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Socio-Economic Impacts of River Interlinking Projects in India

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Abstract

The River Interlinking Projects in India are one of the largest water management projects in the world, which aims at transferring the water in the excess river basins into the water-depleted areas. These are the main aims that involve expansion of irrigation, flood control, hydropower generation and development of the region. Although such projects are allegedly accompanied by serious economic and agricultural advantages, they are accompanied by serious socio-economic and environmental concerns. Massive displacement of populations, loss of livelihoods, deforestation, and inundation of ecologically vulnerable areas have become a major issue. Referring to case studies, including the Ken -Betwa and Par-Tapi-Narmada projects linkages, this document examines the intricate connection between development objectives and social justice. In the study, it is pointed out that the success of river interlinking in India will be not just determined by the engineering and financial feasibility of the project but also by the inclusion planning, the sharing of benefit in an equitable manner and sustainable environmental management. A moderate stance between technological progress, social protection and environmental conservation will be necessary to make sure that the said mega-projects bring about a positive influence on the socio-economic development of India over the long run.

Keywords: River Interlinking, Socio-Economic Impact, Displacement, Sustainable Development, Water Resource Management

Introduction

India is a country of varied climatic conditions and uneven distribution of rainfalls, which always presented a two-fold challenge of floods and droughts. The concept of rivers interlinking was an ambitious but provocative effort to rectify such imbalances. The idea started picking pace in the 1980s when the National Perspective Plan (NPP) was developed under the supervision of the National Water Development Agency (NWDA) which was formed in 1982. The principle behind this was so simple in idea but colossal in magnitude and that was to move water in river basins that had excess flow to those basins afflicted with acute water shortages. By this, the country aimed at obtaining equitable water resources allocation, stabilizing agricultural production, reducing floods, and developing the region. The interconnection of rivers was regarded as a mega-engineering answer to the water crisis and potentially could change the agrarian and socio-economic environment of India.

The plan includes two key elements the Himalayan Component and the Peninsular Component that are undivided by the proposed number of 30 river links throughout the nation. These projects will be aimed at building large system of dams, canals, and reservoirs to enable movement of water across the major river basins of the Ganga, Brahmaputra, Mahanadi, Godavari, Krishna, and Cauvery. Some of the most visible projects that have been implemented

or are under consideration are the Ken-Betwa linking project, the Par and Tapi- Narmada link and the Godavari and Krishna-Cauvery link. The government has argued over the years that such inter-basin transfers would irrigate millions of hectares of agricultural lands, supply drinking water to drought prone areas, create hydroelectric energy and minimize the incidence of disastrous floods. Developmentally, it is an endeavor to tap the hydrological potential of India to build the nation and reduce poverty.

Nevertheless, environmentalists, economists and social scientists also have expressed significant criticism on the concept. They state that river interlinking might not necessarily be socially fair and ecologically viable, although it can be well done technologically. Their effect on the biodiversity (submerged forests) and displacement of thousands of families particularly the tribes and forests cause fundamental questions of the sustainability of the projects in the long run. In addition to this, as the uncertainties of climate change increase, as new hydrological studies are seeking to overturn the assumption according to which some rivers will always be surplus. Therefore, though the vision of river interlinking is the aim of the national integration and development, it is also the reflection of intense contradictions between the human progress and nature protection.

General Introduction to river interlinking projects in India.

River interlinking program in India is one of the biggest and grandest water management programs that had ever been thought of in the globe. It is based on the premise that the unbalanced spatial and temporal distribution of rainfall would be remedied by a national system of river connections which would divert excess water in flood prone areas to drought-stricken basins. This grand vision was in the National Perspective Plan (NPP) that had been prepared in 1980 by the Ministry of Irrigation and later developed by the National Water Development Agency (NWDA). The NPP breaks down the project into two main parts that include the Himalayan Component and the Peninsular Component, which have approximately 30 inter-basin link projects and canal networks of more than 12,000 kilometers. The Himalayan Component is quite realistically oriented to store the water in the rivers in the north like the Ganga and Brahmaputra to control the floods and to provide the water in the dry and semi-arid areas, where the Peninsular Component is oriented to connecting the southern rivers, such as Mahanadi, Godavari, Krishna, and Cauvery rivers, to the better water availability.

The Himalayan Component comprises such suggestions as Kosi-Ghagra, Gandak-Ganga, and Ganga-Yamuna links, which aim at diverting over and above the water of the eastern rivers towards the western and the southern components of the Indo-Gangetic plains. The secondary goal of these projects is also hydroelectric power generation as well as delivery of navigational advantage. Nevertheless, with its complicated topography, trans-boundary character of rivers and expensive nature, majority of the Himalayan links are in the planning or pre-feasibility phase. Conversely, the Peninsular Component has made greater advancements because of comparative easiness of the land and less foreign inconveniences. It has the vision of connecting Godavari and Krishna rivers, Krishna and Pennar, Pennar and Cauvery, Ken and Betwa, and as such all rivers have to be uniform in the distribution of water throughout peninsular India.

The first under the national plan to be implemented under ongoing or advanced stage project is the Ken Betwa link project (KBLP). This is a collaboration project of the Madhya Pradesh and Uttar Pradesh governments aiming to transfer excess water in the Ken River to the Betwa basin in order to reduce water shortage in the Bundelkhand area that is prone to droughts. The project will have the capacity of supplying drinking water to more than 60 lakh individuals, irrigate almost 10 lakh hectares of agricultural land and produce 78 MW of hydropower. However, it has also drawn publicity because it has submerged sections of the Panna Tiger Reserve, bringing about the conflict of development and conservation. On the same note, the Par Tapi Narmada Link, which was to serve the interests of the Gujarat and Maharashtra regions, has not been spared by the tribal people whose lives were at stake to be displaced and lose livelihood.

The financial size of the whole interlinking mission is overwhelming; its previous estimates were in the several lakh crores of rupees. The nodal agency, the NWDA, is still engaged in the conduct of feasibility studies, the production of Detailed Project Reports (DPRs), and communication with the state governments. Various committees have been constituted such as the Task Force on Interlinking of Rivers and the Special Committee on Interlinking of Rivers (SCILR) to oversee the progress and to handle issues at the policy level. Although there have been periodical announcements and political interest, the rate of implementation has been slow because of environmental clearances, funding limitations and interstate conflicts over water sharing.

Socio-Economic Rationale

The socio-economic explanation of the river interlinking program in India is based on the notion of equitable development and the national integration via redistributing resources. The rivers of India are extremely disproportionate in their distribution - some parts get up very much rainfall and are subject to frequent floods, whereas others, especially those of the western and southern peninsular districts, have constant drought and water shortage. This is an imbalance in hydrology that has caused large differences in agricultural production, livelihoods, and quality of life in the country. These interlinking rivers were therefore seen as a way of revolutionizing the issue of these inequalities by making sure that water which is the most basic natural resource could be distributed in a balanced fashion to all regions. The thinking behind this was that not only would such redistribution increase agricultural output but it would also create economic opportunities, lessen regional inequalities and add to the national food security and poverty reduction.

One of the essential factors of the Indian economy is agriculture, as it employs a greater part of the population (over a half) and forms an important segment of the rural economy. However, it mainly relies on the monsoon rains, and thus they are susceptible to variations in seasons. The interlinking projects will have a stabilizing effect on the agricultural production, as the river will irrigate millions of hectares of currently rain-dependent land and make the agricultural production less reliant on unpredictable rains. The KenBetwa project, such as that, is projected to make the Bundelkhand area, which is drought prone, prosperous through guaranteed irrigation and drinking water. Likewise, in a similar effort the Godavari- Krishna Cauvery connection is meant to divert the excessive water in the east coast rivers to the dry

areas in the south basins and maybe the arid lands are made lush. The increased availability of water can also facilitate crop diversification where farmers will be able to abandon the low-value subsistence crops in favor of the high-value commercial crops hence the increase in rural incomes and economic growth in the area.

The interlinking projects will not only be used in agriculture, but also other socio-economic purposes. The building of massive dams, canals, and reservoirs generates temporary jobs to thousands of employees and drives the needs in other sectors like cement, steel, and transportation sectors. The projects are also intended to enhance water supply to both domestic and industrial purposes to promote urbanization and ensure industries in water-stricken states. The dams are also used to generate hydropower to provide more energy to the increasing rural and urban electricity needs. Also, the diversionary operation of river systems can be utilized to control floods in wet basins and decrease the intensity of droughts in dry regions and thereby stabilize the local economies which tend to be susceptible to climatic extremes.

The socio-economic explanation can also be applied to the concept of national integration. The interconnection between rivers and the urge to encourage inter-state cooperation are symbolic of the project as they are created in order to symbolize the unity of India in diversity, a form of infrastructural statement of commonality in development and distribution of resources. According to the policymakers, the network might enhance the internal unity of the country and connect the regions not only by water but also by the means of trade, communication, and cultural sharing. Nevertheless, this vision presupposes management, openness, and fair distribution of advantages. The opponents note that the supposed reason is to facilitate a balanced development but the gains may be skewed to favor the already developed areas whereas the costs particularly displacement and environmental degradation fall on the poor and marginalized.

Favourable Sociocultural Economic Effects.

The possible socio-economic gains of interlinking of rivers in India are enormous and it involved various aspects of development like agricultural advancement, rural enhancement, creation of employment and energy. The first benefit is the stabilization and improvement of agricultural productivity which is the staple of the Indian economy. Much of the cultivable land in India is still reliant on unpredictable rainfall in the monsoon, which causes the unreliability of the yields and frequent droughts in Bundelkhand, Vidarbha, Marathwada, and some parts of Rajasthan. These rain-fed lands are likely to be transformed into guaranteed-irrigation areas through the river interlinking programme which will transfer water in excess basins to deficit-basins. This guaranteed irrigation will dramatically enhance the crop production, enhance the practice of multi-cropping as well as adoption of high yield varieties. An example is the Ken Betwa Link Project alone that is projected to irrigate more than 10 lakh hectares of land in Madhya Pradesh and Uttar Pradesh which will provide a possible economic boost to the drought-afflicted Bundelkhand region.

These projects can transform the rural economy, other than through irrigation. Development of extensive irrigation systems also does not only serve agriculture but also results in the construction of roads, bridges, and rural markets. Due to the lack of water that affected the

villages in the past, clean drinking water, sanitation, and health of the population are expected to be improved. This, as a result, helps to improve the quality of life and indicators of human development. The interconnecting projects can also create short term as well as long term job. In the stages of construction, thousands of employees, engineers, technicians and unskilled workers receive a new workplace, which boosts the economy in the area. When the canals, reservoirs, and hydro power plants are in use, they need maintenance and this will provide stable employment to the rural population.

Another great beneficial effect is hydropower generation. Most of the proposed link projects, like the Ken -Betwa and the Par -Tapi -Narmada include hydro-electric elements that can lead to generating renewable energy. The energy requirements of India are increasing and these hydro projects will help India partially to address the energy needs, thereby cutting down on the use of fossil fuels as well as helping in achieving clean energy. In addition, the increased water supply to industries and urban centres will be able to stimulate industrial growth in the hitherto underdeveloped areas. Such economic base diversification can be used to mitigate rural-urban gap through creating regional balance and encouraging individual investment.

Other important benefits are flood control and drought mitigation. Diverting the excess water into the flood-prone areas to the water-scarce areas helps to minimize the flood destruction, and at the same time minimizes the effects of droughts through interlinking. To illustrate, the water in rivers such as the Brahmaputra or Mahanadi can be moved during high flood seasons and thus the northeast and eastern plains will not flood and that will be beneficial to the arid areas of central and southern India. Moreover, interlinking projects are able to enhance inland navigation and facilitate tourist attraction by creating reservoirs and canals, which indirectly contribute to the service industry and the local economies.

River interlinking in a wider sense can also be symbolic and useful in national integration and equity in the region. It makes the states and regions interdependent and cooperative by interconnecting them using a common water resource. It enhances the feeling of shared responsibility on sustainable management. With proper governance and clear implementation of the projects, the projects have the strengths of empowering the socio-economic fabric of the country by solving one of the most pressing problems in India, which is the unequal distribution of water resources.

Negative Socio-Economic Impacts

Just as the river interlinking projects in India show tremendous development benefits, so are the socio-economic costs involved in the project as well. Among the most visible and important impacts of the project are massive dislocation of people in the project locations. Dams, reservoirs and canals tend to be constructed at the expense of large areas of land including agricultural farms, villages and even forests. Consequently, thousands of families, in particular, tribal, rural, and economically deprived ones, have to be moved. Not only do these communities lose their homes, but also their ancestral lands, which are main source of the social identity and a livelihood of these communities. Displacement process in India has always been associated with poor rehabilitation, under compensation, and deprivation of hereditary means of subsistence. Efforts such as the Ken-Betwa Link, where the portions of the Panna

Tiger Reserve and villages will be submerged into water, are supposed to leave hundreds of families homeless. Likewise, the Par-Tapi-Narmada Link in Gujarat and Maharashtra has already been challenged by the protesting tribes who feel that they will lose their lands and means of livelihood. The resettlement packages do not in most cases compensate the cultural and emotional value accorded to ancestral territories and in the long-term, it causes social distress.

The other significant issue is concerned with the environmental degradation that goes hand in hand with the large-scale river interlinking. When forests, wetlands, and animal habitats are submerged, they do not only disrupt the local ecosystems, but their livelihoods which rely on forest products are weakened. Individually, the Ken-Betwa project is endangering close to 6,000 hectares of forest area, the majority of which is found inside the ecologically delicate Panna Tiger Reserve, which is a serious threat to biodiversity and endangered species. Deforestation is also a source of soil erosion, disappearance of carbon sinks and alteration of microclimate, which further increases the instability of the environment. Altering the natural river flows may interfere with the aquatic life and the transport of sediments and fisheries which serve thousands of families along the riverbanks. Such ecological impacts later on in the transformation into socio-economic losses given that they reduce access to natural resources which the rural population relies on in order to sustain themselves.

The negative impacts are also a major dimension based on the economic challenges. The great financial burden of such mega projects which have risen to several lakh crores of rupees casts doubt over their economic viability. Since India is a low-income country, it may have been the case that such massive investments might have taken into account the funds which otherwise might have been used in other critical areas such as education, health, and decentralized water management. In addition, most economists opine the benefits of such projects are usually over-estimated whereas the environmental and social costs are not factored in the feasibility studies. Consequently, this interlinking programme could bring in much less economic benefits than anticipated after displacement, loss of ecosystems and costs of rehabilitation are considered.

The social life of communities that are affected also suffers greatly. Displacement has a tendency to destroy the traditional forms of community, destroy the cultural heritage, and disenfranchise the vulnerable populations. Since most of the displaced families have lost access to agricultural land and forests, they turn to cities in search of employment, which increases the number of the urban poor. Especially women and children are at greater risk as they lack a means of livelihood and independence due to loss of land and livelihood. Moreover, the projects might give rise to new sources of interstate disputes on water sharing. The example of the conflict between Madhya Pradesh and Uttar Pradesh over the Ken-Belwa X, or the conflict among the southern states over the links of Godavari-Krishna-Cauvery shows that the redistribution of resources can be a politically unstable and socially divisive issue.

Case Studies

In order to gain a comprehensive understanding of the socio-economic effects of the river interlinking projects in India, there is a need to analyse real life case studies of the opportunities and the traps of these mega projects. Out of the many suggested interconnections under the

National Perspective Plan, three are considered representative projects, i.e., Ken -Betwa Link Project, Par-Tapi-Narmada Link and the Godavari-Krishna-Cauvery Link, which show different regional and socio-environmental aspects of the interlinking project. These case studies show that, though interlinking efforts are aimed at the improvement of water security and development of the region, they frequently provoke sophisticated problems of displacement, ecological balance, and inter-state collaboration.

Ken Betwa Link Project (KBLP) is the initial and most developed river interlinking project which is being implemented in India. It is meant to divert the excess water in Kenya River in Madhya Pradesh, to Betwa River in Uttar Pradesh, with the main idea being to resolve the chronic drought and water shortage in the Bundelkhand region. The project will irrigate an area of about 10.62 lakh hectares of agricultural land, supply water to in excess of 60 lakh individuals, and supply 78 megawatts of hydroelectricity. Developmentally, it is regarded as an exemplar of combined water management that has the potential of changing one of the most backward parts of India. Nonetheless, the project has been shrouded in controversies because it has dire ecological and social consequences. Around 6,000 Hectares of forest area including the sections of the Panna Tiger Reserve will be underwater. This does not only endanger important wildlife habitats but also the livelihoods of the local people that rely on forest to get fuel, fodder, and other minor forest products. Moreover, there are hundreds of displaced families of the affected villages. The government has endorsed a compensation and rehabilitation package, however there are critics who claim that the measures are too little and the project is a developmental trade-off between short term ecological sustainability and long term ecological sustainability.

The Par-Tapi-Narmada Link Project, which is a project to move the excess waters of the Par, Aurana, Ambica, and Purna rivers in Maharashtra to the water short water regions in Gujarat via the Narmada basin has met with massive opposition by the local communities, especially the tribal groups. The plan behind the project was to irrigate 2.3 lakh hectares of land and provide drinking water to rural south Gujarat. But tribe people residing at the forests and hilly areas in the proposed reservoir areas are worried about being displaced and livelihoods lost in mass extinction. In 2022, the mass protests took place in the impacted districts that compelled the government to re-evaluate the implementation of the project. The demonstrations highlighted the fact that indigenous communities were increasingly realizing their rights to land and the unsuitability of the rehabilitation experiences in the past. The case of Par-Tapi-Narmada is a good example of how what initially intended to be a good development program may result in social instability when the local voices are not included in decisions taken.

The Godavari Krishna Cauvery Link Project is another high-stake case, which is aimed at solving the water shortage that has been prevalent in Tamil Nadu and certain sections of the southern region of India by directing the excess water of the Godavari basin to the Krishna and Cauvery basins. The project can greatly increase the supply of irrigation and drinking water in the area which is prone to droughts, and this in turn benefits the agricultural stability and industrial growth. The project has however been subjected to several administrative and political challenges because of the water sharing agreements between Telangana and Andhra Pradesh, Karnataka, and Tamil Nadu. The unwillingness of upstream states to share water and

worries on the ecological impacts have slowed down the process. The success of the project remains conditional to the role of proper coordination between states, clear policy mechanisms, and ecological protection despite the huge potentials of reduction of inter-regional inequalities.

Combined in this way the case studies can be used to demonstrate the dual nature of river interlinking in India- both of the projects have developmental ambitions and social issues which are embedded within them. Even though Ken-Betwa connection demonstrates the possibilities of irrigation-based rural development, it also reveals the ecological price of dam-based solutions. The Par-Tapi-Narmada agitations warn policymakers about the need to have participatory planning and the Godavari-Krishna-Cauvery connection shows the politics of the water management systems across states. Such instances finally highlight that, the process of interlinking of rivers sustainably cannot be done by mere engineering, it must be a fine balance of ecological knowledge, social justice, and collaborative federalism.

Governance and Policy Dimensions

The policy and governance aspects of the river interlinking projects in India are the pillars of the implementation and the success of these projects in the long run. These projects are very huge, eco-sensitive and in terms of funds it involves proper governance is required in order to promote transparency, accountability and fair share of the benefits. The nodal body in this is the National Water Development Agency (NWDA) which was established in 1982 under the Ministry of Jal Shakti, also as the body to prepare Detailed Project Report (DPRs) and to coordinate various agencies at the state and central level. Nevertheless, the interlinking of rivers is a multi-dimensional process which occurs both in environmental, social, and interstate jurisdictions, which makes governance a very complex and controversial sphere. It entails the overlapping institutional roles, political bargaining, and the settlement of the competing interests among the states, communities, and the environmental regulators.

The interlinking programme functions at the policy level within the umbrella of the National Perspective Plan (NPP) which proposes two primary constituents namely, the Himalayan and Peninsular river linkages. In order to simplify the process, in 2002, the government established a Task Force on Interlinking of Rivers and subsequently established Special Committee on Interlinking of Rivers (SCILR) in 2014 as per the direction of the Supreme Court of India. The SCILR is vital in balancing activities between the central ministries and state governments such that conflict is settled by dialogue and consensus as opposed to clashing. Nevertheless, the institutional frameworks have not eliminated the problem of coordination because of the diversity of regional priorities and political differences. As an example, the water rich states will be hesitant to share what they consider is their entitlement, the deficit states see interlinking as a development life line. Both the Ken Betwa and the Godavari-Krishna-Cauvery projects have been facing delays due to the disputes that occur on cost-sharing and water sharing formula between the involved states.

The other important policy dimension is environmental governance. Every interlinking project should go through a thorough Environmental Impact Assessment (EIA) and receive clearances before the Ministry of Environment, Forest and Climate Change (MoEFCC) and subsequently wildlife and forest authorities (where needed). It is however contended by critics that the

processes of approval are usually hurried and are often politically pressured resulting in insufficient evaluation of social and ecological risks. In the example of the Ken-Betwa Project, the environmentalists have indicated that the EIA had undervalued the effect on biodiversity of the Panna Tiger Reserve. Good environmental governance therefore needs to have independence and scientific rigor of the assessment agencies made so that the design of the project has been subjected to mitigation and restoration measures before clearance is given.

Social justice and involvement of the public in the governance system need to also take precedence. One of the main criticisms of river interlinking projects is the fact that communities that are impacted by these projects are hardly consulted in any meaningful way during the planning processes. Failure to participate in decision-making can be a source of alienation, resentment and protests such as observed in the Par-Tapi-Narmada case. To deal with this there has been an increasing demand to combine Social Impact Assessments (SIAs) into project planning, make rehabilitation and resettlement policies more open, as well as to ensure that displaced populations are not compensated only financially but are also made to have alternative livelihoods that are sustainable.

Conclusion

The interlinking of rivers in India is one of the most daring developmental projects in the history of the country an idea inspired by the dream to evenly redistribute water to the regions and make India a water-sufficient country. It is representative of the desire to utilize the potential of technology and engineering to be able to defeat the natural differences in rainfall and river flow. However, as this paper demonstrates the river interlinking project is not just an infrastructural problem but a socio-economic and ecological issue. It lies at the cross-road of development, justice and sustainability, and requires a very fine line between development and conservation. The driving force, to eliminate droughts, reduce floods, increase agricultural output and national integration is still noble. Nevertheless, there is a long road to the attainment of such goals which cannot be overlooked because it is burdened with grave environmental, social, and economic challenges.

Socio-economically, the river interlinking programme has colossal potentials of changing the rural landscape of India. It will guarantee an increase in the territory of irrigation, the stabilization of the agricultural sector, and water supply in the areas that have long been plagued by scarcity. Such projects as Ken -Betwa and Godavari-Krishna-Cauvery are the hope of millions of farmers who are dreaming of the constant supply of water to their crops. The jobs created in the construction and work process, the influx of industrial and energy industries, and the opportunities of flood control and navigation can actually benefit the development of the country. In the drought stricken and backward areas, the concept of interlinking is not only a project but a life line to the area in terms of economic stability and better living conditions.

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