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Damming the Rivers Of North Bengal: A Socio-Legal Approach towards Sustainable Use of the River Biodiversity

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Abstract

North Bengal due to various perennial rivers is an ideal for hydro-power project plants. Dam building in India dates all the way back to the pre-Harappan era. India now has over 5100 major dams, according to the latest estimates from the Central Water Commission. Due to various developmental purposes the rivers of North Bengal in particular lost their natural flow. RoR hydropower plants are 'socially and environmentally benign,' and a useful mechanism to meet water demand. Reforming technocratic water and energy organizations is a very difficult task. To solve these concerns in the near term a stronger organizational framework for environmental and social governance is required and the guidelines need to be framed. Additionally, there is no legislative or administrative structure in place to ensure that evaluation, planning, judgement, economic evaluation, or environmental impact evaluations for the assessment the impact of dams on rivers. Proper planning and implementation are the need of the hour.

Keywords: *Dams, perennial rivers, Hydro-power, ecology, action plans*

I. INTRODUCTION

River dams are probably the most visible aspect of contemporary river administration. When the World Commission on Dams conducted a study of the world, it discovered more than 45,000 major dams. While the majority of beavers or certain people have dammed rivers for as far as either species has lived, the extent and size of dam construction in the 21st century were unparalleled. Additionally, manmade operations throughout the river length disrupt the river's dynamic balance and hasten bank erosion. Anthropogenic activities like

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deforestation, gravel mining, dam and bridge building, artificial channelization, bank restoration program, and land-use changes impact the shape and natural dynamics of river biodiversity. Dam development has moved mostly from industrialized to developing nations, with countries like China and India undertaking large-scale dam development projects, involving inter-basin exchanges. While developing nations' water and energy needs are genuine and must be met, the danger to environments is severe, and rare species & places are in peril. Migratory fish, river dolphins, and water birds are especially susceptible, as are individuals who rely on these environments for their livelihood, such as fisheries. Those most impacted by dams seldom gain immediately and often remain without reliable electricity or safe drinking water. Meanwhile, a significant portion of the water stored in dams is squandered, particularly via poor agricultural irrigation facilities. The first dam is thought to have been erected across the Nile about 2900 BC to provide water at Memphic, King Menes' city. Dam building in India dates all the way back to the pre-Harappan era. The first dam on the Indian subcontinent is thought to have been constructed of stone rubbles by Zoroastrians in Baluchistan.[3] In Kutch, dams constructed of stone rubbles known as Gabarbands may be observed, as well as brick bunds in Karachi have been discovered. These dams are reported to be very hard to date. However, archaeologists dated the dating to the pre-Harappan era based on pottery discovered in that location.[4]

The northern part of West Bengal, which is popularly known as North Bengal, is the land of various perennial rivers and as the rivers are flowing in sloppy and hilly areas these rivers is current bearing too. So they are ideal for hydro-power project plants. In this context, we can state categorically that dams are the greatest single hindrance to guaranteeing uninterrupted freshwater flows in rivers. The majority of India's large, medium, and small rivers have been dammed at various points, altering water flows downstream by certain reservoirs, notably during the non-monsoon periods, as well as the nature of monsoon floods. India has less than 350 reservoirs when it gained independence in 1947. Today, India has approximately 5100 major dams, according to the latest estimates from the Central Water Commission. Now the problem with the construction of dams and bridges on the river is that it causes hindrance in guaranteeing uninterrupted

[3] The Dying Wisdom, p.21.
[4] *Ibid*. 22.

freshwater flowing in rivers. India had fewer than 350 dams when it gained independence in 1947. India now has over 5100 major dams, according to the latest estimates from the Central Water Commission. Due to various developmental purposes the rivers of North Bengal in particular lost their natural flow, some rivers like Teesta started to change its natural direction. Even the soil, river bed and bank erosion has now become a regular phenomenon.[5] It is very unfortunate to mention here that the existence of some major rivers of North Bengal namely, Mahananda, Balason, Karala etc. are now at stake.

II. RUN-OF-THE-RIVER (ROR) HYDRO

The Bureau of Indian Standards IS: 4410 defines a run-of-river generating plant as "a generation source that produces electricity from run-of-river flows and has sufficient postage to meet every day or week demand fluctuations." The river's usual path is not appreciably disturbed At such locations where the run-of-river generating plant is situated. Notably in this context IS: 4410 states the following about a reservoir dam: 'This reservoir confiscates water throughout periods of plentiful availability for usage throughout periods of shortage. It absolutely not at all affect the individual activities, the policy sector has promoted the impression that all RoR hydropower plants are 'socially and environmentally benign,' and hence create win-win scenarios. These intervals may be lengthy seasonal, yearly, or longer in duration. The bulk of huge hydroelectric dams that are referred to as 'run-of-river' are being developed in the Himalayan region, the diverting river flows via extensive tunnels before they are returned to the river downstream of a power plant. These projects are marketed as 'environmentally benign' due to the fact that they entail less submergence and less water management than traditional storage dams. This vision conveniently ignores the effect of various design aspects. For example, between the dams and also the power plant, large sections of the riverbank will be diverted, with up to 85–90 percent of the stream flow rerouted through the tunnel in the wintertime (lean season). The 18.5-kilometer-long head racing tunnel connecting the dam to the powerhouse in Sikkim's 510-MW 'Teesta V project' skips a 23-kilometer stretch of river. Not only would this have a detrimental effect on the riverine ecosystem, but a cascading of

[5] "Wetland Conservation and Management Rules 2010", South Asia Network on Dams, Rivers and People, vol. 8, issue 11-12

developments will result in a devastating effect to the majority of the river running via tunnels. These projects require substantial digging in geological formations in vulnerable area, with severely underestimated environmental and socioeconomic consequences. For example, Houses built over lengthy tunnel alignments have developed fractures, water supplies have dried up, and severe landslides have occurred frequently. Additionally, digging creates a large number of muck & stone debris, whose disposal is a significant difficulty. The unregulated dump of these vast volumes of excavation muck in high Himalayan slopes with limited accessible flat ground has also resulted in disposal in rivers which ultimately affecting the entire river biodiversity. This is a truth that has been confirmed by India's Comptroller and Auditor General (CAG) in a 2009 report on Sikkim.[6]

Certain sectors are waging a deceptive campaign, claiming that RoR schemes being constructed in places including Arunachal Pradesh do not even entail the building of reservoirs! It is necessary to emphasize here that the projects usually include big dams, just like defined by the Ministry of Water Resources of India, the International Council on Large Dams (ICOLD), and also the World Council on Dams. Whatever the nature of the project, dams divide rivers by cutting biological ties downstream or upstream, among the river as well as its floodplain resulting in degradation of river biodiversity. Although there is cooperation between Environment Impact Assessment Committee (EIAC) and Ministry of Environment and Forest (MoEF) but there is also constant debate is going on regarding the disclosure of 'ecological flows' (e-Flows)[7] while reviewing projects. It would be incorrect to see this as a panacea for making all projects 'benign'.[8] E-flows have the ability to environmental protection strategy in otherwise environmentally and socially acceptable initiatives, although they are the contentious notion that requires more extensive discussion in the specific setting. As a result, generally labeling RoR initiatives as socially and ecologically

[6] Apr. 02, 2020, http://www.cag.gov.in/html/cag_reports/sikkim/rep_2009/civil_chap1.pdf.

[7] Environmental flows describe the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems. (Mar. 03, 2020),https://en.wikipedia.org/wiki/Environmental_flow#:~:text=Environmental%20flows%20describe%20the%20quantity,and%20spiritual%20needs%20assumes%20significance.

[8] Mar. 04, 2020, iucn.org.

beneficial' is patently false. Regardless of the mode of operation or the kind of storage, the single and aggregate consequences of hydropower plants in every river basin must be thoroughly analyzed and understood prior to giving approvals.

III. IMPACT OF DAMS ON THE RIVER BIODIVERSITY OF NORTH BENGAL

North Bengal boasts the most magnificent river system in the whole nation. It is well-drained by a variety of rivers and tributaries of varying sizes. Apart from its river, the terrain is densely forested with ponds and bogs. The majority of rivers start in the Northern Himalayas and are fed by snow. As a result, they do not dry out throughout the winter. During rainy periods, they are absorbed and nearly always result in flooding. Siltation has an effect on the riverbeds. The Teesta in North Bengal's biggest and most significant river. As is the case with many of Northern India's other big rivers, the Teesta originates on the other edge of the Himalayas and breaks through the mountainous boundaries. Along with its tributaries such as the Rangpo, the Rilli, and the Rangit, the Teesta enters Jalpaiguri from Darjeeling and travels southeasterly till it reaches Bangladesh's Rangpur region. This river often alters its path, resulting in flooding. Between 1787 and 1968, this river caused devastating floods. Its flow is really swift. As a result of its devastation, it is dubbed the 'River of Sorrow in North Bengal'. The Torsa River (also spelled Torsha and referred to as Kambu Maqu, Machu, and Amo Chhu) originates in Tibet's Chumbi Valley, where it is called as Machu. It enters Bhutan as the Amo Chu. It is 358 km (222 miles) long in total, with 113 km (70 miles) in China and 145 km (90 miles) in Bhutan, before running into India's northern state of West Bengal. Torsa joins with Kaljani and it then flows into Bangladesh by the name of Kaljani and meets with the Jamuna there. Amo chu Hydro Power Plant, developed by NTPC Ltd, is one of the biggest hydroelectric projects in the country.

Besides the Teesta and Torsa, the Balason, the Mahananda, the Jaldhaka, the Torsa, the Kaljani, the Raidak, the Ku1ik, the Atrai, the Tangan, and the Kalindri are the other major rivers that pass across the research area. These rivers arise in the Darjeeling Himalayan area or in the Bhutan hills next to it. The majority of these rivers eventually flowed into Bangladesh and subsequently into the Bay of Bengal. The Teesta River divides the country into 2 sections: the Terai in the west and the Dooars in the east. Terai is a Persian term that means a moist and humid

environment. The term applies to the linear patch of land, 15 to 20 miles in diameter that runs the length of the Himalayan foothills from west to east. It relates to the region immediately under the Darjeeling Mountains as well as the boundary foothills between Bhutan and India. The Terai area is a highly uneven strip, sparsely covered and pierced by an infinite number of tributaries from the hills, which combine and split on the flat, until they emerge from a forest zone and penetrate the plain, pursuing convoluted routes that gleam such silver thread. Similarly, the term 'Dooars' relates to the mountain's doors. From north to south, a rough part resembles a massive stairway descending a series of steps from the towering Himalaya to the southern North Bengal plains. Rainfall has been plentiful across the Himalayan foothill districts of Darjeeling, Jalpaiguri, and southern neighbour Coochbehar.[9] When the monsoons arrive, the ground is flooded with periodic streamlets that ultimately flow towards river systems, leading them to overflow and sometimes flood. During the pre-monsoon and post-monsoon seasons, some of the cyclonic storms and bouts of depression from the Bay of Bengal often reach the plains, breaking the climatic monotony. India now has over 5100 major dams, according to the latest estimates from the Central Water Commission.[10] Dam development has increased rapidly in previous years. As As previously noted, rivers provide minimal value in terms of design, judgement, building, operation, and other dam-related operations. The cumulative effect of several dams is not equal to the total of the impacts of individual dams; in fact, it may exceed the amount in the event of numerous impacts. However, no reliable cumulative effect assessment for any basin has been conducted. Cumulative impact evaluation is also important in terms of determining a basin's carrying capacity and guaranteeing that cumulative effects do not exceed that capacity. The first situation in which a study of basin maximum load was undertaken was in the case of the Teesta basin. This occurred as a result of a stipulation contained in the Teesta V project's 1995 environmental approval letter. The report left much to be desired, but even its recommendations have not been implemented, and the MoEF itself has violated them.

[9] Dr. B. Banerjee, *Morphological Regions of West Bengal*, GEOG. REVIEW OF INDIA, Vol. 26

[10] "Wetland Conservation and Management Rules 2010", South Asia Network on Dams, Rivers and People, vol. 8, Issue 11-12.

The passions for dam construction in India started with Pandit Nehru's description of massive reservoirs have been called the 'temples of contemporary India.' He subsequently regretted that our country was afflicted by the 'sickness of gigantism.' Regrettably, contemporary planners have mostly forgotten this. Nehru argued for a plethora of smaller projects during the Central Board of Irrigation and Power's 29th annual meeting (held on November 17, 1958), nonetheless, his followers remained focused on colossal undertakings. This collection comprises the Teesta Barrage Project TBP in the Jalpaiguri district, as well as the National Hydroelectric Corporation's NHPC's level III and IV hydropower projects in West Bengal's Darjeeling district. Snow-capped summits of the Himalayas People from all around the world go to the sheer cliffs, rapid rivers, and green hillsides. The trek towards northern Sikkim will wow visitors with the splendor of the Teesta's dancing and roaring as it winds through verdant slopes. However, if the 8 projected Teesta hydroelectric dams, six from Sikkim & 2 from West Bengal, are completed, the dancing river would vanish. Further downstream, in the Jalpaiguri area, a formidable barrage already exists at Gajoldoba. Siltation which has been a significant issue in all of the hydro projects constructed to date also affects the river biodiversity. The reservoir was emptied through evaporation through dams & seepage of water via channels supply of water to the control area's marginal land that had been guaranteed throughout the project's planning phases. By dumping more water at the monsoon's peak, dams constructed to reduce floods have worsened floods. As per the Central Water Commission's CWC Guidelines for such Sustainable Development & Management of Water Resources, the minimum flow of a Rivers should have a minimum flow of 10 days in their natural state.[11] While the majority of beavers and some humans have dammed rivers for as long as either species has existed, the extent and size of dam construction in the twenty-first century were unparalleled. Notably, West Bengal is blessed with 7.5% of the country's water resources. The primary source of water in West Bengal is rainfall, which averages roughly 1762mm per year. 76 percent of this total is obtained during the monsoon season, while the remainder is received during the non-monsoon season. 21% of precipitation infiltrates the soils and regenerates the groundwater, whereas 49% returns to the environment through evapotranspiration. The net yearly water resource provided by rainfall in West

[11] Report of the working group report on minimum flows set up by the WQAA, Vol. 1, Ministry of Water Resources, Govt of India

Bengal is 51.02 billion cubic meters (WBPCB, 2009). North Bengal has around 60% of the available water resources, whereas South Bengal has 40%. Groundwater resources including natural discharge, are 34.20 billion cubic meters, with 31% in north Bengal and 69% in south Bengal. The state gets 598.56 billion cubic meters of transboundary water from its neighbors. The Ganga transports 525 billion cubic meters of water from its vast watershed, which covers 26% of India's land area. North Bengal receives 60% of the government's water resources, which remained 'underutilized' until the Jalpaiguri region built a barrage over the Teesta. The Teesta barrage project intends to unite a number of rivers in north Bengal. Not just in North Bengal, but also in West Bengal, the Teesta Barrage Project TBP is a significant irrigation project in eastern India, upon completion, the project is expected to irrigate 922 000 hectares in six districts of north Bengal and generate 67 50 megawatts of hydropower 36. Through a network of barrages & canals along the river, the three-tiered plan will utilize Teesta River flows for "irrigated farming hydropower generation navigation, and flood control." While work on the project started in 1976, only a few segments have been finished, notably the building of the Teesta Barrage at Galzaldoba in West Bengal's Jalpaiguri district and barrages on the Mahananda and Dauk rivers.[12] Along with the grandiose TBP, NHPC Limited is creating two "low dams" in West Bengal's Darjeeling district, namely Teesta Low Dam III (132 megawatts) and Teesta Low Dam IV (132 MW of power) (160 megawatts).[13] While the proponents of the project and the government create a bright image, there are several unanswered uncertainties concerning the project and its possible repercussions.[14] How will these initiatives improve the local population's level of living? Is the tectonically precarious terrain capable of supporting such large buildings and the reservoir they generate? What impact will this have on the region's abundant biodiversity? Is it possible to ensure the lives of all downstream and upstream areas' populations? These, as well as several others legitimate concerns about the project's social validity, environmental balance, and financial viability remain unresolved. According to some experts, huge dams and dams can

[12] *Tehelka*. 2011. "Barrage Locked in Land Dilemma". Sept. 9. (Mar. 08, 2020), http://www.telegraphindia.com/1110909/jsp/siliguri/story_14483682.jsp.
[13] (Mar. 08, 2020), NHPC Limited, http://www.nhpcindia.com/index.htm.
[14] Irrigation and Waterways Department (1996), A Note on the Teesta Barrage Project (Unpublished).

contribute to earthquakes[15]. The conflicts surrounding the Koina dam, the Tehri dam, and, more recently, the Teesta dams near Mangan, Sikkim are just a few instances. In light of the recent spate of earthquakes, the existence of a vast number of recharged dams would be devastating in the event of such an occurrence. Connecting a toxic river to a non-toxic river will have a terrible effect on all of our rivers and, subsequently, on all humans and wildlife including biodiversity. In this light, we might cite Mr. W.A. Inglis' opinion from 1909 about the Teesta Barriage Project in North Bengal "We build dams to collect water and divert water from streams to irrigate land without respect for nature's apparent design. We safeguard riverbanks from environmental erosion and dredge gravel and mud from areas where nature intended them to stay. Naturally, there are boundaries inside which we must constrain our effort, and achievement is contingent upon a proper appreciation of these boundaries and a sound sense of balance."[16]

IV. CONCLUSION

In fact, India has no rule requiring perennial rivers to have year-round freshwater flow when a dam, divert, or hydroelectric project is developed. The bulk of India's big, medium, and minor rivers have been impounded at different locations, modifying downstream water flows, particularly during non-monsoon periods, and influencing the character of monsoon flooding. As previously stated, the services offered by rivers have little significance in the design, judgment, development, operation, and other activities associated with dam construction. While approving run-of-river hydropower stations, the MoEF has begun to require that rivers always maintain a certain minimum flow. For example, the NHPC's 510 MW Teesta V hydropower plant on Sikkim's Teesta River was required to preserve a constant discharge of one cubic meter per second. When MoEF was questioned about who is assuring this flow through an RTI application, the response was amusing: "A continuous inspection is conducted by the undertaking itself." Thus, the institution that establishes the standard for freshwater flow seems to lack the ability, will, and purpose to guarantee that its

[15] (Mar. 04, 2020), http://www.geoecomar.ro/website/publicatii/Nr.19-2013/12_mehta_web_2013.pdf.

[16] Inglis, W.A.; “Some Problems Set Us by the Rivers of Bengal”, Journal of the Asiatic Society of Bengal (Nov. 1909), Vol. V No.10 pp.398.

specifications are followed. The regulator relies on the builder to guarantee compliance with the requirements. The north-eastern region has been identified as India's 'future powerhouse,' including at least 168 large hydropower facilities totaling 63,328 megawatts (MW) planned for the region (Central Electricity Authority 2001) Long-term, technological organizations in the water and power sectors (for instance, the Central Water Commission and the Central Electricity Board) require a complete overhaul to represent competence outside technical and technocratic thinking. Ecological and social characteristics of water (together with the regulatory structure of the surrounding environment) are both subordinate to and downstream of techno-economic considerations in the present judgment pyramid. However, reforming technocratic water and energy organizations will very certainly be a lengthy and tough task.[17] To solve these concerns in the near term a stronger organizational framework for environmental and social governance is required and the guidelines need to be framed.

The ministry has recommended the establishment of a multifunctional Northeast Water Resources Authority (NEWRA), nonetheless, the topic deserves more discussion in the area. Critics believe it will turn into another bureaucratic entity focused on promoting mega water public works initiatives rather than guaranteeing socially and environmentally sustainable river basin planning. However, there is no clause in the Environment Protection Act 1986 or any other environment-related legislation that governs or limits the building of dams, canals, barrages, or bridges on the river. Unfortunately, the government perceives rivers like a commodity to be utilized for various water supplies, instead of as a commodity endowed with intrinsic financial, social, ecological, and cultural qualities. Thus, when authorities start deciding to construct a reservoir to store water, an organization to move water, or a hydropower project having a vast capacity for storage or which distracts the stream through long-distance subterranean tunnels, they are blind to the fact that these projects are truly destroying an established precious asset. In India, there is no law requiring such initiatives to guarantee that streams flow perennially with freshwater.[18]

[17] Dr. Rudra Kalyan, *The Ecologist Asia*; Vol 11, No 1, Jan-Mar 2003.
[18] NIRAJ VAGHOLIKAR AND P.J. DAS (2010), DAMMING NORTHEAST INDIA, (Oxford University Press).

Additionally, there is no legislative or administrative structure in place to ensure that evaluation, planning, judgement, economic evaluation, or environmental impact evaluations take into consideration the price of damaging existing river supplies and the services provided by those resources. This indicates that the river like a resource has no value in the official process. Himachal Pradesh is the only Indian state with a well existing protocol on this subject. In September 2005, the government of Himachal Pradesh issued a letter mandating all hydropower plants to comply with the notification (existing, under development, and proposed) to discharge at least 15% of the river's minimum experience as a result at all periods. This was far from sufficient since rivers must be preserved for their environmental and social flows, but it was unquestionably a start in the right way. Finally, it cannot be overstated that 'pollution' takes up a substantial percentage of our river ecology related discussions.[19] Numerous preventative strategies have been suggested to address the problem, however aside from pollution, in the contemporary period, numerous other human developing operations such as dam building, bridge construction for power production, and so on, contribute to ecological and environmental deterioration. The river, which is a significant supply of fresh natural water, is deteriorating gradually on a daily basis and some rivers are also on the verge of extinction.

However, The Ganga Flood Control Commission was set up in 1972 through a Government of India resolution for planning, phasing, monitoring, performance evaluation etc of flood management in the Ganga basin. Similarly the Ganga Action Plan, the Yamuna Action Plan and river action plans for a number of rivers have been taken up by the Union government under the National River Conservation Plan of Ministry of Environment and Forests. In State level as well constitution of such Basin authority on Teesta, Mahananda and other major rivers is the need of the hour. Earlier Mahananda Action Plan was initiated by the State Government but it’s working now stopped mainly due to financial reasons. Formation of voluntary corporate bodies with public- private partnership or Community conservation strategies are some of the effective steps taken by the Government at local as well as institutional level but without proper and continuous monitoring such projects are not so effective in protection of river ecology. In the lack of legal or institutional structures to limit the state's powers

[19] *Report of the working group report on minimum flows set up by the WQAA*, Vol. 1, MINISTRY OF WATER RESOURCES, GOVT OF INDIA

in either situation, the state has acted somewhat arbitrarily, with rivers being one of the numerous fatalities. If we failed to conserve our rivers today, all evidence of life may inevitably vanish from the world in the near future.