

Inter Linking of Rivers - a Review

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Abstract. The rivers in India are truly speaking not only life-line of masses but also for nature. The rivers play a very important role in the life of the People. The river system facilitate us in irrigation, potable water, cheap transportation, energy as well as a resource of living for our ever growing population. Some of the major cities of India are located at the bank of holy rivers. Proper supervision of river water is the need of the hour. Indian agriculture mainly depends upon Monsoon which is always vague in nature. Hence, there is a rigorous problem of lack of irrigation in one region and water logging in other region. Damage to crops due to deficiency and pathetic drainage facility could be managed. Depleting and declining status of water resources may be one of the most essential resource issues in the 21st century. The core idea of the paper is to study issues and challenges in interlinking of rivers in India and to study ecological collision of Inter-River Linking Project (IRL). Inter-River Linking Project (IRL), issues and challenges Inter-River Linking Project involves multifaceted issues and challenges related to financially viable, environmental, and social costs.

I. INTRODUCTION

The Inter-linking of Rivers in India proposal has a long history. During the British colonial rule during 19th century engineer Arthur Cotton proposed the plan to interlink major Indian rivers in order to hasten import and export of goods from its colony in South Asia, as well as to address water shortages and droughts in southeastern India (now Andhra Pradesh and Orissa). In 1970s, Dr. K.L. Rao, a dam engineer and ex- irrigation minister proposed "National Water Grid". He was scared regarding the rigorous shortages of water in the South and frequent flooding in the North every year. He recommended that the Brahmaputra and Ganga basins are water surplus areas and central and south India as water insufficiency areas. He planned that surplus water can be diverted to areas of deficit. When Rao made the proposal, several inter-basin transfer projects had already been successfully implemented in India and Rao recommended that the success be scaled up. In 1980, India's Ministry of Water Resources came out with a report entitled "National Perspectives for Water Resources Development". This report split the water development project in two parts – the Himalayan and Peninsular components. National Water Development Agency (NWDA) setup in 1982 to complete detailed studies, surveys and investigations technical, engineering & economically, in respect of reservoirs, canals and all aspects of feasibility of inter-linking Peninsular rivers and related water resource management. NWDA has produced many reports over 30 years, from 1982 through 2013. However, the projects were not pursued. Inter-linking of rivers idea was revived in 1999, after a new political alliance formed the central government, but this time with a major strategic shift. The proposal was modified to intra-basin development as opposed to inter-basin water transfer. A social federation charge PIL for stopping the river inter linking work, but on dated 13th December, 2002, Respected Supreme Court reject it. The NWDA has divided the project in two parts- The Himalayan part with 14 river links which is estimated to cost Rs. 3,75,000 Crore and the peninsular section with 16 river links which is estimated to cost Rs. 1, 85, 000 crore.

Main aim of interlinking of rivers is to stop the flood problem of the Gangs and Brahmaputra and at the same time solving the deficiency problem in southern India by divert surplus water of the snow-fed rivers to the rain fed Peninsular rivers. These works convey an extra 35 million hectares under irrigation whereby per capita food grain consumption would be doubled in spite of the enhance in population. This interlinking of rivers will furnish food security to the country. Keeping in mind the increasing in demand for water, the government of India has built-up a new National Water Policy which claims that water is a prime natural resource, a basic need and a valuable national asset. India's National Water Development Agency (NWDA) has recommended the interlinking of rivers of the country. This proposal is better known as the Inter-River Linking Project (IRL). It is a jumbo project that engages money, wealth, engineering, management and human understanding. It is calculated to ease water shortages in western and southern India and aims to link 30 major rivers.

The National Perspective Plan comprised, starting 1980s, of two main components:

1. Himalayan Rivers Development, and
2. Peninsular Rivers Development

Water is unquestionably the most significant natural resource on the planet, as it sustains all aspects of life in a way that no other resource can. United Nations agencies and the World Bank have claimed that these scarcities will escalate in the future, creating severe problems for human race and the environment. India needs to take up

a crystal-clear water mission that can assist us to use available water resources to fields, villages, towns and industries round the year, exclusive of harming our environment. Keeping in mind the rising demand for water, the government of India has developed a new National Water Policy which claims that water is a major natural resource, an essential need and a precious national asset. India's National Water Development Agency (NWDA) has recommended the interlinking of rivers of the country. This proposal is better known as the Inter-River Linking Project (IRL). It is a jumbo project that engages money, resources, engineering, management and human understanding. It is designed to ease water shortages in western and southern India and aims to link 30 major rivers. It will also involve diverting the Ganges and the Brahmaputra – two of India's biggest rivers. It is estimated to cost US \$ 123 billion (as per 2002) and, if completed, would be the single largest water development project anywhere in the world. It is expected that properly planned water resource development and management could lighten poverty, improve the significance of life, and decrease regional disparities, better law and order situation and handle the integrity of the natural environment. The core objectives of the paper are to understand the historical background of Interlinking River Projects and to talk about issues and challenges pertaining to Interlinking River Projects.

II. LITERATURE REVIEW

By 2015, fourteen inter-links under consideration for Himalayan component are as follows, with possibility study status identified: Himalayan Rivers Development envisages construction of storage reservoirs on the main Ganga and the Brahmaputra and their principal tributaries in India and Nepal along with inter-linking canal system to transport surplus flows of the eastern tributaries of the Ganga to the West apart from connecting of the main Brahmaputra with the Ganga. Apart from providing irrigation to an additional area of about 22 million hectares the generation of about 30 million kilowatt of hydro-power, it will provide substantial flood control in the Ganga-Brahmaputra basin. The Scheme will advantage not only the States in the Ganga-Brahmaputra Basin, but also Nepal and Bangladesh, assuming river flow management treaties are effectively negotiated. This paved the way for the establishment of the National Water Development Agency (NWDA) in 1982 to work out basin wise surpluses and deficits and investigate possibilities of storage, links and transfers, has identified 30 river links, which would unite every major river in the Indian mainland, and has organized a feasibility report on six of these. The Supreme Court has asked the Government of India to complete all planning necessary to launch the project by 2006 and these projects of inter-basin transfers be completed in the next 10 years or so.

The Himalayan component would consist of a series of dams built along the Ganga and Brahmaputra rivers in India, Nepal and Bhutan for the purposes of storage. Canals would be built to transfer excess water from the eastern tributaries of the Ganga to the west. This is anticipated to contribute to flood control measures in the Ganga and Brahmaputra river basins. It could also supply excess water for the Farakka Barrage to flush out the silt at the port of Kolkata.

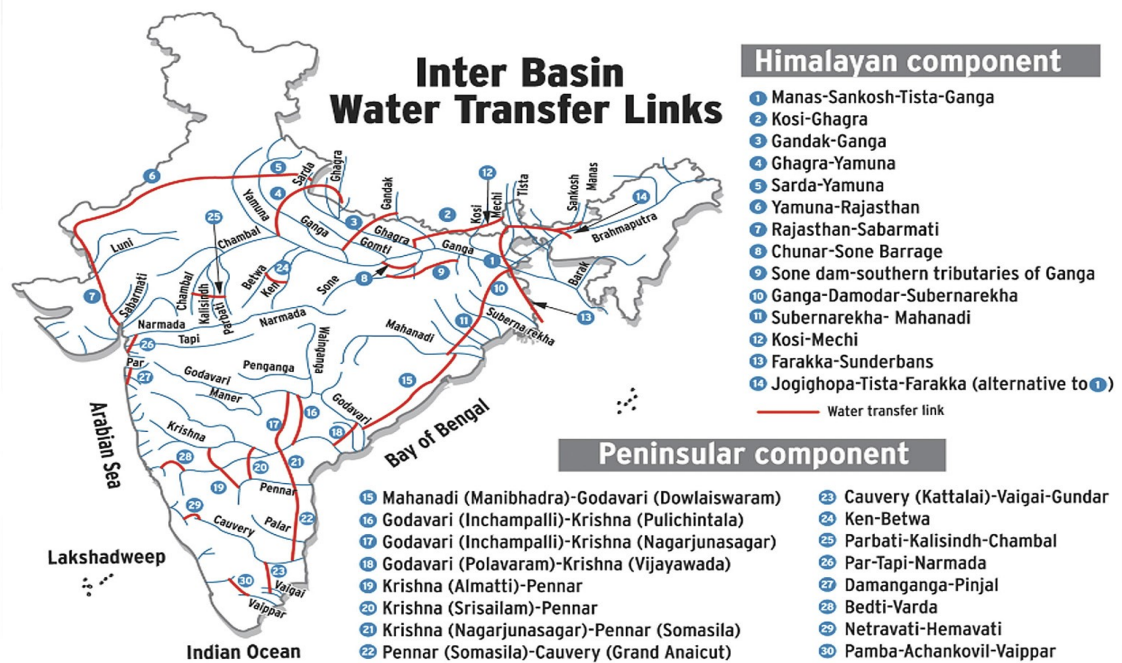


Figure1. Show all links plan Himalayan and Peninsular

Himalayan component of Inter linking of rivers are the following:

- Ghaghara–Yamuna link (Feasibility study complete)
- Sarda–Yamuna link (Feasibility study complete)
- Yamuna–Rajasthan link
- Rajasthan–Sabarmati link
- Kosi–Ghaghara link
- Kosi–Mechi link
- Manas–Sankosh–Tista–Ganga link
- Jogighopa–Tista–Farakka link
- Ganga–Damodar–Subernarekha link
- Subernarekha–Mahanadi link
- Farakka–Sunderbans link
- Gandak–Ganga link
- Chunar–Sone Barrage link
- Sone dam–Southern tributaries of Ganga link

Peninsular Component is divided in four major parts.

1. Interlinking of Mahanadi-Godavari-Krishna-Pennar-Cauvery,
2. Interlinking of West Flowing Rivers, North of Bombay and South of Tapi,
3. Inter-linking of Ken with Chambal and
4. Diversion of some water from West Flowing Rivers

This module will irrigate an additional 25 million hectares by surface water, 10 million hectares by increased use of ground water and produce hydro power, apart from benefits of improved flood control and regional routing.

The main part of the project would send water from the eastern part of India to the south and west. The southern development project (Phase I) would consist of four main parts. First, the Mahanadi, Godavari, Krishna and Cauvery rivers would all be inter-linked by canals. Reservoirs and dams would be built beside the course of these rivers. These would be used to transmit surplus water from the Mahanadi and Godavari rivers to the south of India. Under Phase II, some rivers that flow west to the north of Mumbai and the south of Tapi would be inter-linked. The water would supply further drinking water needs of Mumbai and supply irrigation in the coastal areas of Maharashtra. In Phase 3, the Ken and Chambal rivers would

be inter-linked to serve regional water needs of Madhya Pradesh and Uttar Pradesh. Over Phase 4, a number of west-flowing rivers in the Western Ghats, would be inter-linked for irrigation purposes to east flowing rivers such as Cauvery and Krishna.

The 800-km long Mahanadi-Godavari interlinking project would link River Sankosh originating from Bhutan to the Godavari in Andhra Pradesh through rivers like Teesta-Mahananda-Subarnarekha and Mahanadi.

The inter-links under consideration for peninsular section are as follows, with relevant status of feasibility studies:



Figure 2. Papi Hills on both sides of Godavari

Peninsular Component of Inter linking of rivers are the following:

- Almatti–Pennar Link (Feasibility study complete)(Part 1)
- Bedti–Varada Link (Part 4)
- Damanganga–Pinjal Link (Feasibility study complete) (Part 2)
- Inchampalli–Nagarjunasagar Link (Halted construction by Telangana) (Part 1)
- Inchampalli–Pulichintala Link (Feasibility study complete) (Part 1)
- Kattalai–Vaigai–Gundar Link (Feasibility study complete) (Part 4)
- Ken–Betwa Link (Feasibility study complete) (Part 3)
- Mahanadi–Godavari Link (Feasibility study complete) (Part 1)
- Nagarjunasagar–Somasila Link (construction to be started soon) (Part 1)
- Netravati–Hemavati Link (Part 4)
- Pamba–Anchankovil–Vaippar Link (Feasibility study complete) (Part 4)
- Par–Tapi–Narmada Link (Feasibility study complete) (Part 2)
- Parbati–Kalisindh–Chambal Link (Feasibility study complete) (Part 3)
- Polavaram–Vijayawada Link (link canal constructed and partly in use with Pattiseema lift)(Part1)
- Somasila–Grand Anicut Link (Feasibility study complete) (Part 1)
- Srisailem–Pennar Link (link canals constructed and in use) (Part 1)

III. EXPENDITURE & WORK

On linking all the rivers Himalayan and Peninsular, total expenditure will be Rs. 5,60,000 Crore. According to NWDA report and this amount will spend on power, irrigation, industries, and household water etc. The amount will be divided in two parts –Rs. 1,35,000 Crore for power and Rs. 4,25,000 Crore for irrigation, industries, & domestic purpose etc.

Running Work on inter-linking of rivers

Inter-linking as Mahanadi–Godavari, Ken–Betwa, Parbati–Kalisindh, Polavaram–Vijayawada, Subernarekha–Mahanadi, Manas–Sankosh–Tista, Sarda–Yamuna link, Kosi–Mechi link, Ghaghara–Yamuna, Krishna–Godavari etc work is in progress.

Advantages of ILR

- Create the potential to increase agricultural production by an additional 100 per cent over the next five years.
- Avoid the losses of the type that occurred in 2002 to the level of \$550 million by the loss of crops because of extreme draught or flood situation.
- Save \$ 565215000 a year in foreign exchange by avoiding importing oil.
- Unify the country by concerning every Panchayat as a shareholder and implement agency.
- Make available for enhancing the security of the country by an additional waterline of defense.
- Provide employment to the 10 lakh people for the next 10 years.
- Eliminate the flooding troubles which happen again in the north-east and the north every year.
- Explain the water crisis situation by providing substitute, perennial water resources.
- The large canals linking the rivers are also expected to facilities inland navigation too.
- Increasing food fabrication from about 200m tones a year to 500m tones.
- Boost the annual average income of farmers, from the present \$40 per acre of land to over \$500.

IV. FIRST INTERLINKING OF RIVERS

Krishna- Gadavarilinc canal has been inaugurated on dated 16th September, 2015. This Krishna-Godavari link is 299.3 km long and expenses occurred on it was Rs. 2628.9 cr. and the advantages for state by this linking is about 287305 hectare irrigation, 70 MW power generation & 237 MCM water for domestic and industries.

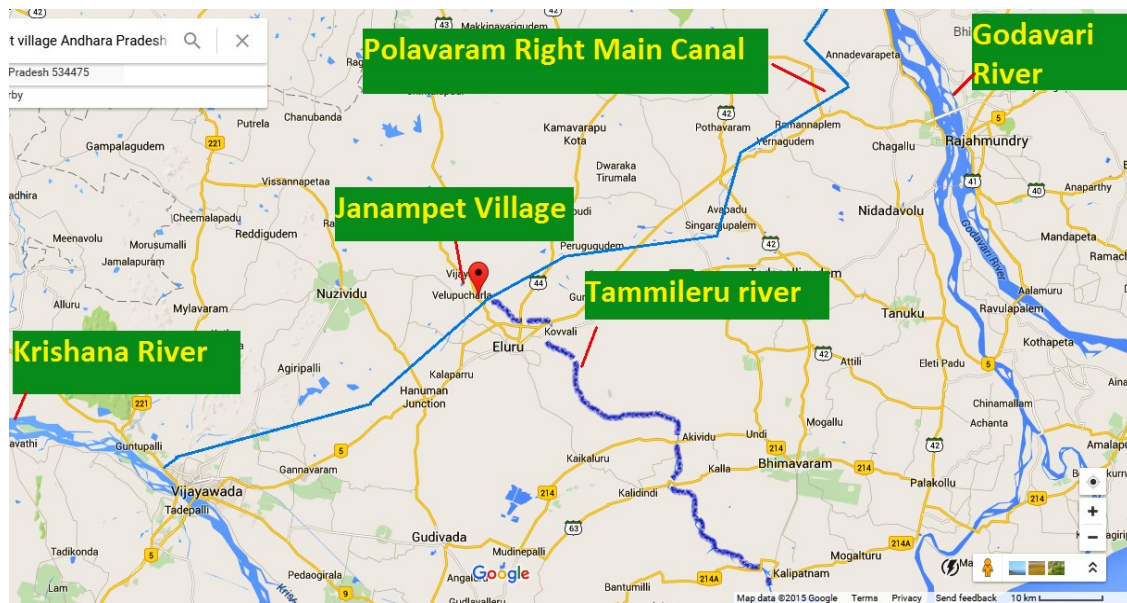


Figure 3. Path showing the Linking of Rivers Krishna and Godavari

V. DISCUSSIONS

Inter-River Linking Project involves comprehensive issues and challenges related to economic, ecological, and social costs. On this note, Iyer (2003) very sharply states that “We have had large complexity in completing even a single project effectively and we desire to embark on thirty huge projects at the same instance.”

IRL project has caused much anger and objection in our neighbour nation, Bangladesh. It is grappled with terror that diversion of water from the Brahmaputra and the Ganges, which supply 85% of the country's fresh water stream in the dry season, would consequence into an environmental calamity. A section of scientists argue that large dams and reservoirs also the reason for earthquakes. The controversies over koina dam, Tehri dam are few such examples. In view of a jumble of earthquakes being experienced, the occurrence of large number of reservoirs will establish to be disastrous in case of any such possibility. Inter-linking a toxic river with a non-toxic one will have a overwhelming impact on all our rivers and, consequently, on all human beings and natural life.

VI. CONCLUSION

Victorious functioning of this project mainly looms upon timely release of water from the additional basin to the shortage basin. The Government of India has constituted a task force to look at the project, comprised of experts from science, engineering, economics, and social sciences and including as official stakeholders one member from a water deficit state and one member from a water surplus state. It will address the following broad issues: provide leadership for norms of assessment of individual projects their economic feasibility, socio-economic impacts, environmental impacts, and preparation of resettlement plans; build up a mechanism for quick consensus amongst states; prioritize different projects; propose executive structures for implementing the project; consider financial support modalities for the project; and consider the international ramifications of the project. As per Ministry of Water Resources, River Development and Ganga Rejuvenation, New Delhi has given the completion date December 31, 2016 for achieving the goal of the interlinking project.

If water transferred from water abundant rivers to water-deficit areas, there would be sufficient supply for everyone in each part of the country. It also appears to endorse national integration and a fair contribution of the country's natural water wealth. India's river linking project shows and promises a huge concern for water conservation and most advantageous use of accessible water resources. Undoubtedly, it is the need of the hour to have a water mission like as IRL, which will enable accessibility of water to the fields, villages, towns and industries throughout the year, even while maintaining environmental cleanliness to combat with both flood and drought simultaneously.

River linking is much helpful in production, power, drinking water, drought, flood control, engineering work and fisheries. So plan of IRL give addition 30 million KW power & 22 million hectare irrigation. Drought region will develop and food grains will be amplified in every state in India, and neighbor country will be also urbanized by this linking. In whole part of India water will accessible for drinking, cattle and industries, etc.