IJASRM

International Journal of Advanced Scientific Research and Management, Volume 10 Issue 1, Jan 2025

www.ijasrm.com

ISSN 2455-6378

Ken-Betwa Link a bridge between environment and people need - public acceptability

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Abstract

Interlinking of Rivers Programme of the country will be a real push towards countries water security as well as to mitigate adverse impact, climate change. The successful completion of individual project under interlinking of rivers shall resolve the dual phenomena of flood & drought syndromeThe present study has attempted to evaluate the adverse impact vis-a vis mitigation steps taken by Ken-Betwa Link Project Authority (KBLPA)which has moved a lot towards concerns. It has been assessed that the project has established a bridge between environmental concerns, afforestation issues, and mitigation measures of wildlife in Project affected area with providing equivalent benefits to flora and faina as well as to huge benefits of 11 lakh ha. Irrigation. To critically visualize public view and analysis for acceptability of KBLP Review of existing status of micro irrigation and interlinking of rivers and Public views and analysis has been done for replacement of traditional irrigation with micro irrigation for various ILR projects.

Keywords:

Adverse, mitigation, inter-state, Bundelkhand, water starved

1. Introduction

The study is concentrative towards the implementation of the Ken-Betwa Link Project, mitigation of its inter-state environmental, R&R, and landscape management issues as well as healthy distribution of water amongst water starved Bundelkhand region of Uttar Pradesh and Madhya Pradesh. Ken-Betwa Interlinking of the Rivers will be a real push towards the water security as well as to mitigate adverse impacts, climate change, etc. as well as healthy distribution of water amongst water starved Bundelkhand region of Uttar Pradesh and Madhya Pradesh.

2. Review of Literature

Amar (2005) assessed the economic and other implications of the proposed cropping and irrigation patterns in the Ken-Betwa project. They observed that the proposed cropping and irrigation patterns do not match the changing face of cropping and irrigation patterns in this region. The benefit cost ratio and incremental benefit of the net value of crop production in the KBP area of the irrigation component seems to be very small even under the most optimistic scenarios.

Sharma (2005) studied the Ken – Betwa Link Project, a Boon for Bundelkhand Region. He concluded that the link project after implementation will drastically increase agriculture project and also supplement ground water and will provide employment opportunities and project is a boon to the Bundelkhand region.

Krueger et. al. (2008) assessed the issues involved in implementation of Ken-Betwa link. The Ken-Betwa Link Project (KBLP) the physical construction required for the KBLP is relatively minimal as a result of the close proximity of the Ken and Betwa rivers to each other (Boojh, 2005).

Prabhu (2008) suggested that the study is about the suitability of the proposed Ken-Betwa Link Project (KBLP) as a water management strategy for the Ken and Betwa region in India. He concluded that the KBLP is to be used as a “litmus test” for future

https://doi.org/10.36282/IJASRM/10.01.2025.1958

national ILR projects a more through and responsible approach must be taken in developing an appropriate strategy for solving the water supply issues of the area.

Jain (2018) The project is a boon to water short area of Bundelkhand region of Uttar Pradesh & Madhya Pradesh. The major dam of the Ken-Betwa Link Project namely Daudhan dam is having submergence of 9000 ha out of which about 4141 ha lies in Panna Tiger Reserve. The present paper covers various issues namely; environmental, wild life and forest land diversion which were faced by NWDA during its clearance. The paper also highlights the present status of forest clearances and a way forward for implementation of Ken-Betwa Link Project.

Jain et. al. (2019) discussed the various issues involved in Environmental clearance of Ken-Betwa Link Project (KBLP) as a model project They described various issues involved in project viz. Environmental Impact Assessment, Environment Management Plan, assessment of magnitude of impact on Tiger habitat due to submergence of area in Panna Tiger Reserve, computation of compartment-wise forest area while obtaining environmental, wild life and forest land diversion clearance.

Jain (2019) studied the economics of crop cultivation under drip/sprinkler irrigation. The economic analysis can be done to be profitable, cost effective with positive NPV and higher IRR than the traditional method. Even though high in initial investment for micro/sprinkler irrigation, the same can be recovered by increased yield, lesser cost of cultivation etc.

3.0 BENEFITS OF KEN-BETWA LINK PROJECT

The project envisages to provide an annual irrigation of 9.04 lakh ha and domestic water supply to a population of about 61.75 lakh utilizing 4843.26 MCM of water. Project also generates 103 MW of hydropower and 27 MW solar power as tabulated below:

Table 1- Benefits of Ken-Betwa Link Project

SN	Component	CCA Lac ha		Annual irrigationMCM		Water Utilisation MCM	
		MP	UP	MP	UP	MP	UP
1							
1.	KBLP Phase-I	4.47	2.51	5.99	2.51	Irrigation-2239 Domestic-60 TL-51 Total-2350	Irrigation-1620 Domestic-67 TL-13 Total-1700
2.	Lower Orr Dam	0.9	-	0.9		292*	
3.	Kotha Barrage	0.2	-	0.255		88*	
4.	Bina Complex Multipurpose Project	0.96	-	0.96		413*	
5	**Sub-Total**	**6.53**	**2.51**	**811**	**251**	**3143**	**1700**
6	**Total**	**9.4**		**10.63**		**4843**	

Includes Domestic and Industrial uses

Total cost of the project Rs.35111.24 crore at price level 2017-18
Benefit-Cost ratio 1.58:1
Internal Rate of Return 10.96

The Index Map of KBLP is enclosed. (Figure 1)

https://doi.org/10.36282/IJASRM/10.01.2025.1958

IJASRM

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www.ijasrm.com

ISSN 2455-6378

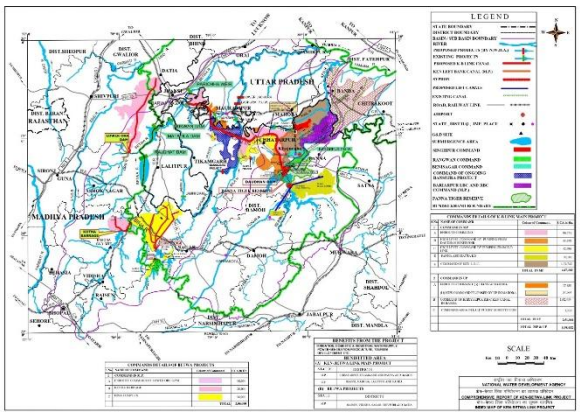

Figure 1
Source: Detailed Project Reports of KBLP

3. Environmental Clearance

Environmental Clearance was granted by MoEF&CC vide letter dated 25.08.2017 with certain conditions. The Environmental clearance is presently under challenge in the National Green Tribunal (NGT) vide appeal No. 34 of 2017 titled 'Conservation Action Trust & Anr. Vs. Union of India & others'. NGT decided to defer the case till decision by Hon'ble Supreme Court in respect of wildlife clearance. The NGT during its hearing dated 12.10.2018 has ordered that first CEC should hear IA No. 27160/2018 in WPC(C) 202 of 1995 in the matter of Shri Manoj Kumar Misra forwarded by Hon'ble Supreme Court to them. Further hearing awaited.

4. Forest Land Diversion Clearance

Stage-I Clearance/In-principle Approval has been granted by MoEF&CC vide letter dated 25.05.2017 with certain conditions. One of the essential conditions is the identification of 6017 ha of revenue land and its transfer to PTR authorities. About 80% of land acquisition is complete.

5. Wild Life Clearance

The wild life clearance of Project having submergence in Panna Tiger Reserve has been obtained and all mitigation measures are undertaken for having a balance between wild life and public needs for water in Water starved Bundelkhand region-Current status of tigers in Panna Landscape, Dispersal and ranging across the landscape (20 tigers to be monitored),Co-predator and prey species dynamics, Habitat quality assessment for entire landscape, Identification of satellite cores and corridors, Updating Tiger Conservation Plan, Compensatory additional areas in the form of core, buffer, satellite core and corridors.

6. Daudhan Dam Submergence - Movement of Tiger

The submergence area of Daudhan Dam ,The location of Tigers and Tiger Path and Buffer area to Core area compartments is illustrated below in Figure 2 and 3

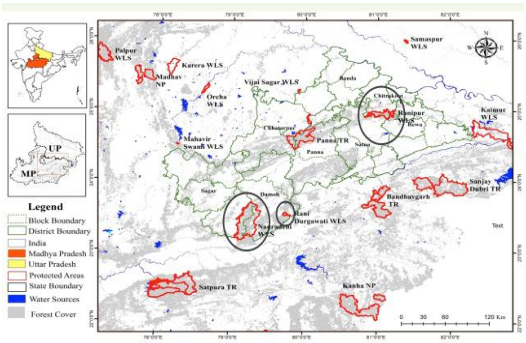

Figure 2 &3 : Movement of Tigers

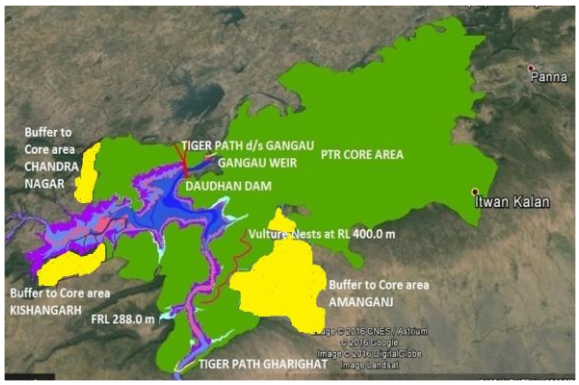

Figure 3: Submergence plan /Buffer area

7. Integrated Landscape Management Plan

As the project submergence area is having issues linked with Flaura and Fauna, Integrated plan to mitigate adverse impacts is shown in figure 4

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IJASRM
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www.ijasrm.com
ISSN 2455-6378

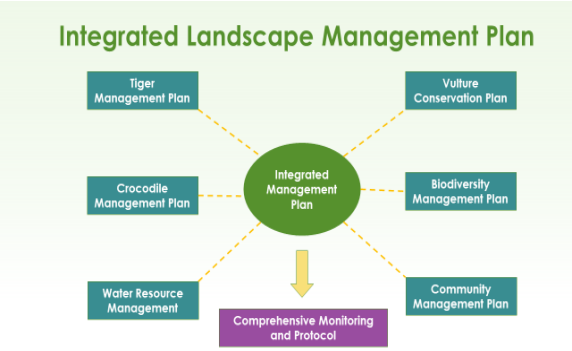

Figure4 Integrated Land Management Plan

8 Public views and analysis for acceptability of KBLP

The present study in addition to review of clearance is concentrative towards acceptability of KBLP.The aspect of applicability of a project to a set of people benefitted has been analyzed and analogy made based on a set of Jain Philosophy SAT (who exists) KHESTRA (where stay) SPARSHA (extend of movement), KAL (time how long they live), ANTER rebitation of activity of time for survival), BHAV (type of deads or works) ALPABAHUTVA (comparison – small or increased).

SAT is well covered term for humans, flora and fauna in the area. KHESTRA is characterized by villages, agricultural fields, forest water bodies and atmosphere for sustenance of human being flora and fauna. SPARSHA is extend of movement in our case. KHETRA is necessary equally for human as well as other living species. The analysis has been carried out for those villagers who are residing in water starved Bundelkhand region as well as increased facility of water for survival of flora and fauna. KALA is time period living species can survive without facility of water and with facility of water. ANTER needed for survival otherwise may cause evacuation for survival. BHAV is characterized by latest technology for utilization of water resources. ALPABAHUTVA is a technical term used for measure of pre and post facility.

- Sat (Number)
- Kshetra (place or abode)
- Sparshan (extend of space)
- Kala (time)
- Anter(A repetition of activity over time)
- Alpavahutva (Deeds or thought (BHVA) and reciprocal comparison)
- The factors as described above converted in to sutra or formulated to assess acceptability of Linking. These include Life before River Linking, aspect of food production, impact of flood and drought, status of canalization, dependence on rain God, and escape due to poverty and if a canal is in place how life will improve. Assessment on Cost Benefit ratio also confirmed promising results. The anology of Pubic survey and interpretation are given in Table 2

Table 2-Prameters vis a vis analogous applicability

Sr. No.	Terms in Jainism	Parameters for present study	Analogous applicability
1	SAT (Existence)	NUMBER OF PEOPLE IN A VILLAGE	Crop water need of above people
2	KHSETRA (Where stag)	PLACE OF STAY	Command area for irrigation
3			
4	SPARSANA (Extend of movement)	EXTEND OF MOVEMENT	Space of movement of people without escape irrigation
5	KALA (How long survive)	TIME OF STAY	Time of survival with low irrigation facilities and flora and fauna without
6	ANTER (Difference)	REPITATION OF ACTIVITY OF TIME FOR SURVIVAL	Water storage can be used for other high land commands so repetition of irrigation with micro irrigation
7	BHAVA (Work/Deeds)	TYPE OF DEEDS OR WORKS	Type of crops and their benefits

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IJASRM

International Journal of Advanced Scientific Research and Management, Volume 10 Issue 1, Jan 2025

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ISSN 2455-6378

8. Sample survey of command area under various command

The concept of micro irrigation system is more acceptable in Irrigation projects to get maximum yield from irrigation projects by covering more area under irrigation with less crop water requirement of crops. In this concept the upland command area which is not under irrigation due to higher upland can be put under irrigation by adopting pressure irrigation system. The main input for this is power and machinery for pressure irrigation system. The plenty of power is available the grid could be utilize in this system otherwise go waste without use, to get maximum output from the Project.
Main advantages of micro irrigation over flood irrigation and their linkage to parameters defined in previous para are given at Table 3

Table: 3 Sample surveys of command area

Sr. No.	Particulars	Micro Irrigation	Flood Irrigation
1	Crop water requirement	Reduced considerably due to increase irrigation efficiency	Increased considerably due to due to reduction of irrigation efficiency.
2	Water consumption per ha of command area.	less	More
3	Command area development cost	Will be less	Will be more
4	Can be brought irrigation facilities in higher upland command areas?	Yes	No
5	Any control on Water supply to command area	Yes within one minutes	It will take more time to stop flow in command area.
6	Water saving can be used for other high land commands	Yes	No
7	Can the concept of more crops per drop be achieved?	Yes	No
8	Benefit.Cost Ratio	higher	low

It is seen from the above, the use of micro irrigation system will be more efficient and cost effective for the overall development of country in irrigation sector. The economy of India is highly dependable on agricultural production of country. It is therefore the adoption micro irrigation in agriculture sector will be game changer in the overall economy of the country.

The field survey was done to cover ommand area of Ken-Betwa link in Uttar Pradesh nd Madhya Pradesh, existing Mohanpura Lift Irrigation Scheme in Madhya radesh, commands of Eastern Rajasthan Canal roject of Rajasthan and Indira Sagar and Onkareswar Dams on Narmada in Madhya Pradesh and in Girdih district of Jharkhand. A visit of Mohanpura dam having one of best micro irrigation scheme successfully working in Rajgarh district of Madhya Pradesh has helped the author to visualize the positive impact of micro irrigation. A set of questionnaire were prepared to cover wide range of enquiries on micro irrigation and new interlinking of rivers, about awareness of farmers and personnel involved in agriculture or doing pitty jobs due to no availability of either land suitable for irrigation, no water for irrigation or shortage of money for agriculture purposes

8.1 Introduction of micro irrigation

A representative set of villagers were identified and set of questionnaire were prepared to cover wide range of issues covering awareness of farmers to shift to micro irrigation, with or without cost, change of crop from water consuming cost alike paddy to cash crops, availability of power supply during crop season in their area, their mind set for switch over to micro irrigation readiness to bear financial implication in selling market, their capability to bear operation and maintenance cost of micro irrigation, their level of reliability on micro irrigation, crops presently grown, cost presently incurred by them per quantum and their views on uninterrupted power supply. The questionnaire developed are given at Appendix-1. These were enquired from them during September, 2021, October, 2021 and response analysed.

8.2 New Interlinking of Rivers introduced in their area

Awareness of farmers about link canal and dam coming soon or existing in their area, their present status of agriculture, type of crop being grown, their shift of crop if monsoon irrigation facility is provided, awareness of farmers about water saving techniques and sprinkler irrigation, micro irrigation, present status of water filled in tanks or ponds, their future plan if these are filled with canal water available, status of drinking water supply and finally their comments on escape of poor people to large cities or towns for labour due to scarcity of water. A set of questionnaire are furnished in Appendix- 2.

https://doi.org/10.36282/IJASRM/10.01.2025.1958

IJASRM

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www.ijasrm.com

ISSN 2455-6378

8.3 Public views and analysis for replacement of traditional irrigation with micro irrigation

A representative set of villagers were identified and set of questionnaires were prepared. These were enquired from them during September, 2021, October, 2021 and response analysed for Mahoba district (Uttar Pradesh), Chattarpur district (Madhya Pradesh), for KBLP beside other districts of country as furnished in table, Giridih district (Jharkhand), Bhilwara district (Rajasthan), Valsad/Nashik district (Gujarat/Maharashtra). Out of 150 respondents in Mahoba district about 83% of the people were found acceptable to micro irrigation as furnished in 4. Out of 150 respondents in Chhattarpur district about 88% of the people were found acceptable to micro irrigation as furnished in 4. Out of 70 respondents in Giridih district about 86% of the people were found acceptable to micro irrigation as furnished in 4. Out of 40 respondents in Bhilwara district about 73%% of the people were found acceptable to micro irrigation as furnished in Table 4.

Table 3-Mahoba District

Mahoba, Uttar Pradesh					
Question No.	**No. of Respondent**	**Fully Accepted**	**Ready to Move**	**No Change Required**	**Against the Project**
	15	4	7	3	1
	15	4	4	7	0
	15	2	2	5	6
	15	7	5	0	3
	15	11	2	0	2
	15	4	6	2	3
	15	3	1	7	4
	15	3	1	7	4
	15	5	1	8	1
	15	7	4	2	2
Total	150	50	33	41	26
%age	100	33.33	22	27.33	17.34

Table 4-Chhatarpur District

Opinion for micro irrigation

Chattarpur, Madhya Pradesh					
Question No.	**No. of Respondent**	**Fully Accepted**	**Ready to Move**	**No Change Required**	**Against the Project**
1.	15	8	6	1	0
2.	15	0	12	2	1
3.	15	8	6	1	0
4.	15	9	4	0	2
5.	15	14	1	0	0
6.	15	2	8	4	1
7.	15	12	3	0	0
8.	15	12	0	3	0
9.	15	0	0	1	14
10.	15	13	2	0	0
Total	150	78	42	12	18
% age	100%	52.00	28.00	8.00	12.00

https://doi.org/10.36282/IJASRM/10.01.2025.1958

Conclusion

- It has been assessed that Project benefitted people are in favour of Project
- It has been assessed that project has kept a healthy balance between environmental concern, afforestation issues and mitigation measures of wildlife with compare to huge benefits of 11 lakh ha. Irrigation.
- Thus the study has established need of implementation of Ken-Betwa Link Project,
- Mitigation of its inter-state environmental, R&R, land scape management issues as well as healthy distribution of water amongst water starved Bundelkhand region of Uttar Pradesh and Madhya Pradesh.
- The Project is presently under implementation
- People in project benefitted area are supportive of project

References

1. Jain (2019) Solar power component in top or canals, Rastriya Jal Goshti, organized by *National Water Development Agency*.
2. Jain et al. (2021). "A Case Study to Increase the Benefits on Interlinking of Par-Tapi-Narmada Link Project" Ecological Environment & Construction 27 (October Suppl. Issue): 2021; pp S 366-371, *Pollution Research*, Pune. October, 2021. SCOPUS h index 23.00 and NAAS India impact rating 5.10. copy right2EM International ISSN0971-765
3. Jain et al. (2021). "Ken-Betwa Link-A boon to Construction Sector" NICMAR *Journal of Construction Management* Vol XXXVIII No. 4 October – December 2022 ISSN0970-3673 278-283
4. Jain et al. (2021). "Optimization of River Linking – A Case Study of Linking Ken and Betwa Rivers" NICMAR *Journal of Construction Management* Vol XXXVIII, No.4 October-December 2022 ISSN0970-3673 278-283
5. Jain et al. (2021). "Study of Sustainability Aspects of Chambal River Linking System Using Reservoir Simulation Techniques", E-FIR Conference 2021. *Lecture Notes in Civil Engineering* Vol. 232, Springer, Cham. https//doi.org/10.1007/978-3-030-96202-9, 4.3.2022 online ISBN 978-3-030-9630-9, Print ISBN 988-3-03-96201-2.
6. Jain et al. (2022). an analysis of public acceptability in India for Interlinking of Rivers – A sustainable Water Management Approach *2nd International Conference on Water Technologies* (ICWT-2022) organized by Water Innovation Centre: Technology Research & Education in Association with Asian University Alliance December 1-2, 2022 at Bombay. Accepted for publication in Springer.
7. Jain et al. (2022). Interlinking of Rivers – A review of mega National Perspective Plan International Conference (6th ICCRIP – 26-27, August, 2022) organized by *NICMAR*, Pune.
8. Jain et al. (2022). Socio-economic impact of interlinking of rivers (ILR) using Social Accounting Matrix (SAM) based model International Conference (ICAWTM-2022), organized by NICMAR, Pune.
9. Jain et al. (2023). Critical Analysis of Environmental Issues of Ken-Betwa River Linking Projects International Conference on advance in Water Treatment and Management (*ICAWTM*), 11-12 March, 2023, Gandhinagar.
10. Jain (2018). Issues involved in Environmental clearance of Ken-Betwa Link Project. In *Proceedings of the 1st International Conference on Sustainable Water Management*, 10-12 December 2018, Chandigarh, 453-461.
11. Jain et.al. (2005). Interlinking of rivers in India: myths, misconceptions, and realities. Water Resources Management, 19(4), 397-414.
12. Jain et.al. (2009). Interlinking of rivers in India: benefits, potential impacts, and environmental issues. *Water Policy*, 11(4), 442-460.
13. Jain et al. (2022). Critical Analysis of Public acceptability of river linking projects. *7th India Water Week – 2022*, 1-5 November, 2022. an international event organized by the Ministry of Jal Shakti,
14. Sharma D. K. *"Ken-Betwa Link Project – A Boon for Bundelkhand Region"* - Eleventh
15. National Water Convention 11th May, 2005.
16. Pandya A. B. *"Strategy for Water Resources Development 1st International Conference on Sustainable"* – Water Management December, 2018.

https://doi.org/10.36282/IJASRM/10.01.2025.1958