Lower Subansiri Hydroelectric Power Project and future of the Subansiri River Ecosystem

ABSTRACT

The 2000 MW Lower Subansiri Hydroelectric Power Project, proposed to come up at Gerukamukh, Assam pose a real threat to the freshwater biodiversity of the downstream of Subansiri river basin by the regulation of the river through diversion, impoundment and reducing water discharge to the downstream. This paper reports on the present biodiversity status of the Subansiri river along with the loopholes of the Environment Impact Assessment of this hydroelectric project prepared by the Water and Power Consultancy Services (WAPCOS) and the ongoing violations of environment and forest laws by the National Hydroelectric Power Corporation (NHPC) during the different phases of construction of this hydroelectric project.

Keywords: Biodiversity, dam, hydroelectric project and Subansiri river downstream.

INTRODUCTION

Globally, there are more than 45,000 large dams in over 150 countries [1] and it is estimated that another 1,500 or so are currently under construction, nearly 400 of which are over 60 meter high [2]. Large dams have caused considerable environmental damages and a major cause of the decline of freshwater biodiversity in recent decades. Sixty percent of the world’s largest rivers are already severely fragmented by dams. World Resources Institute developed an analysis of dams on a river basin scale, using the level of river fragmentation and flow regulation at the river basin level [3]. The indicator assessed 227 of the major river basins in the world and showed that 37 percent of the large rivers are strongly affected by fragmentation and altered flows, 23 percent are moderately affected, and 40 percent are unaffected. This has played a major role in the rapid decline in freshwater biodiversity worldwide. Now a day, most dam construction has shifted from the developed to the developing world, with some countries such as China and India implementing large dam construction program. While water and energy needs in developing countries are real and need to be addressed, the risk to river ecosystems is acute and some unique species and habitats are threatened.

The environmental impacts of dam are well documented. With changes in both upstream and downstream hydrology, dam affect the freshwater ecosystems along the river and as far as its estuaries [4, 5, 6, 7]. People are equally vulnerable, not only those who are displaced by dams, but also those who depend on these freshwater ecosystems for their livelihoods. The people affected by dams still do not necessarily benefit directly and often remain without access to power and clean water. While the obvious and often irreversible impacts of large impoundments are well recognized, there is also growing awareness of the pivotal role of the flow regime as a key driver of ecology of rivers and their associated floodplain wetlands [5, 8].

The Northeast of India has been identified as India’s ‘future powerhouse’. In 2001, the Central Electricity Authority (CEA), India has identified 168 large hydroelectric projects with a potential of 63,328 MW in the Brahmaputra river basin. This includes 22 projects having potential of 15,191 MW in the Subansiri river basin.
The 2000 MW Lower Subansiri hydroelectric power Project, proposed to come up at Gerukamukh of Assam- Arunachal border is the first large hydroelectric project to be constructed in the Subansiri river basin. In this paper an attempt has been made to assess the present environmental and biodiversity status of the Subansiri river before being regulated by the project. This paper also reports on the loopholes of the Environment Impact Assessment [9] report of this hydroelectric power project prepared by the Water and Power Consultancy Services (WAPCOS) and the repeated and ongoing violations of environment and forest laws by the National Hydroelectric Power Corporation (NHPC) during the different phases of construction of this project.

MATERIALS AND METHODS

Study area: The river Subansiri continue its journey through the Himalayan range inside Indian territory in the North Eastern part for 200 km and enters into the plains of Assam through a gorge near Gerukamukh of Dhemaji district. Its total length is 520 km and drains a basin of 37,000 square km. Total length of the river within Assam is about 130 km which flows through the Dhemaji, Lakhimpur and Jorhat districts of Assam in between 26°50' - 27°35' N and 93°41' - 94°23' E. For a systematic monitoring and study, the downstream (from the proposed dam site to the confluence with the river Brahmaputra) of Subansiri river have been divided into four site namely Chawaldhowa (27°26' N and 94°15' E, Altitude 76 MSL), Khabolugu ghat (27°03' N and 94°07' E, Altitude 65 MSL), Dhunaguri ghat (27°00' N and 94°01' E, Altitude 64 MSL) and Jamuguri ghat (26°50' N and 93°48' E, Altitude 59 MSL) to cover as much possible area of the river (Figure 1).

Planktonic Study: The qualitative analysis of the planktons was done with the help of literatures [10, 11, 12].

Riparian and aquatic flora: Floristic diversity of the river and the riparian zones were assessed according to the conventional herbarium techniques [13]. Collected materials were identified with the help of standard literatures [14, 15, 16].

Environmental issues: Different environmental issues like EIA report, violation of environmental laws etc. have been studied with the help of literatures and field surveys during different months of the year 2009-2011.
RESULTS AND DISCUSSION

Ecological condition of the habitats provided by the Subansiri river ecosystem is determined on the basis of their biodiversity status. During our study a large number of plants and animals species were recorded (Table I).

Table I. Habitat and biodiversity status of the downstream of Subansiri river (2009-2011)

<table>
<thead>
<tr>
<th>Sl no</th>
<th>Parameters</th>
<th>Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Biodiversity</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Phytoplanktons (No of species)</td>
<td>48</td>
</tr>
<tr>
<td>2</td>
<td>Zooplankton (No of species)</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>Macrophytes (No of species)</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Habitats provided by the river</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Downstream</td>
<td>130 (Approx.)</td>
</tr>
<tr>
<td>2</td>
<td>Flood plain/Riparian wetlands (Numbers)</td>
<td>98</td>
</tr>
<tr>
<td>3</td>
<td>Oxbow (Numbers)</td>
<td>5-6</td>
</tr>
<tr>
<td>4</td>
<td>Meandering cut-off (Numbers)</td>
<td>3-5</td>
</tr>
<tr>
<td>5</td>
<td>Riparian zone</td>
<td>Both the sides of the downstream</td>
</tr>
<tr>
<td>6</td>
<td>Micro habitat</td>
<td>Small woody debris (SWD) and Large woody debris (LWD)</td>
</tr>
</tbody>
</table>

Downstream of the Subansiri river also provides diverse habitat such as river course, static water bodies (wetlands and meandering cut-off) and the riparian zones, where varied aquatic and terrestrial floras and faunas are survive. Large and small woody debris in its downstream also provides many microhabitats for living biota.

Environmental Issues

A comprehensive Environment Impact Assessment (EIA) is utmost necessary in the downstream from the dam site of any proposed hydroelectric project. The existing environmental scenario with respect to different aspects, which might be adversely affected due to the construction and operation of any proposed project, should be derived through an appropriate and in-depth EIA study. An EIA study was conducted to understand the impact of the power project on various facets of environment in the downstream of Subansiri River [9]. The EAI report, through which the NHPC got the clearance from the Ministry of Environment and Forest, Govt. of India, possesses many loopholes in respect to the downstream [17]. It becomes evident that no sufficient and detailed study was done in the entire downstream during the preparation of the report. Detailed mention about the probable impacts upon the downstream river health, rare and endangered species, physical resource, people’s livelihood and the options for mitigation etc. did not find place in the report.
The EIA report contains insufficient records on terrestrial and aquatic flora, phytoplanktons, fish diversity, riparian flora, zooplanktons, avian fauna, floodplain crops, people’s lively hood etc. besides healthy habitats controlled by the unregulated Subansiri river. The reports itself claimed to have their survey done only up to a distance of 07 km (Koyala Nallah) down from the dam site, and there is no information beyond this distance. However, the total downstream flood plain of the river Subansiri from the dam site to its confluence with the mighty river Brahmaputra is approximately 130 km, which water physico-chemical properties are suitable for aquatic organisms [18] and it is very rich in aquatic macrophytes (Table I). Interestingly no report on the IUCN red listed Ganges dolphin Platanista gangetica Roxb. has been made in the report, but still the river provides a good habitat for this animal [19].

Habitat diversity: At present, the unregulated Subansiri river provides diverse habitat in its downstream. Out of which the riparian wetlands are the most ecologically and economically important. Here, the wetlands are a complex system of marshlands, floodplains and interconnected drainage lines which are regulated by the seasonal floods of the Subansiri river. The flora and fauna in the wetlands are extremely diverse [18]. These are the live gene bank of fishes and the chief habitats of some migratory birds.

Biodiversity: The project is in a region which has been recognized as a global biodiversity hotspot. For the construction activities of the project at least 400 hectares of forests will be used by the NHPC [9]. It lies in the midst of contiguous forests comprising Kakoi, Dulung and Subansiri Reserve Forests in Assam and Tale Valley Sanctuary, Tale Reserve Forest and Panir Reserve Forest of Arunachal Pradesh. The Dulung and Subansiri Reserve Forests together constitute the ‘Subansiri Important Bird Area’, a site of global significance for bird conservation identified as per international criteria developed by Birdlife International. The river Subansiri has rich fish diversity and is one of the important rivers in India for the long term conservation of the endangered golden mahseer [20].

Flood control: The NHPC, Construction Company of the Lower Subansiri hydroelectric power project claims that a flood cushion of 15 m will be provided in the monsoon period which will only achieve partial flood moderation. According to them flood moderation can be achieved by the integrated operation of Upper Subansiri, Middle Subansiri and Lower Subansiri mega hydroelectric projects. If one were to keep aside the serious concerns about the efficacy and desirability of this large dam to achieving flood management in the Subansiri river basin. This is because the Lower Subansiri hydroelectric project has received clearance from the Ministry of Environment and Forest on the condition that no dams will be built in the upstream of the Subansiri river.

Violation of Environmental laws: Since 2001, when the project only had permission to conduct survey and investigations, NHPC has repeatedly committed serious violations of both the Forest (Conservation) Act, (1980) and the Environment Impact Assessment notification, (1994). In 2001 and 2002, both the Assam Government and the regional office of the Ministry of Environment & Forests (MoEF) have brought up this issue with NHPC and the Government of India. Violations include extensive collection of boulders, stone, gravel, sand and earth from the riverbed, massive construction activities for project housing and construction of roads on the left bank of river, planting of gravel crusher adjacent to the river, barrier of an elephant corridor with fencing in the Subansiri Reserve Forest, dumping of muck and debris in the river etc. The MoEF took a strong stand in the early stages (2001 and 2002) but now it has subsequently been quiet on the issue, although violations have been brought to their notice.

CONCLUSION

Dam technologies have improved over time. In the recent years, a large dam can be more eco-friendly than past projects. Proper site selection, such as avoiding building dams on the main stream of a river system and better dam design can play significant roles in minimizing impacts of large dam. Fish passes (where effective), the use of hydrological data (when available) to improve the replication of natural stream flow and also emphasis on appropriate temperature and oxygenation of water released to the downstream can significantly improve the operation of large dams. Unfortunately, the lack of sound hydrological and biological data for many regions of the world can lead to unreliable predictions and inadequate mitigation measures. There is an urgent need to apply an integrated river basin management approach to better balance between social, economic and environmental factors. The World Commission of Dam has recommended a practical and fair path to follow. It is now the turn of governments, developers and financiers to implement and comply with the WCD recommendations and conserve freshwater habitats and species for future generations.
REFERENCES