While some national newspapers present ILR as a "game-changer" for Indian agriculture, investigative journalism has brought attention to delays, inflated costs, and unfulfilled rehabilitation promises in ongoing projects.

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[26] Ramaswamy R. Iyer, Towards Water Wisdom: Limits, Justice, Harmony (2007).

[27] In re Networking of Rivers, (2002) 6 S.C.C. 1 (India).

[28] Draft National Water Framework Bill, Ministry of Jal Shakti (2016), https://jalshakti-dowr.gov.in.

[29] South Asia Network on Dams, Rivers and People (SANDRP), https://sandrp.in.

4.5 INTERNATIONAL AND TRANSBOUNDARY CONCERNS

Several rivers targeted for interlinking, particularly in the Himalayan component of the National Perspective Plan, are shared with neighboring countries like Nepal, Bhutan, Bangladesh, and China. For instance, the Brahmaputra River originates in Tibet and flows through India and Bangladesh. Inter-basin transfers involving such rivers may raise geopolitical tensions and require international treaties[30].

Experts warn that large-scale diversion of transboundary rivers could impact downstream countries and violate existing water-sharing agreements. For example, Bangladesh has expressed concerns about potential changes to the Ganga and Brahmaputra flows due to India's ILR ambitions[31].

Therefore, any progress on ILR involving international rivers must be accompanied by diplomatic engagement and adherence to international water law principles, such as equitable and reasonable use and the obligation not to cause significant harm.

5. CONCLUSION

The interlinking of rivers in India represents one of the most ambitious water management initiatives in the world. With the aim of redistributing water from surplus to deficit regions, the ILR projects promise benefits such as increased irrigation, drinking water supply, and hydropower generation. However, the project also faces considerable challenges, including environmental degradation, displacement of vulnerable communities, financial viability, and inter-state disagreements.

This research highlights that while the Ken-Betwa Link Project serves as a critical case study showing the potential advantages of river interlinking, it also exemplifies the structural and systemic issues that need addressing. These include improved environmental governance, better resettlement practices, stronger legal frameworks, and greater stakeholder involvement.

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[30] Uttam Kumar Sinha, Managing India's Transboundary Waters (2016).

[31] Debal Deb & Priya Sangameswaran, River Linking Project: A Solution or a Problem?, 38 Econ. & Pol. Wkly. 5067 (2003).

Rather than seeing ILR as a one-size-fits-all solution, India's water policy should adopt a pluralistic approach that includes decentralized water conservation, integrated river basin management, and participatory decision-making. Only then can the vision of river interlinking evolve from a grand dream to a sustainable reality.

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4. Ramaswamy Iyer, "Water: Perspectives, Issues, Concerns" (Sage Publications 2003).
5. Jayanta Bandyopadhyay, "A Critique of the Concept of River Linking," Econ. & Pol. Wkly., May 2002, at 2035.
6. Inter-State River Water Disputes Act, No. 33 of 1956, India Code (1956), https://indiacode.nic.in.
7. Ministry of Environment, Forest and Climate Change, "Environmental Impact Assessment Notification, 2006," Gazette of India, S.O. 1533(E).
8. Mihir Shah et al., "A 21st Century Institutional Architecture for India's Water Reforms," Planning Comm'n Working Paper, 2012..
9. United Nations, Convention on the Law of the Non-Navigational Uses of International Watercourses, May 21, 1997, 36 I.L.M. 700.
10. Himanshu Thakkar, "River Interlinking in India: Overview, Challenges and Prospects," in India Infrastructure Report 2011: Water (IDFC Foundation 2011).
11. Ravi Baghel & Marcus Nüsser, "Securing the Heights: The Interlinking of Rivers in India," 38 GeoJournal 255 (2012).
12. Upendra Baxi, "The Judiciary as a Resource for Indian Democracy," 38 Ind. J. Const. L. 1 (2008).