



Erosion and devastation of river Subansiri and future downstream impacts of large dam : a case study from India

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Abstract

Hydro-power projects are generally categorized in two segments— small and large. The 2,000 MW project is being developed by NHPC in Garukamukh, at a cost of approximately \$2 billion and height of the dam is 116 metre. But North-east India has a complicated geology and the lower Subansiri is situated in the seismic zone 'V'. So large dam is not suitable for this region as they may fail during an earthquake. River Subansiri has been created tremendous devastation in the riparian villages by its natural flood. So small hydro-power projects are preferable than big projects. All the projects will have downstream impacts. So, NHPC or sensible state should reconsider their plans before it is too late.

Keywords : River Subansiri, Flood, Devastation, Dam, Impacts, Riparian villages.

1. Introduction

Modern technologies have enabled the man to construct huge dams and reservoirs for the purpose of irrigations and generation of hydroelectricity which is immensely required by the industrial sector to augment the production processes and by the domestic sector to increase the comfort of human beings. Dams have both intended and unintended impacts upon environments. There is no doubt that "planning, development, and management of water resources are interdisciplinary and require an integrated approach". This approach involves both science and humanities. Sometimes humanities are facetiously termed 'soft' sciences including physical and biological sciences, as well as their engineering offspring, as 'hard' sciences. The science includes climatology, geology, soil science, agriculture, civil and agricultural engineering, environmental science and ecology; whereas the humanities include society, social structure, politics, economics, administration,

culture, religion, languages and so on" (Singh, *et al.*, 2004). None of these two can be neglected for any planning. Internal World Bank hydro-electric-dam projects of 1990 showed that 58% dam were planned and build without any consideration of the down stream impacts even these could be predicted to cause massive coastal, pollution and other problems. This comprehensive survey has been carried out to assess the perception of the riparian people of the Subansiri valley in regard to the sustainable development of big dam's impacts of Lower Subansiri Hydroelectric Project (LSHEP). Through this survey an attempt is made to forward some suggestions for increasing the awareness and knowledge about the constructions of LSHEP and environmental impacts on the north bank of Brahmaputra Valley as a whole.

2. Method

The present study was conducted on the different blocks of Lakhimpur and Dhemaji districts which were thoroughly visited and also

the different information related to the flood created by river Subansiri were collected. During the study all the reports were analyzed and came to the conclusion by applying both the quantitative and qualitative methods. The survey work was spanned from April, 2010 to March, 2012.

3. River Subansiri and its role to create flood

River Subansiri is mainly the lifeline of the Lakhimpur and Dhemaji districts. Its important role in the eco-social and cultural aspects cannot be centered within its geographical boundary. This river comes from Arunachal Pradesh and flows down through Gugamukh and most of the parts of Dhemaji and Lakhimpur districts and merges in Brahmaputra near Jamugurighat. The Lower Subansiri Hydro-electric project which is under construction by the National Hydro-electric Power Corporation (NHPC) is situated two kilometers east from Gugamukh. This place is within the boundary of Arunachal Pradesh. On the other hand the office of the NHPC and their colony is in the district of Dhemaji of Assam.

Subansiri flows 200 kilometers in Arunachal and 130 kilometers in Assam. One of its natures is that it changes its route frequently. This river is flowing now 4 to 10 kilometers west in Gugamukh than its route before 1950. In the year of 2000 the river Ghagar became merging into the depth of Subansiri and lost its identity. This river has been creating landslide and flood from last ten years in 5 blocks of Lakhimpur district.

A scenario of landslide and flood created by Subansiri in last ten years are given below :

3.1 Kadam Block

Kadam development block is constituted by nearly 36 to 45 villages. In every year the villagers were affected by the flood. But in 2002 the flood took a devastating form in which total 685 families badly affected according to official record. Paddy fields of 879.56 hectares were destroyed.

3.2 North Lakhimpur Block

Almost 200 villages are there in north Lakhimpur block. People were affected badly in

2008. Total 520 families lost their properties. 225 villages affected and 8,439 hectares paddy fields were destroyed. Due to erosion 1,863 hectares land submerged in Subansiri in between 2007-10.

3.3 Bihpuria Block

Bihpuria development block is situated on the right side of the river Subansiri and in the lower part of North Lakhimpur block. The river Subansiri and Dikrong is the two big rivers under Bihpuria development block. There are 12 numbers of revenue villages on the bank of the Subansiri and 18 numbers of revenue villages on the bank of river Dikrong. In the last few years continuously the Ranganadi Hydro-electric project releases extra water in Dikrong which has created vigorous devastation in this block. In the year 2008 the flood washed away 216.26 hectares paddy field.

3.4 Narayanpur Block

In 2008, 310 families were affected and 762 hectares paddy field destroyed. Due to erosion 64.56 hectares of land merged in Dikrong.

3.5 Gugamukh Block

Gugamukh block is situated in Dhemaji district just left of the Subansiri where it entered into Assam. Kadam block is just right side of it. Nearly 8 kilometers of the bank of Subansiri is included in Gugamukh development block. On the other hand Subansiri flows through the middle part of the Kadam near the Gugamukh block. People of this area faced less problem of flood and erosion compare to the other blocks.

3.6 Subansiri Block

The next to Gugamukh, Subansiri block is situated on the left bank of the river Subansiri. Two villages of this block was completely destroyed and merged into Subansiri. Two villages, No-1 Hatiyemara and Hatiyemara were affected due to flood in the year 2009. 99 families faced the devastation and 30 hectares of land were destroyed. On the other hand erosion was going on till 2010 in Hatiyemara village. This time the erosion is going on in the right sides block and this part is now under tremendous damage.

Here, the paper highlight about the devastation of flood and erosion that took place in the six blocks of Dhemaji and Lakhimpur districts from 2000 to 2010. In 2011 also the North Lakhimpur block and Subansiri block faced the terrible flood and erosion. In this year Ghagar Kalakhua Primary school, East Ghagar M.E. School, Karpunpuli Mahila Samiti office, Ghagar Kalakhua Anganvadi centre, Ghagar Kalakhua Harimondir, etc. were merged in Subansiri due to dreading erosion. Moreover 120 families became homeless. Not only the Subansiri erosion took place in Mohaijan, Mornaichiga, Alengi, Kakatitup but it changed its route towards Lakhimpur town. If the situation will not change within coming two to five years the Subansiri will flow in the midst of the Lakhimpur town and the people will compel to leave the town. Because its route has been become slanting towards the right side and vigorous erosion going on. But the other side of the river becomes like a desert.

Naturally the river Subansiri created enormous loss and damages. This devastation has been going on since 1950 but government has completely failed to prevent this havoc. In this critical movement government is planning to construct the dam at Lower Subansiri which has a structural height of 116 meters. It can be categorized as large dam as it is in between 50 to 150 meters.

Since 2003 the river Subansiri is becoming wayward and the depth of the river became decrease due to the sand brought down by the Subansiri river after construction began. Those people who are living on the bank of the river they can easily imagine what will happen in near future. The destructive changing mood of the river creates fear among the people after 2003.

There is no doubt that the Lower Subansiri dam will spell doom for the northern bank of the Brahmaputra and on the downstream of the project. "By official count, the Lower Subansiri dam will displace only 38 families. In practice several thousand families will be deprived of their livelihood, many more will be deprived of their community land without being physically

displaced. However, they find it difficult to resist their replacement because the region is sparsely populated" (Vinding, 2004). The dam will create havoc in the following way :

4. Tentative impacts of river Subansiri dam in the riparian villages

If the dam will break down than 968 downstream revenue villages become flooded and inundate by the great flow of water.

NHPC will release extra water during monsoon in order to save the dam.

Subansiri dam being set up in a highly seismic zone which is under constant threat of earthquake as the region has fallen in seismic zone 'V'. It would bring catastrophe to hundreds of villages in lower riparian region of the two districts. If the earthquake will hit the place the devastation will be beyond visualization and disaster management will not be possible at the time of dam failure.

Flood will take place due to the release of a huge amount of stored water during rainy season. Such artificial and sudden flood will inundate vast areas of two districts and will render many people homeless.

The flow of water during the winter months would be drastically reduced which will create drought as the stored water would be released only peak hours. Consequently, aquatic life including the river Dolphin, large number of fish species, land fertility, rich flora and fauna including the Assam one horned rhino would be very adversely affected.

The fisherman, cultivator, woodcutter, boatman, cultivator, and the business of sand and stone, all would be affected due to dam which is all related with the river.

The cultural activities and spiritual ceremonies related with the river would be affected. The culture of the riparian villages would be extinguished.

The dam will create threat to the environment. Natural beauty of the areas and land fertility will be reduced. Agricultural land of the bank of the river of the two districts will be deposited by sand. "Due to the abstraction of sediment by a reservoir, degradation of the bed by clear water occurs downstream of the dams. Thus below the Boulder dam in the USA, the river bed has been lowered for several kilo meter by the clear water picking up the bed material, which is deposited further lower down. At needles, 130 km distant from the Boulder dam, the bed has risen by 6 m and special embankments had to be constructed to protect the town area. The

slopes of steep hills may be eroded resulting in further steepness of banks beyond the angle of repose of the banks. On the occurrence of a rainfall these banks become saturated, water reduces the shear resistance and consequent land sliding occurs. Landslides contribute a heavy quantity of silt. Disastrous landslides are also caused by earthquakes. The heavy silt carried even today by the Brahmaputra is in a large measure due to the landslides caused by the Assam earthquake of 1950. The silt also accumulates at the confluence when a tributary stream enters the main river" (Rao, 1975).

Table - 1 : Chart showing the water course of river Subansiri in Chawaldhuya ghat (in every second as Cubic meter; 2010).

Month	Highest (cubic meter/sec)	Lowest (cubic meter/sec)
January	860	630
February	700	480
March	1,685	526.2
April	4,490	935
May	5,970	1,330
June	13,029	3,307
July	12,154	7,430
August	11,236	4,657
Sept	14,060	No report
October	6,635	No report

If we observe the above chart (Table- 1) of information we notice that in the month of September ratio of water course was 14,060 cubic meters in every second, and the lowest 480 cubic meter in the month of February. On the other hand NHPC will release water 2,400 cubic meter per second at the time of producing power and will release water only 6 cubic meters per second when power will not produce.

5. Conclusion

If we try to prevent the movement of any animal or course of river naturally it will get angry. River Subansiri will also express its reaction if we tend to hinder its course and we have already noticed it. Erosion of river Subansiri has been increasing than the previous time. On the other hand there was a record of highest 212.5 milliliteres (14th September, 1984) rain in Subansiri.

Highest rain + highest water course + release of water from dam = devastating flood.

It means, highest water course per second 14,060 qubicmetre + release water from the dam at the time of producing electricity per second 2400 qubicmetre. Adding with this one day rainfall the result will be a fearsome flood. If there will be heavy rainfall the NHPC will release extra water on behalf of the protection of the dam. The highest rainfall of the rainy season and the addition of release water of the dam during the peak hours invite disaster and threat to life and civilization for the entire Lakhimpur and Dhemaji districts.

Sharma (2012), in his article 'Fighting Indias's mega dam' writes that, "The selected site for the mega dam of the present dimension was not appropriate in such a geologically and seismologically sensitive region. Therefore, it did not recommend the construction of mega dam in the present site".

In the year of 2011 on 15th July at 7 o'clock the Ranganadi dam release water per second 701.211 cubicmetre. As a result from 12 o'clock devastating flood had taken place. On the other hand in rainy season the water will flow over Subansiri dam 12,000 cubicmetre per second. In

this situation naturally NHPC will open the gate of the dam for its security and to maintain its balance. The water level of this dam is many times more than the Ranganandi dam. As a result such a flood will take place in which people of Lakhimpur and Dhemaji district will face adverse effect. Here, I would like to quote few lines of "The New York Times" (NYT), 3rd June, 2011 about the Three Gorges Dam of China. NYT states that "faced with a historic drought this spring, cities downstream of the dam have been unable to accommodate ocean-going vessels that usually visit their ports and about 4,00,000 residents of Hubic province lost access to drinking water this month".

All big dams will have considerable impacts like devastation due to earthquakes, landslides, dislocation and relocation, water flow, highest water level of the river, preservation of rich flora and fauna in the state, sentiments of the tribal people of riparian villages etc. Under these circumstances the construction of mega or large dam is not suggestible. Irrespective of what NHPC does, it is time the Assam government woke up to the urgency of the issue in order to protect the interests of its people and its environment.

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