

AN ANALYSIS OF CHALLENGES IN DAMMING AND LINKING OF RIVERS WITH REFERENCE TO ARUNDHATI ROY'S THE GREATER COMMON GOOD

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ABSTRACT

Damming rivers started in India at an incredible pace since Independence to achieve the objective of flood control and meet massive water crisis, primarily for agricultural and drinking purposes, secondarily for power generation and industrial use and resultant economic growth. This paper analyses the development fiasco by recalling the issues of Hirakund and Sardar Sarovar's (SS) multipurpose dams, resulting in changes in social, economic, ecology and environmental factors in the command area in Mahanadi and Narmada River valleys, respectively, being most controversial. The essay 'The Greater Common Good' by Arundhati Roy has been chosen to analyse the effectiveness of a writer's direct involvement as an activist in agitation for displaced people besides eye-opening analytics of controversies related to the SS project. This paper also studied the anticipated effect on social, economic, and environmental factors in the command area of sanctioned Ken and Betwa river linking projects (KBP) by co-relating issues of multipurpose dams. A discussion on rationalisation of the grievances of marginalised people due to delivery of various government schemes to the last corner of the country in the growing digital eco-system along with the possibilities of enactment of a national law for regulating the construction of water infrastructure and its operation and maintenance through regulatory mechanism with a holistic approach.

Keywords: Dam, Displaced, Digital eco-system, Environment, Multipurpose, National law.

1. INTRODUCTION

Damming of rivers started in India during British rules and continued after independence with great leap considering as economic booster by expanding irrigated lands, besides flood control at many regions in India. The following statistical data establishes the fact-

Decade	Upto 1900	1901-1950	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001 & beyond
Dams Constructed	68	302	235	504	1288	1304	705	664

Source: National Register of Large Dams | Central Water Commission, Ministry of Jal shakti, Department of Water Resources, River Development and Ganga Rejuvenation, GoI (cwc.gov.in).

During 1971-80 and 1981-90, the Construction of Large Dams Increased Abruptly.

The multipurpose Hirakund dam was completed in 1957 on the Mahanadi River, and the Sardar Sarovar dam in 2017 on the Narmada River. Study of the social and economic issues related to the Hirakund and Sardar Sarovar dams reveals that both the projects lagged behind what they ought to deliver as committed by the planners, designers, and government. As a result, these dams underestimated the costs and overestimated the benefits. On the banks of Mahanadi and Narmada rivers flourished many prosperous villages, towns, and cities with a large area of irrigated agricultural land having ancient Adivasi culture and age-old economy which developed gradually and sustained in the lap of nature. Roy, in the essay *The Greater Common Good* criticised the developmental activities through damming rivers and extinction of old cultures, society and economy with ecological and environmental degradation, giving many prone justifications and arguments. The need for balancing the choice of project affected and the beneficiaries are also discussed. Improvement through the exchange of information due to digitisation processes on the smooth displacement and resettlement process also has been discussed.

Few personalities get involved in agitations on behalf of project-affected people to minimise their grievances in real terms. When writers became activists of agitations, like Arundhati Roy, the voice of the affected strengthened with increased argumentative power to deal with bureaucrats, technocrats, financiers, scientists, and politicians. The essay *'The Greater Common Good'* discusses the pains of land use and various anomalies of the Sardar Sarovar Project. The compulsory land acquisition and involuntary displacement of people for public projects happened in both the dam projects. They failed to balance a larger population's needs while protecting the project-affected people's rights. The present study of the good and the bad side of these projects is to weigh the possible benefits and drawbacks of the Ken and Betwa River Linking projects on the backdrop of the experience earned in the execution of the Hirakund and Sardar Sarovar dam projects.

The confinement of people in different clusters made them develop self-sufficient ecology for survival. Dependence on resources beyond their area of residence was minimum. After the unification of these clusters into the concept of the Indian nation, it is essential to walk on the path of developing an interdependent economy through significant projects,

however depriving some of the benefits of others. Mridula rightly wrote, “The British brought a different philosophy to water engineering in India, and under their influence, India began to invest in expensive, centralized water supply while weakening community-managed, decentralized tanks” (Mridula 3). This paradigm shift can be viewed from Baviskar’s description of the relationship between growth and people as “The attempt to achieve modern industrial growth has been based on two interrelated processes: one, the unchecked use of the earth’s natural resources; and two, the transformation of people, often against their will, into a dispossessed working class” (Baviskar 35).

DISCUSSION

2. History of Dam and River Linking Projects

2.1 The Hirakund Dam

2.1.1 Geographical Information:

Mahanadi river rises near Sihao hills in the Dhamtari district of Chhattisgarh plains. It travels about 851 km, of which 357 km are in Chhattisgarh, and the remaining 494 km are in Orissa, which discharges upon the coast of Orissa in the Bay of Bengal.

2.1.2. Conceptualization

On the recommendation of Dr A. N. Khosla¹ it was decided to construct a multipurpose river valley project on the Mahanadi River at Hirakund for flood control in the downstream at Cuttack. Controversy on the project started from the beginning with the announcement of the construction of the dam that began in 1945. Mass agitation by the people of Sambalpur district against the proposal surfaced since most of the fertile agricultural land of the command area was to be submerged. The agitation caught intensity on the fear that Sambalpur to suffer for the benefits of coastal districts, suggesting that flood-affected people could be shifted and rehabilitated; if not, Sambalpur district from the rest of Orissa be separated. However, the agitation lost its teeth due to leadership crisis, poor participation, and the wrong concept that Mahanadi could be ever dammed. The canvassing with nationalistic euphoria was done to propagate that dam is an anti-flood measure and bring significant development in the state and command area.

2.1.3. Construction Activities

Foundation stone of the Hirakund dam was laid at the site by Sir Howthorne Lewis, the Governor of Orissa on 15 March 1946 and the actual work started in the middle of 1948. The construction of the Hirakund dam completed in 1956 and inaugurated by Prime Minister Jawaharlal Nehru on 13 January 1957. It took 12 years to complete.

2.2. Sardar Sarovar Dam

2.2.1. Geographical Information

Narmada river flows 1312 kms from its origin at Amarkantak Plateau of Maikal range at the border of the State of Madhya Pradesh and Chhattisgarh, separating Vindhya and Satpura range and discharge at gulf of Khambhat in Gujrat.

2.2.2. Conceptualization

the benefits of coastal districts, suggesting that The late Sardar Vallabh Bhai Patel conceptualized the Sardar Sarovar dam in 1946-1947. It was intended to bring drinking water to Kutch and other drought-prone regions of Gujarat and to irrigate a vast area of Gujarat and nearby two districts of Rajasthan by constructing a dam on the Narmada River and an extensive canal system for irrigation. The Central Waterways, Irrigation and Navigation Commission (CWINC) recommended Navagam as the site for dam construction in 1957. The CWPC (earlier CWINC) submitted a proposal to the government in 1959; after that, Prime Minister Jawaharlal Nehru laid the foundation stone on 5 April 1961. Narmada Water Disputes Tribunal (NWDT) was set up in 1969 to find the solution to disputes among beneficiary states of Gujrat, Madhya Pradesh and Maharashtra and was given its award in 1979. In 1985 World Bank made credits and loans to the government of India and all three states to help finance the construction of the Sardar Sarovar dam and its canal network. The Ministry of Environment and Forests, Government of India, granted the project a conditional environmental clearance in 1987.

2.2.3. Construction Embargo

Construction of the dam started in 1987. In 1988, Narmada Bachao Andolan (NBA), under the leadership of Medha Patkar, Baba Amte and supported by Arundhati Roy, opposed the Sardar Sarovar Projects. In May 1994, NBA sued in the Supreme Court of India to restrain the project activities unless the terms of NWDT were honoured. However, the Supreme Court in January 1995 stayed the construction work and again allowed construction work from February 1999, and the final ruling was given in 2000. Prime Minister Narendra D. Modi inaugurated the completed project on 17 September 2017.

2.3. Inter-Basin River Linking Projects (IRL)

2.3.1. Conceptualization

Interlinking of rivers was conceptualized in the subcontinent way back in the 19th Century by Sir Arthur Cotton, who devised a plan to link south Indian rivers for inland navigation. The idea was implemented only partially. Afterwards, Dr K L Rao 1972 suggested developing a national water grid to transfer surplus water available in an area to water

¹MahalikNirakar<https://magazines.odisha.gov.in/Orissareview/apr2005/englishpdf/damacrossmahanadi.pdf>, 74-78, accessed 30 Jun. 22

deficit areas. The proposal comprises a 2640 Km long Ganga-Cauvery link as its main component, involving large scale pumping over a head of 550-meter consuming colossal power. Central Water Commission rejected this proposal on the ground of being uneconomical. Another proposal for “Garland Canal” was suggested by Captain Dastur in 1977. According to the scheme, two canals are to be constructed, the first of 4200 km long Himalayan canal along the foot of the Himalayas from Ravi River in the West to the Brahmaputra River and beyond East and the second of 9300 km long spanning the central and southern parts of India. Both the canals were proposed to be interconnected with pipelines at two points, Delhi and Patna. This was also rejected since the committee of experts of central and state governments was not found viable.-affected people could be shifted and rehabilitated; if not, Sambalpur district separated from the rest of Orissa. However, the agitation lost its teeth due to a leadership crisis, poor participation, and the wrong concept that Mahanadi could be ever dammed. The canvassing with nationalistic euphoria was done to propagate that dam is an anti-flood measure and bring significant development in the state and command area.

2.3.2 Initiation of IRL Projects in India:

After a long silence, the river linking proposal again surfaced with Presidential speech given on 14th August 2002 on the eve of Independence Day by Dr A.P.J. Abul Kalam-

“This drought – flood phenomenon is a recurring feature. The need of the hour is to have a water mission which will enable availability of water to the fields, villages, towns, and industries throughout the year, even while maintaining environmental purity. One major part of the water mission would be networking of our rivers” (Web).

The Hon’ble Supreme Court of India’s directives on 31 Oct 2002, that the rivers of India shall be linked within ten years. In compliance with the notices of the Supreme Court, the Centre set up a high-powered Task Force. As per National Perspective Plan, the National Water Development Agency (NWDA) identified 30 river links– 16 under the Peninsular component and 14 under the Himalayan component. The Ken-Betwa Link Project is one of the peninsular component projects. The Ken and Betwa river linking projects to be executed for the transfer of water from ken river to Betwa river to meet, primarily irrigation demand of Bundelkhand area.²

2.3.3 Ken-Betwa River Linking Project (KBP) Execution

MOU (Memorandum of Understanding) for Detailed Project Report was signed on 25 August 2005, between UP and MP Chief Ministers in the presence of PM. In the General Budget for the Financial Year 2022-23, provision for KBP has been made.³ Government of India, in the budget for the financial year 2022-23, made provisions for the project. The Canal will be 221 km long, including a 2-km long tunnel. Ministry of Jal Shakti will implement the project, the government of India, Madhya Pradesh, and the Uttar Pradesh States through a particular vehicle.

3. ANALYSIS

3.1. Hirakund Dam Project

3.1.1. Defeat of Objectives

The objectives of constructing the Hirakund dam were to save the Mahanadi delta from frequent floods on Orissa's thickly populated fertile land, irrigate the Sambalpur Bolangir tract, and generate power with flood control cushion in its storage capacity. It is the longest earthen dam in the world. Pandit Jawaharlal Nehru called it "the temples of modern India". He had also assured that the Hirakund dam project would end people's miseries. However, excess water inflow than the catchment capacity resulted in the breach of the flood control cushion provided in the reservoir catchment area, defeating the primary purpose of flood control.

3.1.2. Issues and Agitations

From the beginning, agitations became an everyday phenomenon against dam construction. Project-affected people were not part of the planning process, so grievances accumulated. Even after 50 years after the inauguration, a large-scale gathering of farmers at the dam site observed civil disobedience against the water allocation to industries depriving agricultural needs that too when the displacement and rehabilitation issues remain unresolved. The lift irrigation potential originally assessed was not considered due to the high power and allied system cost. As per the catchment contours of the reservoir, some villages exist on high land within the reservoir. Villagers of these villages were allowed to live there without any rights. The fishers were to face the hijacking of fishing business by outsiders with massive illegal fishing, besides contamination of the reservoir water by untreated effluents and fly ash from industries and powerhouses, which affected the fish diversity and catch significantly. Two canal systems, Sason and Bargarh, were constructed for irrigation of land within the command area of the dam. Stoppage of water flow in the Sason canal in 2005 for two years for maintenance threatened agricultural activities, forcing the farmers to fall into severe economic and social losses in the absence of alternative arrangements.

3.1.3. Clash between Sufferer and Gainer

The land outsees felt alien in the new settlement and identified as ‘reservoir outsees’, putting them under mental trauma and compelled them to engage in hard physical work to settle. A psychological division between land outsees and the

² PIB, Interlinking of Rivers, <https://pib.gov.in/Pressreleaseshare.aspx?PRID=1523256>, Delhi, accessed 1 July 2022

Mahanadi delta population increased since they believe the dam was constructed primarily for protecting Cuttack city from ravage of flood rather than developmental initiatives for their area. This decision invited strong opposition from the people of Sambalpur district since they were to be displaced by sacrificing their culture, society, and economy at the cost of adding further prosperity to coastal delta population.

3.1.4. Uncontrolled Harness of Water from the Reservoir

Commercialization of the Mahanadi water basin increased direct withdrawal of water from the Hirakund dam and other reservoirs on its tributaries in Chhattisgarh State, for industrial purpose. This threatened the water ecology of the basin and so on the lifestyle and economic conditions of the population residing there. However, in original project report there was no mention of water allocation for industries. Industrial use of water from the reservoir was nominal till 1991. Later, due to rapid industrialization, demand for water from the reservoir increased many folds. Unregulated water drawl from the reservoir by the industries and reduced flow in the Sason canal system, became the reason for conflict between the farmers and government of Orissa.

3.1.5. Resettlement and Rehabilitation

Dam-displaced who settled in the vicinity of reservoir, fisher who settled in the reservoir and farmers of the command area of the reservoir, all faced the increasing injustice due to irregular availability of quality water transforming many of them as surplus labours for industries since their earlier engagement was not sustainable. "The outsees, who really wanted to be rehabilitated by the government, were just dumped in those identified camps (full of jungles and wild animals), which were devoid of basic amenities of life and without basic sources of economy, roads, schools, hospitals, clubs, markets, etc." (Nayak 144). All the agitations are mainly based on the issues of resettlement and rehabilitations and right share of water for various stake holders. The displaced people were resettled at rehabilitation camps, established by clearing forest land and low-grade barren land was given for cultivation with the promise for better housing, road connectivity, electricity supply and water for irrigation. However, lack of facilities forced them to leave these camps and most of them resettle on the surplus land along the periphery of the reservoir for better livelihood.

3.1.6. Environmental Impacts

Industrialization brings in environmental degradation in the vicinity of the dam and its water. Productive lands were converted to waste disposal sites around the Hirakund reservoir, resulting in soil erosion and accelerated siltation. Unused heat energy from thermal power plants goes back to the environment, and thus temperature rises. It stores huge amounts of water in one place, and disbalance due to more incoming than outgoing water flow causes water logging, making farming difficult and costly. In addition, the spread of canals for irrigating agricultural lands endangered the traditional water storage bodies, which were environment friendly.

3.1.7. Interstate Relations and Disputes

Mahanadi is the lifeline of the people of Chhattisgarh and Odisha. After 1957, the construction of dams on the tributaries of Mahanadi, upstream in Chhattisgarh, started to meet our water requirement for drinking, irrigation, and industrial use. This led to a changed inflow pattern at the dam site. Water inflow quantity was also affected seasonally, and the yield of silt in the reservoir due to watershed treatments, water harvesting structures and reduction in forest area increased. Direct irrigation through gravity flow of water become defunct from 1971 onwards since drying the reservoir's tail areas and canals. The decrease in water flow in the catchment area of Hirakund put pressure on social, economic, and environmental aspects of beneficiaries from the dam in Orissa.

3.1.8. Compensation Embargo

The tribals were the major sufferer of the dam project. As Nayak explained, "It was found from the study that especially the displaced tribals, resettled in Jammal village, were forced to work as wage labourers. Earlier, they were considered as masters of their own. Deprived of compensations and any kind of help from the government, they were reeling under severe socio-economic hardship" (Nayak 147). Initially, displaced people were deprived of government welfare schemes without original resident ship recognition of the village. Moreover, uneven development due to uneven distribution of irrigation water in the different reaches of the command area resulted in conflicts among farmers of the head reach, middle reach, and tail end area.

3.1.9. Failure of Flood Control Concept

Hirakund dam was constructed primarily for flood control. Still, it failed in a flood of July 2001 when torrential rain in the upstream catchment areas of the Mahanadi River raised the reservoir level to be maximum, despite keeping all the water discharge gates open. At the same time, a high tide on 20th July along the coast created pressure on the discharged water from the dam, causing flooding of the delta region, and the very purpose of building the dam got defeated. Rohan D'Souza described, "In effect, the Hirakund dam, instead of holding back flood waters, is now copiously inundating the delta" (qtd. in D' Souza 96).

3.1.10 Power Generation

The dwindling picture of hydro power generation could not compensate the bunch of benefits expected to receive from the Hirakund reservoir due to moss deposition and depletion of reservoir water level causing slow flow of water to turbine.

3.1.11. Issues Afterwards

Construction of Hirakund dam brings in considerable economic, environmental, and ecological changes in the catchment, reservoir, and command area but rapid industrialization polluted the river water and induced various kind of

conflicts between farmers and industries due to larger share of withdrawal of water for industrial use. To mitigate the water demand for farming, big chunk of investment in secondary and tertiary canal and drainage system is required. The land use changes in upper catchment area became a matter of concern due to reduction in forest area over the last 60 years since rapid increase in area under watershed treatments and water harvesting structures changed the catchment characteristics considerably. As a result, quantity of water inflow, seasonality and yield of silt affected. Siltation is a big issue for the reservoir since it is reducing water storage capacity.

3.2 Sardar Sarovar Dam Project

Sardar Sarovar dam is intended to use the water of Narmada for irrigation, drinking water and power generation to change many people's lives drastically. However, the affected population was not taken into confidence, and work started. The project became a huge confrontation front due to inadequate resettlement and rehabilitation for the displaced people as per Land Acquisition Act, 1894. Being an active participant of the NBA, Arundhati Roy's anxiety for the marginalized, her vehement protests on improper rehabilitation policies of the government and the politics involved in the name of development that caused destruction and displacement is expressed in the essay *The Greater Common Good*.

3.2.1. Reason for Opposition to the Project

Jagadeesan and Kumar, in the forward note of the book *The Sardar Sarovar Project: Assessing Economic and Social Impacts*, gave an account of the project, which has faced economic, financial, social, and environmental-related challenges since its inception. Insufficient mitigation of negative impacts of these challenges was the reason for strong opposition by various social and environmental activists. The confrontation between the administration and pro-dam political leaders with the land outsees was very harsh. Roy's investigation is this, "We will request you to move from your houses after the dam comes up. If you move, it will be good. Otherwise, we shall release the waters and drown you all" (Roy 40). The victims of the Narmada project were not paid any proper consideration by the responsible persons in power and, most importantly, the political parties, to the loss of the sufferers.

3.2.2. Funding of the Project

The financial support that India has received from World Bank for the Sardar Sarovar dam project served as an aid to sufferers but put India in a state of debt where it pays more money to the bank as interest than principals, forcing it to take new debts from bank to repay the loan with more interest and put the country into a possible debt trap. Roy explained the condition: The relationship between us is exactly like the relationship between a landless labourer steeped in debt and the village moneylender-it is an affectionate relationship, the poor man loves his moneylender because he's always there when he's needed. The only difference between the landless labourer and the Government of India is that one uses the money to survive. The other just funnels it into the private coffers of its officers, and agents, pushing the country into an economic bondage that it may never escape (Roy 55).

3.2.3. Nationalism Euphoria

Pandit Jawaharlal Nehru have called dams the temples of modern India while inaugurating the Hirakund dam in 1957. The bad effect of dams did not endorse it as temple, since they are filled with the feelings of worship and devotion, but in case of big dams they create disaster, the opposite of what being told to people, creating feeling of nationalism in people to support construction of dams.

3.2.4. Impact of Project on Adivasis

Failed relocation policy of government and insufficient compensation that radically altered the lives of the displaced Adivasi villagers. In support Nadeem Hasnain in the book *Tribal India* rightly opined that rearrangement in human settlement patterns has been a companion of development but the target groups or beneficiary should not be the victims of progress and development. The resettlement process should be voluntary and humane. The plight of land outsees, as raised by Roy, has a reflection in Manish Kumar Verma's book *Development, Displacement and Resettlement*. Where it is argued that the land outsees became victim of development by losing productive system, productive assets, and income source due to less applicability of their old skills and facing greater competition in the use of scarce resources. They had to walk long distance to offer wage to themselves whereas in forest they had food, fuel, and fodder. Displaced tribes are not attracted by materialistic facilities and showing sympathy to them by giving new advancements, is depriving them from their natural instincts. The 1979 Narmada Water Dispute Tribunal (NWDT) award disregarded the tribal agricultural practices of crop rotation by slash-and-burn agricultural practices, moving from less fertile land to more fertile land in forest. To remain outside the purview of government taxation of the allotted land, they avoid registration and became encroachers. The issue further complicated due to unreliable land records. As per tribunal ruling, many tribals outsees did not qualify for settlement land. The plight of tribals is echoed in Roy's writing as "The deception, however, lies in its definition of who qualifies as 'Project Affected' (Roy 72).

3.2.5. Effect on Ecology

Keeping a large volume of water in one place by building dams has an ecological effect that takes many years to destroy. Roy cited the example of Punjab, where waterlogging by extensive use of water from canals and bore wells heavily disturbed the region's watershed dragging towards a future crisis. Water logging in the command area of the dam spoils the productivity of the soil owing to salinity and causes a natural disaster like a flood. Moreover, due to waterlogging, various diseases are spread. Debnath says, "Water logging is mainly due to the accumulation of excess irrigation water in the agricultural lands which affects productivity of the soil and also gives rise to salinity. These

problems might aggravate in command areas of major irrigation projects under conditions of liberal application of water and lack of a proper drainage system particularly in very flat terrain "(qtd in. Morse and Berger 312-313). An issue of economic loss was also reported regarding the negative impact on the Hilsa fishery in lower Narmada, which drastically shrunk and even wiped out.

3.2.6. Farmers' Issue

Roy viewed big dams as obsolete since they do more harm than good. They create displacement and take away wisdom and means of taking farmers' water, land, irrigation to benefit the rich. The market-driven economy changed the farmers' attitudes, who stopped growing the crops they consume, concentrated more on the market demand crops, and thus became market dependent.

3.2.7. Apprehension of Big Dam

Roy questioned the government's claim that big dams are the only cause behind huge food grain needs since a significant portion of irrigation is completed through ground water and increased food grains by hybrid seeds and chemical fertilizers. The study by Himanshu Thakkar reveals that big dams cater to only twelve per cent of India's food grains, equal to the amount lost to rodents due to improper storage facilities. Therefore, saving grains through better storage facilities could have reduced the number of big dams that uproots people. Further, Roy cautioned about the danger of earthquakes due to Big Dams. As Yan describes,

The most widely accepted explanation of how dams cause earthquakes is related to the extra water pressure created in the micro-cracks and fissures in the ground under and near a reservoir. When the water pressure in the rocks increases, it acts to liberate faults that are already under tectonic strain, but are prevented from slipping by the friction of the rock surfaces (Yan 12).

3.2.8. Agitations

Findings on big Dams reveal that displacement of the population undergoes several effects. C. D. Thate, in his article Resettlement due to Sardar Sarovar Dam, India in the book Impacts of Large Dams a Global Assessment, pointed to resettlement and rehabilitation policy for the displaced from the early stages of project planning. However, an analysis of the agitation by the Narmada Bachao Andolan (NBA) reveals that the agitation was merely confined to opposition to building a dam for the sake of getting proper rehabilitation and resettlement of land outsees was not convincing for many people, especially those living outside the command area of the dam, since they believe dams are necessary. This could have been avoided provided agitation on the issues of incomplete plans; clearances are given hastily, figures fudged, work progress overstated and so on.

3.2.9. Data, Costing and Progress

The impact of the weakness of having primary data was questioned by Roy in the essay "How can you measure progress if you do not know what it costs and who has paid for it? How can the market put a price on things --food clothes, electricity, running water—when it doesn't take into account the real cost of production" (Roy 43).

3.2.10. Criticism of Project Design

In her book Deep Water, Leslie observed, "on a functional level, Sardar Sarovar's parts did not quite fit. The dam and the canal were bigger than necessary to meet their stated water-delivery goals, while the reservoir was far too small." (Leslie 46). Therefore, the project's designers opted for constructing three large upstream dams,³ all in Madhya Pradesh, to meet the required supply to the Sardar Sarovar dam. According to the World Bank memorandum on January 2, 1992, it was assumed that "power at the Sardar Sarovar Projects would decrease by 25 per cent and the irrigated area by 30 per cent without the Narmada Sagar Projects" (Morse Berger, 250).

The canal system of SSP is designed to irrigate land covering twelve districts through a 160-kilometres-long concrete central canal with 75000 kilometres of branch and sub-branch canals. Kutch and Saurashtra districts are at the far end of this network, so a high dam level is a must for water to reach the far end. To mitigate the problem of waterlogging due to the blocking of the flow of natural, seasonal water due to the canal network system, engineering solutions are available but too expensive and so not included in the project, allowing waterlogging and corresponding salination to continue.

3.2.12. Dam Water Reached to the Last Point

After long years, Narmada water could reach to the far end of the Kutch Branch Canal Mod Kuba village in Mandvi taluka of Kutch district on 7th July 2022 by travelling 750 kilometres from Sardar Sarovar Dam.⁴ Roy criticizes the building of such a big dam by referring to the Farakka Barrage that diverts water from the main flow of Ganga to

³ Indira Sagar, 298Kms, Omkareshwar, 257 Kms and Maheshwar, 217 Kms, all in upstream of Narmada River.

⁴Express News Service, Canal fully functional; villagers cheer as Narmada water approaches Kutch,

<https://indianexpress.com/article/cities/rajkot/canal-fully-functional-villagers-cheer-as-narmada-water-approaches-kutch-8013596/>, accessed on 8th July 2022.

Hooghly River for Kolkata Port by reducing drinking water availability for downstream population in Bangladesh. The quote of Roy best fit in this situation "Build a dam to take water away from forty million people. Build a dam to pretend to bring water to forty million people" (Roy 92).

3.3. River Linking Projects

India is a diverse climatic country, where the Southwest monsoon generates most of the runoff with high spatial variability. South and western parts of India are drier than the north and north-eastern. The prime objective of the river interlinking plan is to transfer this surplus water to the deficit region. Such an idea shifted the focus from water supply augmentation schemes to demand side management and resulted in global inter-regional water transfers (IWT). The Periyar-Vaigai system, Indira Gandhi Canal and Telegu Ganga are classic examples of IWT in India. The complexity of the above concept is required to be assessed with a high level of transparency and professionalism. Nath wrote, The aims of interlinking river project is to transfer water from surplus to water deficit areas in the country. Interlinking River Programme will help saving the people living in drought-prone zones from hunger and people living in flood prone areas from the destruction caused by floods and add in power generation (Nath 8).

3.3.1. System

The system involves one-way water transfer and regulating its distribution with professional skills. It may harm ecology, society, economics, and the environment, as experienced in dam building projects. The positive views of interlinking rivers are improved and expanded irrigation systems and better flood and drought mitigation. In contrast, the opposite views are that it is economically expensive and involves uncertainties and disastrous and irreversible adverse after-effects. Assessment of river basin as 'surplus' or 'deficit' may not always be accurate since the rapid change in the pattern of monsoon rains and increase in water consumption from donor river may cause a flow shortage in the downstream area. Bandopadhyay et al. have analysed the need for Inter-basin Linking of River (ILR) in terms of its use in irrigation, "The proposed ILR, if implemented, would nevertheless transfer a significant amount of additional water to the drier areas, at great public expense. The question arises about what will be the use of this water. When the country is having a large food grain buffer stock, it would surely not be logical to use it for irrigation to produce more food grains. If there is a need, such crops can be produced with much less investment by using the additional water to feed the existing irrigation potential" (Bandopadhyay et al. 43).

3.3.2. Concerns

The Ken-Betwa River project (KBP) is yet to come up with benefits to enjoy. However, the concern for the environment and human consequences requires attention from the implementors. The proposed Daudhan dam reservoir will submerge 40 square kilometres of the Panna Tiger Reserves. In transporting water from this dam to the Betwa river, transit loss and cost of transit may be high. The construction of two dams, two reservoirs, an open and tunnel canal system, Powerhouse with a pumped storage power plant can change the area's environment. Multiple construction activities may change the socio-economic structure of the command area with massive funding, outside workforce, machinery, economic activities, change in land use and environmental changes.

3.3.3. Enhanced Benefits

The Ken-Betwa River link project will benefit more when it is integrated with irrigation, power generation, municipal water supply, catchment area management, conservation, tourism, fisheries, and rural development. Further, as proposed, the river linking system may encounter water losses during its travel in canals, contributing to groundwater recharge below the command areas and links. A proper study may quantify the indirect contribution of the benefit streams.

3.3.4. Possible Drawbacks

The inter-basin possible transfer of flora and fauna into the recipient basin from the donor basin may disturb the ecological balance. For example, Vladimir et al. (2008) described the possible disturbance of water flow downstream as "many peninsular river basins could be perceived to have more surpluses than what they actually have. If these perceived surpluses are impounded and transferred out of the basin, they could badly affect river flows downstream" (qtd. in Amarasinghe et al. 47).

3.3.5. Counter View against Dams

Iyer countered the concept of the River Linking as a 'national water grid' in the context of a power grid or network of highways. Elaborating it further, he wrote, "highways and power lines are human creations and can be manipulated by humans. Rivers are not human artefacts; they are natural phenomena, integral components of ecological systems, and inextricable parts of the cultural, social, economic, spiritual lives of the communities concerned. They are not pipelines to be cut, turned around, welded, and rejoined" (Iyer 55). Here, nature's role is predominant.

3.3.6. Way Forward

A detailed study considering aftereffects, strong and sensitive administration, a balanced approach between construction activities and project affected population by ensuring their involvement at the appropriate level, and political support is a must to execute such a big project. The river linking concept is an old system, conceptualised before independence, and now DPR for KBP has been prepared and approved by authorities. Various studies such as EIA and Socio-economic surveys are already done, and Forest, Environmental, R&R and Wildlife and other statutory clearances are under process. Regular public awareness campaigns are being carried out to accommodate feasible issues in the

project's execution plan. The central cabinet approved the project for execution in Budget 2022-2023 with an outlay of Rs. 1400 crore. Project cost pegged at Rs.44,605.00 crores at the 2020-21 price levels with 90:10 share, of which central share is Rs. 39317 crores. Rehabilitation and Resettlement (R&R) will be done according to the Policy Guidelines of the Government of India 2007. Notification for the constitution of a particular purpose vehicle for the implementation work has been issued. The project is expected to be completed in eight years.

4. CONCLUSION

4.1. Necessity

The Hirakund, Sardar Sarovar dams and Ken-Betwa River Linking Project are huge water structures that involve mass engagement of men, machines, materials, colossal funding, and displacement of project-affected people, change in ecology and environment, change in social structure and economic conditions. However, the survival of humanity depends on water, and these projects are necessary for increasing irrigated land, providing drinking water, generating electricity, controlling floods, and removing drought and navigation.

4.2. Execution Embargo

Development is inevitable, but how it is harnessed the natural resource establishes the role of elites as impoverishers of nature as well as human masses whose sustenance depends on natural resources. The challenge to development can be seen in the construction of Hirakund and Sardar Sarovar dams in the form of various movements by the people who are ecologically, economically, and culturally marginalised. Opposition to building new dams for poor resettlement and rehabilitation of displaced people became the focal point in the execution of the Narmada Project. Funding after an interim review by the World Bank was another embargo.

4.3. Harnessing of Water and Human Resources

After independence, India's water resources were harnessed by constructing dams and canals using vast chunks of agricultural and residential lands by changing the demography of villages, towns, and cities. It attacks nature by changing the path of water flow created by nature. Earlier, more stress was given to the construction of water structures, neglecting human values, which are now prioritised. The benefits of irrigation from big dams can only be drawn after the completion of water distribution networks like canals and pipelines, which takes a long time.

4.4. Impact of Compensation

Spiralling effect on the amount of compensation due to frequent changes in policies, and procedures to transfer the benefits, causes a delay in shifting. In the meantime, due to a sudden influx of compensation money, socio-economic disruption takes place in the form of an increase in family disputes, disintegration of families into nuclear families, unwillingness to share the problems of others, and deserting old and aged parents. Moreover, the elite reaps the more significant portion of benefits from the project by designing and executing projects according to their requirement. This leads to conflicts between the rich and the marginalised, creating delays in project execution, thereby increasing the cost by many folds.

4.5. Unequal Battle

The dwelling layout of every village speaks the different story of society, culture, and ambience; therefore, shifting to a new place creates adjustment problems. Moreover, elites envisaged the development by harnessing the earth's wealth and impoverishing nature and the Adivasi people, who depend on natural resources for sustenance, thus fighting an unequal battle against outside oppressors.

4.6. Catalyst of Agitations

In the essay, The Greater Common Good, Roy unfolds human tragedy that is brought to the individuals for sheer development. The essay describes some critical facts of the Narmada Valley Project, which are not only treated as a literary work, but also for the river valley projects planners, executors, government, and financiers to realign their school of thought towards the displaced people and environmental issues. The author's emotional outburst draws attention to how development asked millions to sacrifice themselves for the 'greater common good of the nation. Water is a precious resource for irrigation that increases agricultural growth. After that, a country's industrial production is trapped by dams to control and regulate the same to produce hydroelectricity, but why at the cost of poor people's shelter? A question that Roy wanted to be answered.

4.7. Flood Control and Effectiveness of Canal

Roy apprehended the irrigation potential of the dam and flood control capability by explaining that the reservoir must be kept empty to handle the surplus water during monsoon. In inadequate rainfall, the dam is left empty, which beats the purpose of irrigation. The effectiveness of canals emanating from the dam depends on the quantity of water filled at full so that water reaches the end. However, poor maintenance and regulation restrict water flow to the tail end, depriving many farmers of adequate water, whereas better-connected farmers get unlimited access to canal water.

4.8. Sanctity of Land Acquisition Acts:

Centralised watershed management is the answer to a reduction in interstate disputes and equitable distribution of water to every corner of India, regulating uneven water harvesting by many states as per their convenience, sometimes changing the priority of allocation to beneficiaries by the intervention of state legislatures. Moreover, multiple land acquisition acts are used by various governments with amendments from time to time, making it dynamic, which keeps the doubt that the act is modified to benefit some interest groups.

4.9. Ken-Betwa River Linking Project (KBL)

Issues linked with KBL are mostly the same as dams. The fundamental difference is that dams are supply-side water infrastructure, whereas river linking projects are demand-side infrastructures. The requirement for standalone dam building is now reduced, and inter-basin river linking activities will be implemented in a phased manner. An awareness program on KBL has been launched to remove the anomalies from the mind of possible land outsees. The success of this project depends on sharing benefits equally among all, for which the government's target-oriented actions with transparency in every aspect are required.

4.10. Land outsees are at Par with Others

Land acquisition for projects is responsible for frequent wipeouts of marginalised, land losing and livelihood losing communities, thus subsidising the development for the population that got the benefits more. Such a regressive redistribution system in the 2000s was adopted. However, with the rise of civil society organisations and political movements, land acquisition has become a hard negotiated activity—such change in negotiation power in the hands of land affected people catalysed by the Narmada Bachao Andolan. Information dissemination was the part of the SSP which inflamed the activists and created a cadre of workers against displacement to establish a new discourse on development.

4.11. The Intensity of Agitations

Agitations took place before, during and after the work execution of both the dam projects. However, the Hirakund project was weak and less mobilised than the Sardar Sarovar dam project. Agitation in Hirakund mainly was confined to the Sambalpur district of Orissa, whereas it was widespread in Sardar Sarovar, covering more districts in MP, Maharashtra, and Gujrat. Moreover, the Sardar Sarovar project was more voluminous and controversial than the Hirakund dam project, so the project was also abnormally delayed.

4.12. Interstate Disputes

Disputes are mostly confined to distributing the rightful share of water and power among affected states. Narmada Water Dispute Tribunal draws the guidelines and regulations for managing Narmada Valley Projects. In contrast, the Mahanadi River Dispute Tribunal is presently hearing the submission of the states to decide on the allocation of water and power between them. Water disputes will aggravate in the coming days. The 'Every Household with Tap Water connection' scheme has been launched under the centrally funded 'Jal Jeevan Mission'. The river linking projects also aim to distribute water equally to all regions, a futuristic action to subside the prospective disputes.

4.13. Suggestions

i. Challenges in the watershed management of India require a coordinated approach through a mandatory national law absorbing all local laws within its ambit and a digital eco-system to automatically acquire multidimensional data from the command area of dams and river linking projects. Furthermore, regulating water use through demand side management requires pricing of water used to inculcate consumption discipline and recovery of infrastructure costs for further investment.

ii. To monitor land acquisition activities, many government agencies are involved, and they work independently within the policy framework as per the responsibilities assigned to them. Such activities can be reduced through large-scale digitization of information gathering and exchange mechanisms of various water structures and affected people. Disputes can be resolved using digital ecology so developed in a much shorter time.

iii. Extensive use of Information Technology can help gather data related to social, economic, cultural, and practices around the year from all the regions to effectively implement prospective projects. Information acquired can be utilized to survey the actual land outsees, government services they are already receiving and best fit location where they can be resettled and rehabilitated during the finalization process of project design.

iv. Constitutionally, water resource management is a Central and State subject. Therefore political rivalry and clashes on visions and modalities of execution may delay the implementation of projects and create operational issues to transfer benefits to the end users of projects. Therefore, water should be treated as scarce resources at par with coal and natural oil. Therefore, the central government should ensure equitable water distribution throughout India by regulating supply and demand under a central law like coal and natural oil with legal and constitutional power.

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