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SOCIO-ECONOMICAL, ENVIRONMENTAL EVALUATION OF KEN-BETWA RIVER LINK PROJECT, INDIA

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Key words: water, environment, Bundelkhand.

Abstract. The India's ambitious Rs 9,393 crore Ken-Betwa river interlinking project will impact very significantly on Socio-economic life of two million people of Bundelkhand region, India. Water is an important input for survival and sustenance of life. The demand of this natural gift has been increasing exponentially. This ambitious project will help us in irrigation, potable water, cheap transportation, electricity as well as a source of livelihood for our ever increasing population. In Bundelkhand region, there is a severe problem of lack of irrigation in one region and water logging in others. Damage to crops due to drought and pitiable drainage facility could be managed. The objectives of the paper are to study socio-economical issues and environmental challenges in Ken-Betwa River link in India and to study environmental impact of this Project.

Introduction

Water is the most important natural resource on the earth, major source of water in Bundelkhand region's rivers fed by monsoon rain. Scarcities of water escalate in this region, creating serious problems for local people and the environment. Government of India has developed a new National Water Policy which claims that water is a prime natural resource, a basic need and a precious national asset. India initiated river linking to use available water resources to fields, villages, towns and industries round the year, without harming local environment.

Methodology

Study area

Ken-Betwa, a multi-objective water development project, is one of the parts of the proposed National River Linking Project (NRLP) of India. The catchment area of both rivers is spread over Panna, Chhatarpur, Damoh, Sagar,

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Satna, Katni, Narasingpur and Raisen districts of Madhya Pradesh.

Bundelkhand region is very big area of India extended over two most populated states viz. Uttar pradesh and Madhya Pradesh of India, generally perceived to be a zone of multiple vulnerabilities. Adverse climate conditions created one of the backward regions of India victim of drought from many years. Entire Population of more than 7 million inhabitants. It has experienced a rapidly migration of peoples from many years due to continuously drought. The recent statistics indicate that about 79% of the population is living in informal settlements in very miserable conditions with limited services.

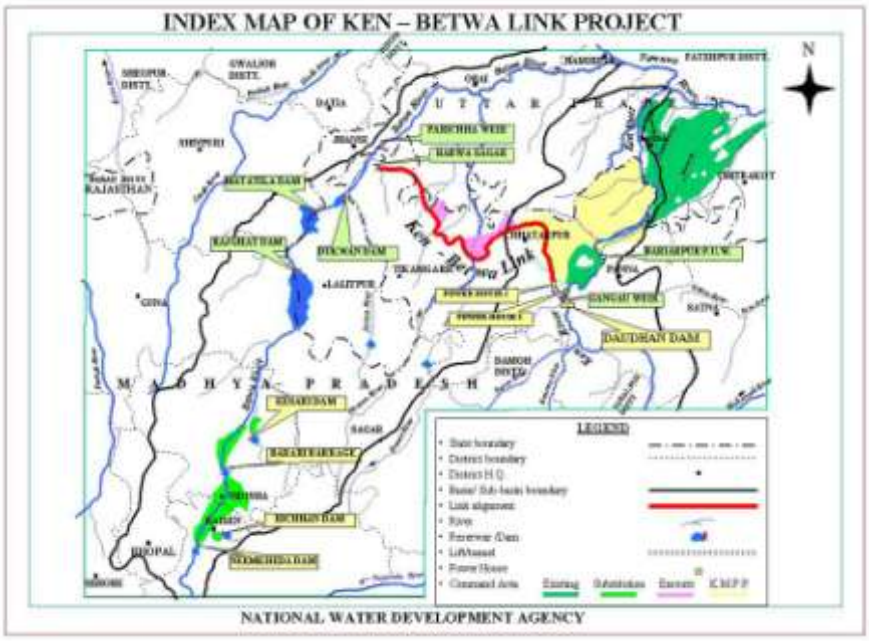

Fig. 1- Study Map of Ken-Betwa Project (KBP)

The Ken-Betwa Project (KBP) is an independent link in the peninsular component that connects two small north-flowing rivers namely, the Ken and Betwa rivers in the Greater Ganga Basin. Seven districts in Bundelkhand region cover the KBP command area. The KBP plans to transfer 3,245 million m^3 of water, which is only 1.8 % of the proposed total water transfers of the NRLP. The cost of the KBP, which is estimated at US$ 442 million, is only 0.36 % of the total NRLP cost.

The cost of the project, excluding the hydropower component, is estimated at US$43 million. The KBP expects to provide irrigation for 0.49 million ha. In the process it expects to recharge groundwater to irrigate a substantial part of

the non-command area.

The primary objective of this paper is to evaluate the direct and indirect Socio-economical and environmental impact on local people and surrounding.

I.Social Impact evaluation of Project area

A major goal of KBP is to provide irrigation to the water scarce Bundelkhand region. According to the Water Resources Ministry, a total of 10 villages consisting of 1,585 families are likely to be affected by this project. The project envisages construction of a dam across river Ken in Chhatarpur district in Madhya Pradesh to irrigate 6.35 lakh hectare area of land, drinking water purposes and generation of 78 MW hydropower.

The project comprises two powerhouse of 2x30 MW and 3x6 MW each, two tunnels of 1.9 km long upper level, 1.1 km long tunnel lower level and a 221 km long Ken-Betwa link canal, proposed on the left bank of the river.

The project will provide irrigation facilities for 6,35,661 hectares of land in Panna, Chhattarpur, Tikamgarh districts in Madhya Pradesh, and Banda, Mahoba and Jhansi districts in Uttar Pradesh.

Loss of Land: In all 6422.62 ha of private lands would be lost by the project affected families for the construction of Daudhan dam and other project components along with canal network under the project. Besides, as per the project design about 5339.00 ha of forest lands would also be brought under various project components. This indicates that the land owners would lose their landed properties.

Loss of Livelihood: about 72 per cent households would become landless, nearly 21 per cent would become marginal farmers and almost 7 per cent will fall under the small farmer category. As a result of land acquisition the project affected big farmers would lose their big farmer status. Loss of Employment: Due to land acquisition, several families, who become landless, would lose their total self-employments, who otherwise have been engaged in their farming activity.

Loss of Income: project affected household's socio-economic environment is going to affect their family life due to loss of land, livelihood and employment resulting in reduced regular family income.

I.**Economic Impact evaluation of Project area**

This project will prove several economic benefits like development of agro-based industries, transportation and storage facilities. Increased in farm supplies, production and consumption of fertilizer, pesticide, farm equipment and employment generation.

Economic benefits of irrigation water supply include various benefits on, crop production; recharges groundwater; animal husbandry; farm equipment and agro-processing.

The negative part of KBP project is loss in crop and livestock production due to submergence of the crop area in the upstream of the reservoir.

Due to the implementation of Ken-Betwa Link Project, it will give a good opportunity to the locals for getting employment during the construction period of the project. The locals would get preference for employment on daily wage basis as causal / workers. This will benefit the economy, both national and local levels. Further, the increased agricultural production in the command area will stimulate the development of forward and backward linkages and in turn the economic development of the area.

Ken-Betwa link project will generate employment at the time of construction and post construction phase. About 4000 – 5000 persons will get employment under the project during the operation phase. The total employment generation in terms of man days will be over 225 lakh man days in the command area of the project.

There are several tourist spots around the Daudhan area due to which the project site develops into a good tourist resort which is a positive influences.

The project has the provisions for laying new roads in the project area for the easy communication and transportation of goods and materials needed for the dam construction. The laid roads also will create a road communication network in the area and would facilitate the locals and others for their movements and also to start small scale industries.

This project envisages the creation of medical and health facilities for the staff, dam construction workers, and employees during the implementation of project and project related activities. These medical and health facilities have the provisions of in-patient and out-patient treatment.

After the project implementation also, the created medical and health facilities will not be withdrawn and could be utilized by the locals. This would bridge the gap of existing medical and health infrastructural facilities and to a largest extent would solve the problems of locals.

The field survey in the study area revealed that ground water levels are deep during pre-monsoon period. Some of the groundwater sources mostly used for drinking water go dry during this period. Under the project a large water body will be coming up by constructing dam and will certainly recharge and increase the groundwater levels in the project area. This will help the farming community as well as other water users who depended on groundwater facility. Livestock production, especially milk, is a major part of the agricultural economy in the Bundelkhand region.

The project has got good potential, particularly, because of close proximity of Daudhan dam site to Khajurao for recreation and tourism development. Provision for development of tourist huts, picnic spots has been made on the

periphery of Rangwan reservoir (about 9 km from Daudhan dam site). The link canal also offers good scope for tourism development. At the tail end of the canal, the Orcha temple (Jhansi) could become an ideal place for tourist. Therefore, it is proposed to develop tourist's huts and necessary provision has been made thereto.

II. **Environmental Impact evaluation of Project area**

This project would submerge an area of 9,000 hectares. Of which 5,258 hectares are forest land (including 4,141 hectares Panna Tiger Reserve). This area is not a major attraction for tourists. Presently most of the tourists visit the Pandava Falls and Plateau regions of the national park, where open gross land with abundant numbers of herbivorous. These areas are in downstream of Daudhan dam and will not submerge.

Scientists are also doubtful that river diversion would bring drastic changes in the physical and chemical compositions of the sediment load, river morphology and the shape of the delta formed at the river mouth. All these have serious economic and livelihood implications that are merely ignored by the project.

Air pollution impact of the project activities on surroundings is mainly during construction phase. Operations are mechanized and are operated on Diesel. Heavy machinery contributes to increase in suspended particulate matter, SO_2 and NO_x. During the construction phase of the dam, there will be large scale deforestation, which may heat the ambient air. This resulting heat island is a kind of micro-climate.

Usage of large quantities of concrete, cement and asphalt absorb the sun's energy, heat up and reradiate that heat to the ambient air. Thus, during the construction phase around the dam sites and heating up of ambient air will take place to some extent. This impact on micro-climate is of low intensity and of short term in nature.

Noise Reduction Barriers should be created in the project area where heavy machinery shall be installed. It will act as an acoustic barrier so that wild animals are not affected adversely by creation of noise produced by the machinery.

Daudhan reservoir due to

Water quality in reservoir may improve in view of the process of natural purification resulting from sedimentation, dilution, destruction of organic substances like sewage from labour colonies and effluents from crushers and other sources.

Minimum flow in the Ken River is adequate to dilute the untreated sewage. Hence the impact on the surface water quality is negligible, which will still be reduced by sewage treatment measures.

Eutrophication risk for Daudhan reservoir is of low intensity due to decay of forest produce in submergence area and diamond mining activity. Proper deforestation of submergence area will mitigate the risk. The reservoir is covered by semi-quartz sandstone which is compact and hard. Hence the possibility of leakage from the bed of the reservoir can be considered negligible.

There are valuable timber trees are going to be submerged. There are no known migratory routes for birds including the occasional visitors. The access for food and shelter for the habitat may not be severally affected due to the project on the other hand; the animals would get plenty of water so that they don't need to venture out of forests during summer for water.

The Panna Tiger Reserve area coming under submergence is mainly located in right flank of dam covered by steep hills; dense forest will get submerged due to the project.

Results and Discussion

Presented paper evaluated the socio-economic and environmental impact of the Ken-Betwa project. These would have generated significant benefits to the KBP region, as inadequate electricity and drinking water supply are major constraints for economic development in Bundelkhand, victim of severe drought years. This project also promotes national integration and a fair sharing of the country's natural water wealth also shows and promises a great concern for water conservation and optimum use of available water resources. Some farmers were sold their livestock as they are unable to provide an adequate drinking water supply for their livestock. In the case of the Ken-Betwa link project, no official figure is available for the number of people to be displaced. It is estimated that the mostly tribals and farmers people will displaced. Project importance increased in the crop production and livestock output in the command area. Groundwater recharge and irrigation will increase in and outside the command area. This project Undoubtedly will prove to be milestone of developing Bundelkhand, it is the need of the hour to have a water mission like as KBP, which will enable availability of water to the fields, villages, towns and industries of this backward area throughout the year, even while maintaining environmental purity to combat with both fold and drought simultaneously.

Conclusion

Last but not the least, in the era of climate change; river networking is the need of time for development. Indian Government has constituted a committee to evaluate the socio-economic and environmental impact of Ken-Betwa link project. Successful implementation of Ken- Betwa link project largely looms upon timely release of water from the surplus basin to the deficit basin.

The problem of providing domestic water supplies in areas away from the rivers will largely remain unsolved. Some of the major criticisms of the project are about its socioeconomic viability, environmental impacts, displacement and rehabilitation of affected people, the challenge of resource mobilization, geo-political constraints, as well as domestic political dynamics.

There is an urgent need to take Socio- environmental concerns related to Ken-Betwa link Project so a very detailed hydrological, geological, meteorological and environmental analysis of the project would be imperative in the benefit of Bundelkhand, India.

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