

Tipaimukh Dam: An alarming venture

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Bangladesh



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TIPAIMUKH dam located in Monipur state of India, by all definitions falls into the category of a large high head [162m] dam. Though learnt to be a hydel power project for generation of 1500 MW electricity, it will definitely work as a flood control dam for Monipur and the neighbouring Mizoram state and irrigation may be practiced in suitable land areas along the 1 km stretch of the Barak river up to the Bangladesh border and by the periphery of the reservoir perimeter.

Dam and international river

Since the river Barak-Surma-Kushyara is an international river, Bangladesh as a lower riparian country should have an equitable share of water and an access to the design details of the project, planning and design etc. It is learnt that the construction that started in 2007 was halted due to national and international uproar and resistance against probable environmental degradation inside and outside Indian territory and unilateral withdrawal of water of the river which will turn Bangladesh's north-eastern lush-green fertile soil into a sandy dry waste land, during the dry season.

Such action tantamounts to violation of international convention which controls/regulates the equitable share to water of international rivers/watercourses. The above topics were discussed in many forums in different meetings and seminars in Dhaka and Sylhet and in at least two published books, 'No to Tipaimukh Dam' and 'Controversial Tipaimukh Dam: Overall Review'.

If we have access to the planning and design details of the dam we can see, apart from hydro-power generation, what else the project entails. Whether it has a component of irrigation in particular, as for irrigation they will use winter dry season flow which otherwise would have been flowing downstream for ecological and other uses in the lower riparian country. For any large dam the release of water in the low flow period for ecological use is mandatory by international convention as well as custom.

Dam Break Study

For every large dam there is an important study called "Dam Break Study". In olden days this study was done by thumb-rule calculation without use of modern technology. In USA dams constructed in the 30's had serious incidences of collapse. Now the computer assembles all study, data and design criteria to ascertain the stability and strength of the dam against possible break/breach due to some acts of God like catastrophic hydrological events, severe earthquake or other events (like war). Different models are used to determine as to how to minimize high flood damages that might cause death and destruction downstream. In this case Bangladesh will be the poor victim. Tipaimukh dam impounding "billions" of cube meter (M3) of water, will naturally cause catastrophic floods (in case of dam break) for the dam is large and high.

Nigerian experience

The writer has the experience of review and analysis of a Chinese-built large and high dam in Cameroon, Africa, 40km east of Nigerian border on the large Benue river in 1980. In Nigeria its dam break study was performed. Design flood for this large dam was taken as 50,000-year flood. In the high hilly drainage basin of the dam, there was very high rainfall with consequent abnormal rise of water level of the reservoir in 1988 flood season which menacingly threatened the very stability of the dam, with water almost overtopping the dam. It was a rock-fill dam on which overtopping might have resulted in washing away of the dam with catastrophic consequences in both countries.

However, I am citing this grim episode for lessons for Tipaimukh dam design. If we can have an access to its design details, we can verify what flood frequency they had applied to arrive at design flood. As for any faulty design, if any catastrophe occurs, the sad outcome will fall on us in Bangladesh as a result of dam break.

For a dam of such magnitude and dimension a 100,000 to 500,000-year design flood should be considered adequate, particularly when the location of the dam is in a hilly earthquake-prone and a high intensity rain region of India.

Adverse effects

Adverse effects of the Tipaimukh dam will be staggeringly devastating and damaging for Bangladesh. Environmental degradation, economic crisis and hydrological drought will cause irreversible damage. Suddenly, the free flowing Surma and Kushyara rivers will turn dry and remain so for a major portion of the year (Nov-May) disrupting agriculture, irrigation, drinking water supply, navigation etc. Six to seven months dry conditions will stop/lessen recharge of ground water which over the years will lower the ground water level, affecting all dug wells, shallow tubewells, as it happened in south western region of Bangladesh as a result of drastic withdrawal of the Ganges water at Farakka. Agriculture that depends on surface as well as ground water will be affected seriously.

Surma-Kushyara with its maze of numerous tributaries and distributaries support agriculture, irrigation navigation, drinking water supply, fisheries, wildlife in numerous haors and low lying areas in the entire Sylhet division and some peripheral areas of Dhaka division. The river system also supports internal navigation, wildlife in haors, industries like fertilizer, electricity, gas etc.

The rosy, prosperous and healthy scenario may soon turn into history causing despondency desperation and misery to the people inhabiting the zone which is known for abundance of water, lush green field of crops and fish sanctuary.

Massive environmental degradation will occur, drastically affecting weather and climate, turning a wet cooler habitat into a hot uncomfortable cauldron. The severity of micro-climate causing heat and dry conditions will gradually increase in intensity spreading over a large area over the years. It may be mentioned that rainfall that the area gets for 4 to 5 months and flood water that will be released from the dam for a short period will not be enough to

replenish the ground water. Climate and environmental change will force the farmers to reluctantly resort to planting low-yielding drought-resistant crops (unknown to them).

Sedimentation

Scarcity of water will cause siltation on river beds. When high rainfall will occur in the catchment area of the dam, enormous quantity of sediment-laden flood water will be released which will cause severity of flood in the Surma and Kushyara channels which would be already raised for low flow. This will further raise the water level causing floods in adjoining additional areas.

Navigation in river channels in the Meghna (combined Surma and Kushyara) will face depleted water flow and consequent sedimentation and severity of flooding in the wet season. Surface irrigation will be in jeopardy. The Meghna up to Chandpur will suffer from the adverse effects. The Meghna-Padma will have low flow which will accentuate saline backwater intrusion in the Padma channel which is already affected by the low flow for the withdrawal of water of the Ganges at Farakka.

Relevant ecological flow

The writer visited Bhumipol and Sirikit Dam sites in Thailand in mid seventy's. Though the dams were completed about 5/6 years ago the reservoir water level did not reach design level and the filling of the reservoir was continuing unabated during dry and rainy seasons. It was ascertained that water flowing (a good per cent of the impoundment) unabated through the outlet meant for release of water to maintain ecological balance in the downstream channel. The writer designed four major dams in Nigeria where, in all of them, there are separate adequate outlets for irrigation, water supply and hydropower and ecological flow for environment and emergency outlet for rapid evacuation of water for the safety of the dam.

It is expected that Tipaimukh dam will also allow ecological flow along with the equitable share of water for the international river Barak-Surma-Kushyara for Bangladesh as per entitlement negotiation.

Conclusion

Our government (JRC) may request India to postpone, better stop the construction of the Tipaimukh Dam if possible, through bi-lateral diplomacy or else seek intervention by United Nations. Sharing of water of Indus basin was negotiated between India and Pakistan with the assistance of the World Bank. A dispute on river Danube between Czechoslovakia later Slovakia and Hungary was referred to the International Court of Justice. In our own country Farakka issue was resolved bilaterally with India.

Our government (JRC) should soon start negotiation on equitable sharing of water according to our entitlement as a lower riparian of the international river Barak-Surma-Kushyara as per UN Convention. Unilateral withdrawal would be a gross violation of UN Convention that regulates the use of water of international rivers/water courses. Any delay in negotiation might end up in a pathetic situation, causing irreversible environmental, economic and hydrological chaos.

We may ask for design/survey data, drawings/maps etc, and EIA report prepared by the dam authority in order to verify if the Dam Break Study was made and whether EIA included adverse effects and mitigation measures thereof for the lower riparian Bangladesh. Environment-concerned institutions and individuals may even intensify resistance against the Tipaimukh Dam, as it is still in the rudimentary stage of construction.

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