

## **The Loktak Hydro Electricity Power Project in Manipur and its Impact on the Socio-Economic Conditions to the Catchment Areas.**

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**ABSTRACT:** The Loktak, a Ramsar Protected Site under *the Ramsar Convention*, is the largest freshwater lake in North East India, located in Bishnupur district in the Imphal Valley, Manipur. 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 by the Government of India on 4<sup>th</sup> June, 1983 with the National Hydro Electric Power Corporation (NHPC) executing the project. The present paper aims to find out the adverse impact on the socio-economic condition that the project which aims to generate 103 MW of electricity and irrigate 24,000 hectares of land in the oval shape Imphal Valley. On the contrary, the impact of the project which aims to generate sufficient electricity and irrigate extensive agricultural land, has adversely affected the eco system of Loktak lake and has also flooded around 80,000 acres of land in the valley. The Project has brought a reverse picture in economic status of Manipur from a self-sufficient food grain to borrower's position with a large number of agricultural lands submerged under water. The study is all about to focus on the Ithai Dam. The component of the Ithai Barrage, constructing across at the junction of the Manipur river and the Khuga river, where the Khordak channel leaves the lake, flowing southwards, that acts as an artificial reservoir to ensure sufficient volumes of water for the project. Construction of this Dam is not limited to only submergence of vast productive agriculture land, devastated homesteads in the lake skirt areas and destroying peoples' livelihood but it also led to disappearance of several indigenous fishes, indigenous varieties of aquatic edible plants from Loktak Lake.

**Keywords:** Submergence, Self-sufficient, Artificial reservoir, devastated homesteads, Indigenous fishes

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### **I. INTRODUCTION**

The Loktak Lake, located in Bishnupur district in the Imphal Valley, is one of the largest natural freshwater lakes in the North-Eastern region of India and is well known for its charming natural beauty. The origin and evolution of Loktak Lake may be ascribed to tectonic activity and neo-tectonism remarkably influenced by a long history of fluvial-lacustrine processes. The isotopic data of the lake sediments suggest that it existed from the middle of the last glacial period about 25,000 years ago (Mitre *et al.*, 1986). The lake has been considered to be the lifeline for the people of Manipur because of its importance in their socio-economic and cultural life, besides influencing the climate of the state (Tombi Singh and Shyamanada Singh, 1994). Many traditional folklores of the state and legends of the people of Manipur are associated with the lake. Construction of this Dam is not limited to only submergence of vast productive agriculture land, devastated homesteads in the lake skirt areas and destroying peoples' livelihood but it also led to disappearance of several indigenous fishes, indigenous varieties of aquatic edible plants from the Loktak Lake. In recognition of the lake's rich biodiversity and its socio-economic importance, the Ramsar Convention on Wetlands designated the Loktak Lake as a *Ramsar Site* (Wetlands of International Importance) in 1990. The Loktak Multipurpose Hydro-Electric project began under the supervision of the Ministry of Irrigation and Power, Government of India in the year 1971. The National Hydro-Electric Project Corporation (NHPC) has been operating the project ever since it was commissioned in 1983 along with Ithai barrage which was also constructed as a part of the project over the Manipur River. A major component of the project is the Ithai barrage – which acts as an artificial reservoir to ensure sufficient volumes of water for the project and providing facilities of:

- i) Giving Lift irrigation facilities to the 24,000 hectors of land for double to triple cropping in the valley of Manipur.
- ii) Flood control of land around the Loktak Lake and Imphal city.
- iii) Reclaiming 40,000 hectares of surplus land from the peripheral areas of the lake.

The following are the main objectives of this project when the project is once completed.

- a) At the beginning, produced 2x35MW and then in future 3x35MW but first 35MW was produced by March 1975.
- b) Giving irrigation facilities to the 23,000 hectares of land for double to triple cropping.
- c) Flood control of land around the Loktak Lake and Imphal city.
- d) Preparing transmission line of 132KV for the states of Manipur, Nagaland and Assam.

Loktak lies in between 24°15'N to 24°30'N latitudes and 93°45'E to 94°0'E longitudes in Moirang, Bishnupur district, the southern part of the Manipur valley. It was only 12 km long and 8 km wide with 96 km<sup>2</sup> in area during 1970's, before the construction of Ithai Dam. The Ithai Barrage is located at 768.5 m above MSL at Ithai village (LDA and WISA, 2004). The Loktak downstream Hydroelectric Project is located on river Leimatak in Tamenglong district, in the western part of the state of Manipur and about 22km downstream of the power house of Loktak Hydroelectric Project. The project falls in Survey of India toposheet 83 H/10 (1:50000 scale) and is bounded between coordinates 24°44'00"N and 93°35'25"E. The project envisages construction of a 20m high concrete gravity dam above river bed level, a 5m dia, 5.85 km long Head Race Tunnel, one 12.5m dia, 61m deep surge shaft and surface power house to generate 66MW comprising 2 units of 33 MW each. The project aims to generate 103 MW of electricity and irrigate 24,000 hectares of land in the oval shape Imphal Valley. On the contrary, the Ithai barrage constructed has already led to submergence of more than 80,000 acres of agriculture land and the Project has brought a reverse picture in economic status of Manipur from a self-sufficient food grain to borrower's position with a large number of agricultural lands submerged under water.

## II. SOCIO-ECONOMIC STATUS OF LOKTAK LAKE

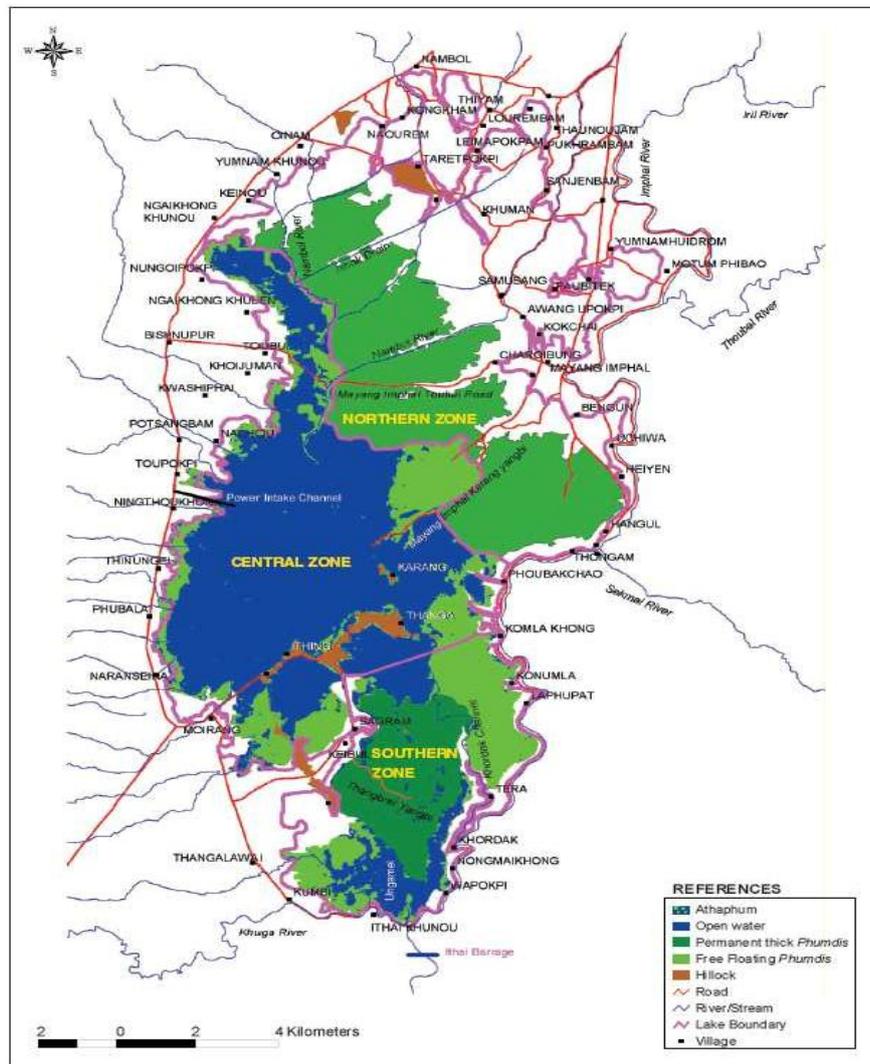
The vast expanse of floodplain wetlands of Manipur River known as Loktak Wetland Complex (including pats of Loktak lake, Pumlen pat, Ikop pat, Kharung pat and Khoidum pat) plays an important role in the ecological, social, cultural and economic to the catchment areas as well being of the State of Manipur. Ecological and livelihood security of the communities is inextricably linked with the ecosystem services derived from the wetland system which is spread over 469 sq.km. Overall 45 villages and 29 towns are located in and around these wetlands. These wetlands are the largest source of fisheries, edible plants and freshwater for the state. The staple food of Manipur is directly linked to Loktak Lake and surrounding pats. The lake is rich in biodiversity and has been designated as a wetland of international importance under Ramsar Convention in 1990. The Keibul Lamjao National Park, in the southern part of the lake, is home to the endangered Manipur Brow Antlered Deer, locally called *Sangai*. The lake has been also the breeding ground of a number of riverine indigenous fishes and continues to be a vital fisheries resource. It supports a significant population of migratory birds and resting place of numerous fauna and flora. Phumdi, floating heterogeneous masses of soil, vegetation and organic matter at various stages of decomposition are a characteristic feature of the lake.

Loktak Lake, one of the largest natural freshwater lakes in the North-Eastern region of India and the largest wetland of the complex provides water for 105 MW Loktak Hydropower Project, which is one of the largest sources for the power deficit north eastern region. This also played a very positive role in the sustainable development of the micro-eco-systems of the localized areas as an integral part of the entire eco-system of the Manipur valley.

## III. IMPACT ON THE SOCIO ECONOMIC CONDITIONS

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 by the Government of India in 1983 with the National Hydro Electric Power Corporation (NHPC) executing the project. The project envisages to generating 103 MW of electricity and irrigating 24,000 hectares of land in the oval shape Imphal Valley. The National Hydro-Electric Project Corporation (NHPC) has been operating the project ever since it was commissioned in 1983 along with Ithai barrage which was also constructed as a part of the project over the Manipur River. Before the coming of the LMP and Ithai barrage, the common people settled in and around the peripheral areas of Loktak, hoping that the completion of the Loktak Multipurpose Project (LMP) would boost their living standard and economic conditions. Unfortunately, on the contrary, the project has proved many false. After the construction of the Ithai Dam has brought a reverse picture in economic status of Manipur from a self-sufficient to borrower's position with a large number of agricultural lands submerged under water. Manipur continues to lose around 300 crore rupees annually, if one calculates the annual loss of crop yield, fishing and other seasonal vegetable harvest from the land destroyed by Loktak Project in and around Loktak wetlands, over 80,000 acres of land. The construction of Ithai barrage and decrease in absorption capacity of the lake due to siltation and phumdi (floating masses) has resulted in inundation of the peripheral agricultural and settlement areas. It is estimated that the inundation of cultivable and habitation land is about

50,000-80,000 hectare (WWF India 1994).Manipur has incurred a loss of more than 10,000 crores of rupees since the project operation from 1983 onwards.



**Fig.1: Drainage system of Loktak catchment area**  
Source: The Atlas of Loktak Lake, 2004

A careful calculation of economic, social and environment impact of Loktak project is a serious and critical need of the hour. Instead of reclaiming 40,000 hectares of surplus land from the peripheral areas of the lake and its distribution of the displaced/effected people, more than 30,000 hectares of land had been getting sub-merged after every shower. It was promised that the LMP will provide continuous supply of water by lift irrigation for multiple cropping (60,000 hectares of land) in order to achieve adequate production starving of water. For lack of water, the power generation capacity of LMP has gone down to such a level that the power production unit had to be closed down in 1992. It was also promised that the electricity produced by the LMP would be sold to the consumers in Manipur a rate below 10 paise per unit. But presently the people pay much higher. Unfortunately, the people, on the whole, have been cheated by the LMP beyond imagination. The permanent water has caused thinning of the Phumdi in the Keibul Lamjao area, the habitat of *Sangai*. The indigenous technique of *phum* fishing in Loktak Lake also becomes difficult due to the constant rise of water level and many other associated problems. Thus, Ithai barrage has completely shattered the traditional economy system and caused unemployment of the state particularly the peasants of the surrounding areas of the Loktak Lake.

Owing to construction of dam at a height of 760 metres contour line, the water level rises and submerges the entire surrounding areas of the lake during rainy season. The water reaches up to Hiyangthang including many other settlement areas of Khangabok, Leishangthem, Tentha, Athokpam Moirang, Nambol and

many places around Ikop pat, Kharung pat, Pumlen pat, etc. That is why a large tract of area has been flooded. A total area of 63.5 sq. km from different zones of the lake has been identified as highly flood prone (Trisal and Manihar 2004). Now, after the construction of Ithai Barrage, the entire eco-system of lakes has terribly deteriorated. All the fishermen communities and lake dwellers have suddenly found themselves totally uprooted their socio-economy. This has in turn led to the pollution of lake water and health hazards for the fish eaters of the State.

#### **IV. PUBLIC AND GOVERNMENT OPINION ABOUT THE ITHAI BARRAGE**

Since the commissioning of Ithai Barrage in 1983, there have been disastrous flash floods in and around the lake. These floods have severely affected the socio-economic life of the people of Manipur. There have been drastic overnight changes in the hydrological path of Loktak that have in turn adversely affected the environment and socio-economic condition of the people of Manipur, Loktak dwellers being the most affected. Instead of reclaiming 40,000 hectares of surplus land from the peripheral areas of the lake and its distribution of the displaced/affected people, more than 30,000 hectares of land had been getting sub-merged after every shower. It was promised that the LMP will provide continuous supply of water by lift irrigation for multiple cropping (60,000 hectares of land) in order to achieve adequate production starving of water. For lack of water, the power generation capacity of LMP has gone down to such a level that the power production unit had to be closed down in 1992. It was also promised that the electricity produced by the LMP would be sold to the consumers in Manipur a rate below 10 paise per unit. But presently the people pay much higher. Unfortunately, the people, on the whole, have been cheated by the LMP beyond imagination. The total damages inflicted by the recent floods of 2017 in Manipur has been estimated at Rs 223.83 crore which has been further increased to Rs 358.23 crore (Manipur, 2017).



Photo.1: Floating huts of Loktak Lake, Manipur

The dam has blocked the course of Manipur River that drains Loktak Lake. This blockage has brought irreversible losses to the health of this rich fresh water lake in the Northeast, many flora and fauna have become scarce and on the verge of extinction. These are evident by the dwindling varieties of native endemic species, including fishes, edible plants like heikrak yelli, heikak, Taothabee paddy and submerge the floating phumdis which is the only suitable home of blow antlered deer, locally called Sangai, the only living deer in the world found in Manipur. Protests against already operating dams, or those under various stage of planning and construction in the North East, are not new. Many Civil Organizations, NGOs has demanding and protest against the construction of the Ithai Barrage because if its sever affected in and around the Loktak Lake and surrounding pats where extensive productive agricultural fields and fish farms are submerged under water.

All these implications were pointed out well in time to the Project authorities i.e. in 1975 by a group of concerned people led by Maharaja Kumar Priyobarta Singh. But it all fell into deaf ears. The Ithai Barrage has been responsible for series of floods in Manipur as the NHPC in several occasion, refuse to open the sluice gates of Ithai Barrage, leading to widespread submergence of agricultural areas.

Acknowledging the role of Ithai Barrage in the worsening flood situation in Manipur, the Chief Minister of Manipur, Mr. Biren has even requested Mr, Narendra Modi, Prime Minister of India in July 2017 to remove the Ithai Barrage that blocks the Manipur River. Unleashing environmental impacts, the Ithai Barrage also led to disappearance of several indigenous fishes from Loktak Lake such as the Ngaton, Khabak, Pengba, Tharaak, Ngaaraa, Ngaatin etc. It has been observed that these fishes migrated from the Chindwin-Irrawaddy

river system of Burma to the course of Imphal/Manipur River for breeding in the adjoining lakes and streams of Manipur valley.

The populations of migratory and resident waterfowl have declined during last few decades due to poaching and changes in ecological character of the lake. Thirty five animal species (5 mammals, 3 birds, 9 reptiles, 3 amphibians, 12 fishes, 2 mollusks and 1 annelid) which were reported occurring abundantly in the past have declined and are now disappearing gradually (Trisal and Manihar 2004).



Photo.2: Aerial view of 2017 flood submerge villages

Various indigenous species of fish which used to migrate from Chindwin-Irrawaddy river system to Manipur river system have declined steadily after the construction of the Ithai barrage. The practice of keeping the water level of the barrage at 769 above the mean sea level all year round is the prime cause of frequent floods at both the upstream and downstream areas and the project has also led to a negative shift in the natural cycle of the phumdhi.

Mentioning that Ithai barrage has become the main cause of frequent flood in the State, the CM has also demanded Prime Minister to figure out a permanent solution to the frequent floods in the state. Stating that Manipur is facing one of the worst man made ecological disasters and the floods have severely affected the socio-economic life of the people, the CM asserted that the Ithai barrage should be removed so that natural course of water could be maintained. He mentioned that at present, the state is having sufficient power resources from other sources.



Photo.3: Public protest against the commission of Ithai barrage and Loktak Project

Before this, on July 27, 2017 in a very significant statement, M. Asnikumar, the vice chairman of Manipur Infrastructure Development Agency (MIDA) and also the state vice president of BJP Manipur have said that the Loktak Hydro Electric Project and Ithai dam have been disastrous projects and they must be decommissioned. The people of Manipur can live better without the Loktak Project. But we cannot develop without the Loktak. The statement Ithai dam has been the main reason for flash flood in an around the Loktak

lake The Manipur BJP leadership has requested the Union government that the 105 megawatts Loktak hydroelectric project be broken down or, to use the technical term, decommissioned. Following up on the political call from the party-in-power, the newly-elected state government has written twice to the Union Ministry of Environment, Forest and Climate Change to set up an expert panel and review the impacts of the dam.

## V. RECOMMENDATION

Before the coming of the LMP and Ithai barrage, the common people settled in and around the peripheral areas of Loktak Lake, hoping that the completion of the Loktak Multipurpose Project (LMP) would envisages to generating 103 MW of electricity power and irrigates 24,000 hectares of land. And dream to improve their economic conditions. Unfortunately, on the contrary, the project has proved many false. After the construction of the Ithai Dam has brought a reverse picture in economic status of Manipur from a self-sufficient to borrower's position with a large number of agricultural lands submerged under water. Since the project operation from 1983 onwards, many Civil Organizations, NGOs and recently the Government of Manipur has demanding and protest against the construction of the Ithai Barrage because of its sever affected in and around the Loktak Lake and surrounding pats where extensive productive agricultural fields and fish farms are submerged under water. The vest and urgent remedies to solve the problem is to decommission of the project and destruction of the Ithai barrage. To find out a workable solution to the problems of the Loktak Multipurpose Project and the Ithai Barrage, the following suggestions can be recommended.

1. **Siltation:** Siltation of rock sediments, eroded from the surrounding catchment river Basin is a serious problem. Jhum cultivation, extensive deforestation and unscientific land use practices in the catchment area are responsible for deposition of approximately 336,325 tons of silt annually in the Lake. Controlled soil erosion through afforestation, fuel wood and fodder plantation, regeneration of degraded forests, control/improve shifting cultivation through, modern techniques, optimise water level in the lake through hydrologic modeling and interventions to realise multiple values and functions of the wetland (power, wildlife, fisheries, flooding, and water quality). The proliferation of *phumdi* and aquatic weeds have led to the reduced water holding capacity, deterioration of water quality, interference in navigation, and overall aesthetic value of the Lake.
2. **Floating Phumdis:** The decrease in water holding capacity due to siltation, weed infestation and proliferation of *phumdi* has reduced power generation capacity of the Lake. The populations of migratory and resident waterfowl have declined during the last few decades due to poaching and changes in ecological character. The habitat of *Sangai* deer in Keibul Lamjao National Park (KLNP) is also threatened due to the permanent water has caused thinning of *phumdi* and poaching.
3. **Site of the Barrage:** The location site of the Ithai Barrage is at 769 meter contour line above the mean sea level, that the entire surrounding areas would be submerged under water and the people inhabiting the area would be displaced, leading to their marginalization and pauperization., The construction of Ithai Barrage and decrease in absorption capacity of the Lake has resulted in inundation of the peripheral, agricultural and settlement areas.
4. **Catchment Conservation:** Injudiciously cutting of trees for fuel and jhum/trash cultivation in the catchment areas of the Loktak and associated wetlands are highly degraded of the surrounding hill sub-water heads is the primary factor contributing to enhanced soil erosion and siltation of Loktak. Conservation of these wetlands will have to address degradation of the watershed thereby reducing sedimentation.
5. **Removal of Phumdi from the outlet channels:** Rivers/ channels are also responsible for draining out the excess monsoon rain water from the lake, which are clogging of thick phumdi and it increasing the problem of water logging and flooding in the peripheral areas.

## VI. CONCLUSION

It is really unfortunate that a project like Loktak Hydro Electric Project, that is already a curse for Manipur, that has inflicted so much of suffering with no responsibility and accountability of the project proponent, NHPC, there is no review of the project, for its relevance and rationale even after nearly forty years of project operation. The NHPC all the more seems to insist on reinforcing its practice of exploitation and plunder of Loktak wetlands, by trying to garner more profits from CDM mechanism by renovating Loktak power station and also by building another dam, the 60 MW Loktak Downstream project to harness the water released from the power Station. Decommissioning or removing the Ithai Barrage from the Manipur River is the only solution at this point to save Loktak Wetlands and to recover its vibrant and fragile ecology. The decommissioning of the Ithai Barrage should be carried out as per the recommendations of the World Commission on Dams, 2000, that outlined the key steps and procedures to decommission mega dams like Ithai

Barrage. The current management plan and process in Loktak by negating communities' rights and role in such management goes against the spirits and provisions of the Ramsar Convention. For all violations and unaccountability, NHPC should completely be banished from Manipur. Policies like the Manipur Loktak Lake Protection Act, 2006 that unleashed sufferings to fishing communities and which are incompatible to the sustainable practices and ethos in Loktak wetlands should be scrapped altogether. It is high time the people and the Government of Manipur take responsibility for their own land, rivers, wetlands, forest and save not only her indigenous flora and fauna but to improve the economy of the state. Removing unsustainable projects like NHPC's Loktak Project, already a curse for Manipur will be a virtuous beginning for fostering sustainable development in Manipur.

#### **ACKNOWLEDGEMENT:**

The Ithai Barrage and Loktak Hydro Electricity projects are not a Boon but Scourges for Manipur because of not properly manage by constructing ring-round band/embankment around the Loktak Lake for reservoir of project water. Excess water from Loktak Lake due to Ithai Barrage submerge extensive high yield productive paddy fields and losses more than 80,000 acres of agriculture land and the Project has brought a reverse picture in economic status of Manipur from a self- sufficient food grain to borrower's position with a large number of agricultural lands submerged under water. The total damage inflicted by the recent floods of 2017 in Manipur has been estimated at Rs 358.23 crore. Moreover, increase water level of the Lake, submerges *phumdi* which is the most favorite place for Sangai, the lone species in the world.

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