Baglihar Hydropower Project in Chenab Valley J&K is a Bone or Bane: A Case Study

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ABSTRACT

Dams have been promoted as an important means of meeting water and energy needs, and as a long-term, strategic investment with the ability to deliver multiple benefits, some of which are typical of all large infrastructure projects, while others are unique to dams and specific to particular projects. Regional development, job creation and fostering an industrial base with export capability are often cited as additional considerations when building large dams. Construction on the 900-Mega Watt Baghliar project near the Chanderkote area of Ramban district was started in 1999. The first phase of 450 MW was commissioned in October 2008. If the dam were to burst, several major towns downstream of the dam with a total population of over approximately 20000 people could be wiped out. Landslides are common on the steep slopes above the Baglihar Dam. A massive landslide into the reservoir could cause a huge wave, which could overtop the dam and cause massive damage downstream. It would bury the Chandeekoot, Ramban, Ramsoo within hours and devastating large areas of the Agricultural land. The Baglihar Hydroelectric Power Project in the Chenab valley region is turning into a potential threat for the people of the area as the stagnant water in the dam is leading to sinking of land at various places.

Key Words: ***Dams, Energy Needs, Chenab Valley, Lanslides, Baglihar Dam etc.***

INTRODUCTION

Indus river water system has been used for irrigation purposes in Indus Basin since the beginning of the civilization. In old days availability of river water was more than the requirements, principally because the population was small and demands were less as compared to the availability of water in the rivers. When the demand grew, substantially disputes started between various water users. Since middle of the 19th century, disputes were mostly between upper and lower riparian. During British India, Sindh which became a separate province, was a lower riparian, objected to Punjab, an upper riparian water projects.

Sindh feared that the use of water by Punjab would establish Punjab's water rights over Indus river water and may encroach upon Sindh's share of water. At those times these disputes were of domestic nature as they were between provinces of the same country, the British India. However, the nature of these disputes changed after the creation of Pakistan.

The Hydro Electric Power potential of the J&K State is about 25,000 MW, but only 3132.87 MW have been harnessed so far. The demand of power in state Jammu & Kashmir's (J&K) is mostly met by the Central Generating Stations (CGS) and the State's own sources. The State Jammu and Kashmir has own installed generation capacity is 1,419.37 MW comprising of 1,110 MW of Hydroelectric Power Stations, 198 MW thermal (Gas turbine) and 110.96 MW of SHPs. The State owned plants contribute only 45 % of the total energy requirement and contribution from CGS is 53% of the power supply and remaining 2.0 % is sourced from private sector.

The Baglihar hydropower dam is located on the Chenab River in Doda district about 110 kilometers eastward of the Pakistan border in the Jammu division of the Indian state of Jammu and Kashmir. Currently, construction is said to be somewhere between one-third and one-half complete. The dam, when finished, will rise to 144.5 meters and have an installed capacity of 450 MW (900 MW when a second phase power station is built). The Baglihar is one of eleven reported major hydroelectric projects that India has identified in Jammu and Kashmir, nine of them on the Chenab. Along with two others, the Wullar dam (officially labeled by Indians the Tulbul navigation project) and Kishenganga hydropower project, the Baglihar dam project is presently the focus of intense diplomacy between India and Pakistan.

S. No.	Year	Peak Load (MWs)	Energy in Mus
1	1998-99	1459	7133
2	1999-00	1608	7886
3	2001-02	1768	8703
4	2004-05	2539	12678
5	2009-10	2650	16214
6	2015-16	2732	19470
7	2017-18	2899	18809
8	2018-19	2980	19420

The PEAK LOAD (MWs) and ENERGY (Mus) demand projections in respective years.

Environmental Impacts and Dam Construction

The environmental impacts of dams can generally fit within two categories: those due to the existence of the dam and reservoir; and those due to the pattern of dam operation.

Impacts Due to Existence of Dam and Reservoir

1. Imposition of a reservoir in place of a river valley (loss of habitat).

2. Changes in downstream morphology of riverbed, delta and coastline due to altered sediment load (increased erosion).

3. Changes in downstream water quality: Effects on river temperature, nutrient load, turbidity, dissolved gases, concentration of heavy metals and minerals.

4. Reduction of biodiversity due to blocking of movement of organisms.

OBJECTIVES OF THE STUDY

1. To identify the potential environmental impacts by Baglihar Dam in Chinab Valley.
2. To provide the suggestion and mitigations for reducing the negative environmental impacts caused by Baglihar Dam in Chinab Valley.

REVIEW OF LITERATURE

A literature review has the aim of reviewing the current state of knowledge on various aspects of dam research and this study attempts to fill a gap in this research. Massive or large dams are much more than simple machines to generate electricity and store water. They are concrete, rock and earth expressions of the dominant ideology of the technological age and act as icons of economic development and scientific progress.

Forced population displacement as a result of dam construction to be the most serious social consequence of water resource development. Development induced displacement causes more refugees globally than wars and natural disasters. Human dislocation, impoverishment and community rehabilitation are perhaps the gravest concerns surrounding dams in developing countries.

The movement against the construction of the Hirakud Dam in Orissa. It is evident that the anti-Hirakud Dam movement was unsuccessful due to the lack of involvement of Non-Governmental Organizations (NGO), allied transnational advocacy networks, legitimized global norms on human rights, indigenous communities, and environmental lobbies.

The construction of the Ithai Dam has brought a reverse picture in economic status of Manipur from a self-sufficient to borrowers position with a large number of agricultural land submerged under water. It is estimated that about 83,450 hectares of agricultural lands of both sides of Ithai Dam have been affected. Out of this total area, about 20,000 hectares were used for double cropping purposes.

Several indigenous fishes have disappeared from Loktak Lake such as the Ngaton, Khabak, Pengba, Tharaak, Ngaaraa, Ngaatin, etc due to Ithai Dam. It has been observed that these

fishes migrated from the Chindwin-Irrawady river system of Burma to the course of Imphal/Manipur River for breeding in the adjoining lakes and streams of Manipur valley.

Large dams are the single largest cause of displacement in India since India got independence in 1947. The World Bank notes that though large dams constitute only 26.6% of the total WB funded projects causing displacement, the resulting displacement makes up 62.8% of the total number of people displaced. It is also apparent that project authorities do not consider the problems of displacement and rehabilitation as important parts of the project. The primary concerns are engineering specifications and electricity and irrigation benefits. In this event, concerned authorities seldom undertake detailed and systematic surveys of the population to be displaced. Information on the extent of displacement is therefore hard to obtain.

According to the American state Observer, worries are that water may overflow from a number of the dam's spillways, and not be controlled. If a dam is removed, rivers and alternative waterways would possibly attempt to reclaim its recent channel, which means that expensive river training structures, like bank protection, needs to be implemented in order to keep the river on the desired course. This is usually difficult to try and do and depends on the accuracy of hydraulic modelling studies and alternatively advanced analytics.

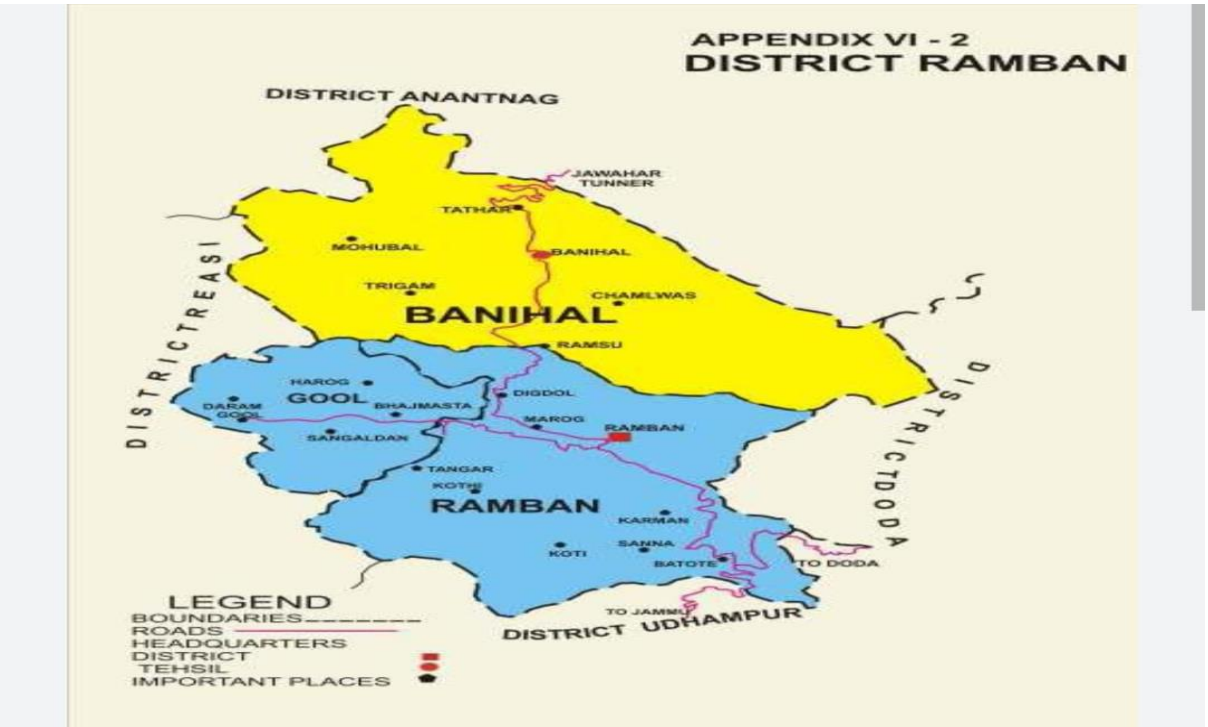
It is reported that over the past 60 years the construction of some 4,300 large dams in India has displaced over 40 million people. India is now facing a severe shortage of water for agriculture, industrial and domestic use and this is largely brought about due to a lack of storage and poor water management. Recent trends in reduced reservoir capacity appear to have come as a result of environmental and social objection to projects and the need to limit resettlement.

MATERIAL AND METHODS

SITE DESCRIPTION

Ramban used to be a part of the erstwhile district Doda and has a distinction of being the the 2nd largest district of the state. Ramban district is 1,156 metres above sea level. The boundary lines of Ramban district encompass hill station Patnitop as its southernmost point, Assar on its eastern edge, Gool to the west, and Banihal to the north.Terrain of district Ramban is tough and hilly. District Ramban shares its boundary with Reasi, Udhampur, Doda, Anantnag and Kulgam.About 95 km of National Highway (NH 1A) connecting Jammu and Srinagar run through district Ramban.11.215 km Pirpanchal railways tunnel (longest in India) provides rail connectivity between Banihal, District Ramban and Kashmir valley. Location and size Ramban district has an average elevation of 1,156 metres (3792 feet). The

boundary lines of Ramban district have come to be drawn from Patnitop on its south, Assar on its east, Gool on its west and Banihal on its north. River 'Chenab' also known as 'Chanderbhaga' river passes through the district. National Highway-1A (now 44) that connects Jammu Srinagar withpasses through the district. Ramban is located at 330.14’ N and 750.17’E longitudes with an altitude of 1000M from MSL. The district is all mountainous with very difficult rough and terrain. It shares borders with Patnitop on South, Assar on East, Gool on west and Banihal on north. The incidence of soil erosion is very high and road blockade is frequent during the rainy season on the National Highway at different places; namely; Batote ,Banihal, Ramban and Ramsoo.



Map of District Ramban

Figure and Map of Baglihar Dam

Material and methods used for study

For the purpose of study the following methods were employed:

1. Site visit to see the physical features of Baglihar Dam.
2. Questionnaire methods in Education Intuitions to get feedback about the Baglihar Dam.
3. Survey methods to see the impact of Baglihar Dam on people and adjacent agricultural land.
4. The information regarding the project parameters is sourced through secondary information sources such as electric utilities, project proponent, government planning reports and publications.

RESULTS AND FINDINGS

During my initial study I found that the following environment impacts could be happen in near future if the dam burst.

1. The dam wall itself blocks fish migrations, which in some cases and with some species completely separate spawning habitats from rearing habitats. The dam also traps sediments, which are critical for maintaining physical processes and habitats downstream of the dam.

2. Another significant and obvious impact is the transformation upstream of the dam from a free-flowing river ecosystem to an artificial slack-water reservoir habitat.

Changes in temperature, chemical composition, dissolved oxygen levels and the physical properties of a reservoir are often not suitable to the aquatic plants and animals that evolved with a given river system.

3. The alteration of a river's flow and sediment transport downstream of a dam often causes the greatest sustained environmental impacts. Life in and around a river evolves and is conditioned on the timing and quantities of river flow. Disrupted and altered water flows can be as severe as completely de-watering river reaches and the life they contain.
4. Rivers possess a delicate ecology that depends on a regular cycle of disturbance within certain tolerances. The plant and animal communities that inhabit the river and river margins have evolved to adapt to their river's own peculiar pattern of flood and drought, slow and fast current. Dams disrupt this ecology.
5. If the dam is allowed to release water from its reservoir, it will often do so only once in a while, rather than in frequent, small floods as are seen in nature. This leads to scouring and armouring of the riverbed.
6. The construction of a dam itself can contribute to the degradation of its catchment. For example, extraction of cooking fuel by the labour force and improved access to the forests, both during and after dam construction, degrades catchment forests. The construction of roads and other infrastructure and the enhanced activities in the area also put an additional pressure on the forests. This results in greater silt flows into the reservoir, thereby reducing the life of the dam.
7. The reservoir and the dam also affect other ecosystems and various fauna and flora species. Unfortunately, till recently, there was little effort to assess the impact on flora and fauna and on non-forest ecosystems. Even where studies were conducted, there was a tendency to consider only large mammals as wildlife.
8. Since the project was commissioned, climatic conditions in the area have changed.

DISCUSSION

The Baglihar Hydroelectric Power Project in the Chenab valley region is turning into a potential threat for the people of the area as the stagnant water in the dam is leading to sinking of land at various places. The water in the dam has entered the loose soil and experts fear of a huge disaster in the near future. Experts believe that the effects were visible as most of the areas with loose soil in the region were sinking. Few places are on the verge of submerging. Recent torrential rain increased the threat with landslides on both the sides of the

Chenab becoming a routine affair and many areas have been declared unsafe for living. The root cause of the problem is believed to be the 15-km Baglihar dam, which is threatening the existence of the area. People in the area are also of the same opinion. People said that they should have protested the project at the beginning. But we were not aware of its demerits at that point of time. If the project is not stopped it could lead to huge disaster.

CONCLUSION

Baglihar is a 900MW hydro power project. It is located on Chenab river basin in Jammu and Kashmir, India. The project is currently active. It has been developed in multiple phases. The project construction commenced in 1999 and subsequently entered into commercial operation in 2008. It consists of a gravity concrete dam 143 m high and 363 m long, which has total volume of 1.9 million m^3, creating a reservoir with a capacity of 475 million m^3. the villages and the catchment area around the dam is in the verge of danger due to massive reservoir and storage of water could cause the harm for the environment, wildlife and aquatic creatures in the river. Their negative effects are much more than their positive effects. Develop procedures for public evacuation that include evacuation routes and emergency shelter locations that meet the needs of the community. Encourage dam owners and operators to communicate with residents and businesses whose properties could be impacted by a dam safety incident. So the Baglihar is bane not bone in terms of environment, people, property and river ecosystem.

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