

Problems and Prospects of Dams in Manipur

L Sherjit Singh^{1*}, Kh Mohon Singh² and Ibameaihun Dhar¹

¹Department of Environmental Studies, NEHU Shillong, India

²Department of Geology, Imphal College, Imphal, Manipur, India

Corresponding Author: L Sherjit Singh¹

Abstract: *The main purposes for constructing dams are to supply water (for drinking and irrigation) and to generate hydroelectricity. But severe environmental and socio-economic effects have been realized during and after construction of dams and reservoirs. The water from the reservoirs submerges many agricultural land and habitats that dramatically change in land use pattern of the surrounding areas besides ecodegradation. Some major projects such as the Loktak hydroelectric project have impacted badly the wetland ecosystem of the Loktak Lake and surrounding areas. It threatens the habitats of many flora and fauna including endangered Sangai (Cervus eldi eldi) and the livelihood of surrounding people. Hence, in this paper, we attempt to find out the positive and negative effects induced by the dams constructed at different parts of Manipur to the environment and socio-economic life of the people.*

Keywords: *Tipaimukh Dam, Khuga Dam, Ithai Barrage, Khoupum Dam, Maphou Dam, Singda Dam, Dolaitabi Barrage*

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I. Introduction

Dams are the major hydroengineering structures constructed to store river water for different purposes. Dams are made primarily to supply water, to produce hydroelectricity and for flood control. Besides these, it also attracts tourist and encourages other recreational activities like boating and fishing. In many cases, Environmental Impact Assessment (EIA) is not done properly before and after construction of dams. Instead of controlling flood, it induces floods and draughts. It submerges agricultural land and habitat areas. It also causes many problems in sharing of river water (e.g. Tipaimukh Dam between India and Bangladesh). It also causes change in the livelihood of the people. In many cases in Manipur, relocated people start cutting of forest for Jhum cultivation and timber harvesting to earn their livelihoods. A large dam can cause loss of entire ecosystem including endangered and rare species in the region and the replacement of the original environment by a new lake (reservoir). Large reservoirs formed behind dams may induce seismic activity due to increase in water load.

II. Methodology

The maps (for reservoirs) are prepared from the Google Earth Image after proper ground verification and delineated the thematic boundaries using GIS tools and techniques. For better understanding, we prepare the map including the rivers where the dams are constructed. The areas of different categories are also investigated. Most of the data are collected through field survey and other secondary sources. After collecting data, comparative analysis is done to find the positive and negative effects of the dams in the state and the change in socio- economic and environmental condition of both upstream and downstream sides.

III. Problems and Prospects of Dams

Maphou Dam / Mapithel Dam

Maphou is located in the Mapithel Hills range and is situated on the bank of the Thoubal River. It is located 36 km from the city of Imphal. The construction of Mapithel Dam/ Maphou Dam /Thoubal River Valley Multipurpose Project started in 1970s. It is an earthen Dam having dimensions of 66 m high and 107.4 m long. The aim of the project is to utilize water from the Thoubal River for irrigation (area of 21,860 hectares), flood control, drinking water (10 million gallons per day) and electricity (7.5MW).

Negative effects

- The Dam displaces many people from surrounding villages while an estimated 1200 hectares of land (including habitat areas and forest) are expected to be submerged by the Dam when reservoir is fully filled.

- The blocking of the Thoubal River has disturbed the water flow. The sediments (sand and stone) brought down by the River are now deposited in the reservoir of the Dam causing high rate of siltation and sedimentation.
- Most of the village communities in the downstream who are living by fishing, collecting sand and stone from the Thoubal River have lost their livelihoods (Kipgen, 2015).
- It leads to water scarcity in downstream side, affecting agriculture and other allied activities that threaten the food and water security of the people.



Fig. 1 A view of Maphou/ Mapithel Dam

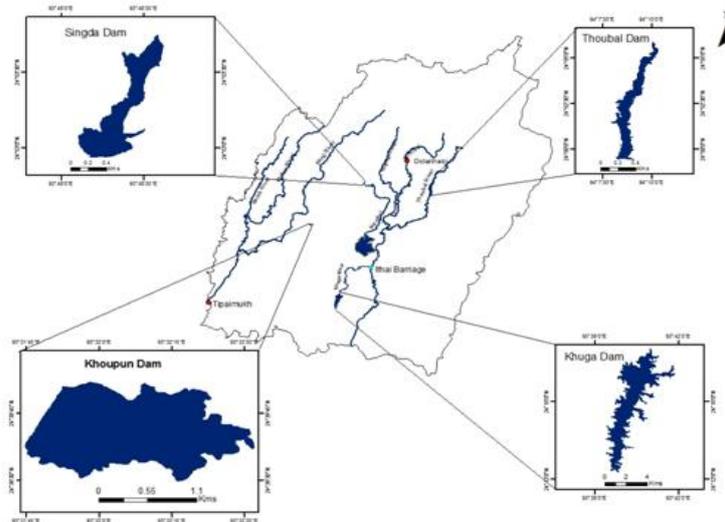


Fig. 2 Location of Dams and reservoirs (showing shape) of Manipur

Khoupum Dam

Khoupum Dam was constructed in 1978. This is the first dam in northeast India which is constructed in the hilly areas. The main purpose of the project is to provide irrigation water to the agricultural land of 800 hectares in the valley. It is also to practice double cropping under the programme of Green Revolution. The project consists of an Earth Dam of 17 meters height and around 600 square meter across the Machengdui River, tributary to Irang River, in Manipur. The dam is situated in south eastern part of the Khoupum Valley which is 85 km away from Imphal.

Negative effects

- The water from reservoir spills out in the rainy season into the surrounding areas causing floods and flash floods.
- Reservoir of the Khoupum Dam causes loss of 60 hectares of agricultural land.
- People who have lost their permanent agricultural lands due to this Dam start clearing the forest for Jhum cultivation in catchment areas that leads to depletion of vegetation cover and soil erosion.

- Khoupum Dam Project controls flood to some extent and reduces the flood prone areas from 200 hectares to 90 hectares but the areas under water deficit and fallow land have increased to 200 hectares after the dam (Rongmei and Singh, 2013).
- Dam provides fishing facilities to the upstream areas but there is no fish again in the downstream valley. Again, the dam generates employment but number of families living below poverty line and landless in the valley has risen higher than before the dam (Rongmei and Singh, 2013).



Fig 3 A view of Khoupum Dam' reservoir

Loktak Hydroelectric Project/ Ithai Barrage

The construction of Loktak Multipurpose Hydro Electric Project was taken up by the Ministry of Irrigation and Power, Government of India in 1971 and was commissioned on 4th June 1983 with the National Hydro Electric Power Corporation (NHPC) executing the project. The project aims to generate 105 MW of electricity and irrigate 24,000 hectares of land in the Imphal Valley besides flood control in Imphal valley. As a part of project they constructed Ithai Barrage at Ithai where Khuga River meets Imphal River.

Negative effects

- It causes floods in Imphal valley (around 80,000 acres of land). The water reaches up to Hiyangthang and many other settlement areas of Khangabok, Leishangthem, Tentha, Athokpam, Mayang Imphal, Nambol and many places around Ikop pat, Kharung pat and Pumlen pat, etc. (Jugindro, 2017).
- It has led to submergence of more than 30,000 acres of agriculture land. People of Manipur continue to lose huge amount of money (around Rs 300 crore) annually (Jugindro, 2017).
- The stagnant water has caused thinning of the Phumdis (floating biomass) in the Keibul Lamjao area, the habitat of *Sangai* and large scale growing of Phumdis in other parts of the Lake. The Government of Manipur spends huge amount of money annually to remove Phumdis but still not successful.
- The Dam has blocked route of migration (Imphal River) of many fishes that breed in the lake. This has led to disappearance of several indigenous fishes from Loktak Lake such as the Ngaton, Khabak, Pengba, Tharaak, Ngaaraa, Ngaatin etc. (Jugindro, 2017)
- Siltation and sedimentation is another major problem that declines the water holding capacity of the Lake. It leads to change in both quality and quantity of water of Loktak Lake.



Fig. 4 A view of Ithai Barrage



Fig. 5 A view of Loktak lake

Khuga Dam

Khuga Dam is a multi-purpose project located to the south of Churachandpur district Manipur. The project was started in 1983 and resumed in 2002 after being at a standstill for a period of time. On 12 November, 2010 Sonia Gandhi inaugurated the dam and dedicated it to the nation. The Khuga Dam was

constructed to generate hydroelectricity (1.5 MW) and to provide irrigation to 15,000 hectares of agricultural land. Now, the Khuga multi-purpose project provides drinking water (29%), fishing (4%), recreation (2 %) and minor irrigation (8%) to the displaced communities. The Dam also serves as spot for tourist attraction.

Negative Effects

- More than 3000 people were displaced due to the construction of Khuga Dam. The displaced people are forced to change their primary occupation and livelihood (Zou, 2011).
- Jhum cultivation increases clearing forest as people lose their agricultural land.
- Dependency on forest and forest products such as timber, charcoal making and firewood cutting has also increased as people have lost their primary occupation i.e. agriculture.
- One of the main purposes of Khuga Dam, i.e. power generation has not been initiated till today.
- Source of water for domestic purposes also changes. Dependency on river water increases from 49.2% before displacement to 68.4% after displacement as water from pond, tube well or hand pumps has diminished considerably (Zou, 2011).



Fig. 6 A view of Khuga Dam

Tipaimukh Dam

Tipaimukh Dam will be constructed at Tipaimukh (Churchandpur district, Manipur) where Tuivai River meets Barak River adjoining Bangladesh. The proposed 162,8 m. high rock filled dam aims basically at production of 1,500 MW of hydroelectricity, irrigation of the agricultural fields and prevention of flood and the development of ecotourism.

Negative effects

- The dam will destroy all the ecosystem of downstream side including the Barak catchment area of Assam and neighbouring country like Bangladesh.
- The proposed Tipaimukh Dam will involve felling down of 27,000 hectares of forest.
- The Dam will submerge some parts of the Imphal–Jiribam national highway. Hence new alignment of the submergible parts on the road will create another problem to both people and government.
- The site chosen for the dam is seismically active. Large reservoir formed by this Dam may induce another seismic activity in the region due to increase in water load.
- The dam will also submerge various historical and legendary sites and sacred groves with vital spiritual and cultural significance to the communities and lead to destruction of rich biodiversity which is threatening the peoples' right to life and livelihood (Bhattacharjee, 2013)

Dolaithabi Barrage

The main purpose of ongoing Dolaithabi Barrage is irrigation. It is a medium size project constructed at Iiril River which is a main tributary of Imphal River. The Barrage was approved by planning Commission in the year 1992 at a cost of 18.86 crore but reviewed from time to time. From this Barrage, two districts namely, Imphal East and Senapati district will be benefited.

Negative effects

- The blocking of Iiril Rivers which is a main tributary of Imphal River will disturb the present drainage system of whole Imphal valley.
- It will force to change the livelihood and lifestyle of the people who live in both upstream and downstream side of the Barrage because these people depend on this river.
- It will adversely affect the ecosystem of downstream side.



Fig. 7 A view of Dolaitabi Barrage

Singda Dam

Singda Dam is a multipurpose dam which is located at Kangchup (19 km from Imphal) and constructed at Singda River. It is one of highest earthen dams in India (height-.60m and length-490m). The main purpose of the Dam is to supply drinking water to greater Imphal area and to provide irrigation facility to nearby areas. Now, it provides 7MGD drinking water to greater Imphal and irrigation water to an area of 4148 hectares of nearby paddy fields. It also serves as good tourist spot. The Dam was completed in 1995 though it started construction in 1975 at a cost of 6814 lakh.

Negative effects

- Since the dam blocks up flowing water, those aquatic animals that depend on the flow to reproduce or as part of their life cycle are put in danger.
- In addition to this, the beneficial sediments that is normally washed down by the river is blocked, which decreases the fertility of the soil in downstream side.
- Filling and exploitation of the dam reservoir has a negative effect on the stability of the slopes surrounding it and thus causes minor landslides.



Fig. 8 A view of Singda Dam

IV. Conclusion

From our study, we know that dams have both positive and negative effects on environment, agriculture, social, cultural and normal life of the people. But if we compare both effects, the negative effects are much higher than the positive effects. The dams provide water for irrigation which is often lesser than the areas submerged under water by the dams (e.g. Ithai Barrage). Because of disturbance of normal flow of river by the dams, many swamps have dried up in the state. It has severe effects to the wetland ecosystem including Loktak Lake which is the habitat of many rare flora and fauna. These dams cause floods and draughts very often in Imphal valley. Many people are displaced without proper rehabilitation. So, proper rehabilitation and counselling should be given to the affected people. Some recommendations are given below based on our finding-

- ❖ Environmental Impact Assessment (EIA) should be done before, during and after construction of dam and taking necessary action in time.
- ❖ Avoid construction of large dams as North Eastern Region falls in Zone V of Indian seismic zonation. Beside this, there is chance for reservoir induced earthquakes in the region.
- ❖ Proper rehabilitation and resettlement of the affected people is necessary.
- ❖ Regulate flow of water (i.e. don't cut off river flow totally as it will affect severely in downstream side).

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