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The Tradeoff between Hydropower and Development: Livelihood Risk for Downstream Dwellers in Lakhimpur District of Assam

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Abstract

Water has been one of the commoditized items during the course of natural growth of capitalization. It resulted in contractual legal relationship between man and water; and detached the right on water of man for the sake of development in technology-driven civilization, with the belief that the more the use of power, the more is the progress of civilization.

The construction of mega dam in 'future power house'of North-East India, under BOOT policy, is a large scale investment in river development projects. Such projects have become a major threat to the people whom they deprive of their traditional livelihood without alternatives . The directive principle of state policy, aiming benefit to all with welfare views are avoided and ignored by parties (public and private) at the time of construction and operation of dam. Incorporating secondary source of materials, this paper is to discuss the tradeoff between dreaming for hydropower and development. In dealing with the subject, the paper would emphasize livelihood risk of RHEP and LSHEP on riparian downstream dwellers of Lakhimpur district of Assam.

Keywords: Hydropower, Dam, Development, Livelihood, RHEP, LSHEP.

Introduction

Generation of electricity is the key to the economic development in the era of rapid industrialization, rural electrification and increase in urbanization. In recent era all these caused acute shortage of electricity. To overcome these types of problem or shortage, water resource development projects are key instruments for policy makers as well as politicians. The multi usability of nature's gift water has attracted the policy makers as an instrument to uplift the development phase of an economy by constructing river barrier dam projects.

Dams are key means to exploit the huge untapped potentialities of water. Dam has an important and significant contribution to human development, and has provided considerable benefits (WCD, 2000). Dams provide the opportunity to harness water for a variety of human uses, including electricity, irrigation, flood control, household and commercial consumption, recreation, and navigation. The water storage capacities of dam stabilize the seasonal variation of water flow and divert the water for human consumption, agrarian and industrial production and for the reduction of flood control. Dams are promoted as an important way to meet water and energy needs and support economic development (WCD, 2000).Time of construction as well as after construction of dam create favourable 'spread effects' (Myrdal, 1957) in particular region. Millions of people depend for their survival, welfare and employment on dams (Goudie and Viles, 1997). An estimated 30-40% of irrigated land world-wide relies on dams and that generate 19% of world electricity (WCD, 2000). They provide water and power, fresh water ecosystems, affecting both nature and people (Ward and Stanford, 1995; McCartney et al., 2007). On the other hand, dam project is one the most critical factors contributing to changes of river ecosystem. During all project phases eco-environmental impact may arise, i.e. construction, river impoundment, and dam operation (Goldsmith and Hildyard, 1984). Artificial regulation of water impacts on downstream ecosystem (Goldsmith et al., 1988), by changing the quantity and timing of downstream water flow (Williams and Wolman, 1984; Rood and Mahoney, 1990; Magilligan et al., 2003; Richter and Thomas, 2007),

reduced passage of alluvial materials and particularly suspended sediments (Ligon et al.,1995; Kondolf, 1997), alter downstream aquatic habitats (Petts, 1984; Munn and Bruseven, 2004), incising river channels and restricting channel migration (Collier et. al, 1996), altering water temperatures (Poole and Berman, 2001), and limiting migration of fish (Baxter, 1997). Dam project has created large number of displacement too. World Commission on Dam, (2000) estimated 40-80 million people world-wide have been physically displaced by dams. In China alone 10.2 million people were displaced between 1950 and 1990 (Asian Development Bank, 1999). In India, after independence, the estimated amount of displaced people is 16-38 million (Fernandes et al., 1997).

Reconciling competing needs and entitlements gear up dam construction with an aspiration of "full development of the feasible hydropower potential within the country" and without emission of any greenhouse gases to the atmosphere (Central Electricity Authority [CEA], 2001). In Arunachal Pradesh of North-East India, the construction of mega dam for hydropower generation is going on in massive rate from huge untapped five different river basins. To harness the natural water resources an estimated over 56,539 MW, electricity out of around 66,000 MW of North-East hydro power potentiality, a gargantuan network of 168 mega dams has been coming up across in the land with gift of nature-green mountains, forest and number of rivers with plenty of flowing water from the Himalayan regions. The state government has signed 158 Memorandum of Assessment (MoAs) and Memorandum of Understanding (MoUs) with public sector undertakings and private developers under Built, Own, and Operate and Transfer (BOOT) basis for execution of power projects according to the government notification vide No.SPWD/W-26/93 dated 31st March, 1994 . An initiation to hydro power exploitation the Ranganadi Hydro Electric Project (RHEP, 405 MW) is the single commissioned (in the year, 2002) dam at Yazali of Lower Subansiri district of Arunachal Pradesh. In RHEP, to generate electricity the project has a tunnel of 10 kilometer long through mountain ranges near Potin and water after generating electricity and excess water released to the Dikrong River. The diversion of water from the Ranganadi to the Dikrong has meant that the Ranganadi is reduced to a trickle during the winter months, while the additional amount of silt carried by the diverted water has raised the Dikrong riverbed. The Dikrong riverbed between Doimukh and Badati in Assam, where it joins the Subansiri, has risen by 2.5 m from the 1972 level. The regulated flow of Project certainly affects or is affecting the hydrologic regime of the downstream inhabitant which is experiencing an adverse impact on hydro-geomorphic set-up, geo-environmental as well as ecological setup is on the verge of gradual change that is contributing to the occurrence of hazards like flash flood during June 2008 and the river is becoming highly erratic in nature in terms of discharge, velocity and sediment deposit on its bed (Shaid, Abdus H.M,2011).

Again, an initiation to hydro power development on Subansiri river, there is another ongoing project with installed capacity of 2000 MW by NHPC in Lower Subansiri district of Arunachal Pradesh. The total downstream stretch of river Subansiri, from where the river course enters Lakhimpur district and Dhemaji district of Assam, is up to Jamugurighat, (130 km from dam site) confluence of Brahmaputra River. In case of ongoing Lower Subansiri Hydroelectric Project (LSHEP), significant impacts on riparian wetlands have been observed. In a study, Dutta and Sarma (2011) found quite high sedimentation rate (40-44%) during year 2008-2009 in the Chaowldhowaghat in comparison to 2003 (prior to the construction of the dam). In another study, Hazarika et al., (2010) observed that downstream river ecosystem and biodiversity have been changed already due to commissioning of dam. So there is a doubt on RHEP and LSHEP projects as regarding forecasting lucidity of unabated continuous degradation of environmental quality and resulted risk of damming on livelihood.

Methodology

The livelihoods of the local communities are linked with the river system directly or indirectly. Their dependence on river is traditional from the point of view of their approach to life as well as functioning. There is a need to examine the impacts of dams in the life of the local riparian communities with their livelihood risk from hydroelectric projects. Information from secondary sources is useful for empirical study in this regard.

Objectives of the Study

Nature-based, largely self-sufficient economies of tribal people are sustained and nurtured through their life which is in close proximity to forest, river and mountains (Partwardhan Amrita, 2000). There arises inquisitiveness for development in technology-driven civilization, by considering large scale development projects which encroaches the livelihood of marginalized community. The wellbeing of these people is muffled without understanding the real opportunities, sacrificing their wellbeing at the altar of others' goals, and not making full use of their freedom to achieve a high level of well-being which is happening right now. In this regard whether the damming in Arunachal Pradesh of North-East India is in the right path of wellbeing or dogma of development of 'state' is in doubt. So, this paper seeks to spell out livelihood risk of riparain downstream dwellers due to commissioned of RHEP and ongoing LSHEP in Lakhimpur district of Assam.

Conceptual Framework

Nature gifted rivers are both a blessing and a nuisance for human being as well as for ecological niche. While the natural flow of freshwater and system of a river feed local riparian people, whose economies and livelihoods are linked with river system directly, also destruct the agricultural field and damage the economy of rural agrarian people. To avoid natural calamities occurring due to natural course of river and to upgrade natural benefit derived in form of primitive way from river as livelihood, a suitable river development project is an option (for example

Brahmaputra Flood Control Commissioned envisaged multipurpose project primarily for flood control and irrigation with a 122 meter high dam near the present dam site of LSHEP). So, a development project consisting of normative purposes stands for socio-economic development and is able to nest the means and ends in different phases of operation (Small and Sevendsen, 1992). In this regard, a montage approach of development is the need of the hour for civilization so that a project can reach up proximate to ultimate goal of development.

Subansiri River the Source of Livelihood

A livelihood compromises of people, their capabilities and assets (tangible: stores and resources, intangible: claims and access) and activities required for a means of living (Chambers and Conway, 1992). The downstream of river Subansiri comprises population density of 280 per square kilometer. Among them maximum inhabitants are invariably cultivators. For survival they depend on Subansiri river as the source of their livelihood. The dependence on river system and various uses of river are given in table 1.

Table 1 : Household dependence on river

River Use	Household dependence on Subansiri river for various uses							
	Bathing	Drinking	Fishing	Wood	Fire Wood	MC	Transport	Trade
	Dom	Dom	Dom/Com	Do/Com	Dom/Com	Dom/Com	Dom/Com	Com

NB: Dom=Domestic; Com= Commercial; MC=Material Collection.

Baruah. S, (2012) in a study find out the agriculture production in riparian zones of Subansiririver is as follows:

Table 2: Agricultural Production in Riparian Zones Of River Subansiri

Name of Agricultural Products	Types	Area of Land(in hectare)	Production (per hectare)
Baudhan	30	58,430	1000-12000 kg
Mustard	2	17,500	450
Pea	1	560	420
Potato	2	7,560	3680
Black Gram	1	1,960	320
Sesame	1	360	405
Ginger	2	1,047	850
Vegetables	59	NA	NA

Quarry Business in Subansiri River is an important source of livelihood. In different areas, different types of stone and sand (Boulder: larger than 256mm in diameter, Coubble: 64-256mm in diameter, Pebbles: 2-64mm in diameter, Sand: 0.06-2mm, Silt:3 to 60µm,Clay:less than 3µm or less than 0.003mm) are available in the downstream of the river Subansiri (Baruah S, 2012). Per day 5000-5050 people are engaged in this business and total business of quarry is amount of Rs. 5, 00, 00,000 to 9, 00, 00,000 in a year from collection of 300000-3600000 (approx.) cubic meter sand and stone.

Livestock farming is another important livelihood option for riparian dwellers. Livestock (buffalo) rearing in the open grass tracts area (*char-chapori*) of downstream produce 1600-1700 liter per day and they earn Rs. 4,34,000 to 4,68,000 in year includinganimal wealth (buffalo) from 46 numbers of the makeshift livestock farming(*mohorkhuti*).

Fishing is an important occupation of riparian tribe and other communities in that area. Subansiri produce 1357800 kilogram (approx.) fish in a year. 2000-2200 people in general are associated with fishing business directly (Baruah S, 2012). Traditional Indigenous Knowledge System (TIKS) of fishing has been practiced for more than a century and it has been passing from generation to generation. Fishing techniques through application of trials on dolphins and by using Attracting, Fishing and Terminating (AFT) method of cooperative fishing applied by fishermen in nature in the Subansiri river are the existing practices. The percentage of catch per unit effort (c.p.u.e) among all the fishing techniques found to be in the following trends cooperative > dragnet>castnet> gill net fishing with 47%, 34%, 14% and 09% values respectively. (Dams doom endangered Ganges dolphin and a traditional indigenous knowledge system (TIKS) of human-dolphin co-operative fishing in the Subansiri river, North Eastern India, 2011; pp86-95). Wetlands (Beel) are an important source of water and nutrients necessary for biological productivity and often-sheer survival of people (Thompson, 1996). To sustain the ecosystems and fulfill human life (Schuyt, 2005) wetlands (Beel) are important element in the Subansiri basin. Altogether there are at present 112 wetlands for fishing in the Lower Subansiri basin as reported by "leaseholders". Out of these there are 15 major beels (>40 hectare) having total area of 1102 hectare with an annual fish production about 110-115 ton (90-140 kg/ha). Another 1083 hectare area of wetland comprises of small size wetland (2.7 hectare-25 hectare) with total production of 100 ton fish annually (The Expert Group, 2010).

People used the river for transportation purposes. There are 11-15 numbers of *ghat* and 100-110 people are engaged in that business. In winter season hira (*kumar*) people use the river course for their pottery (*kalah and tekeli*) business.

Livelihood Threats, the case of Ranganadi Hydro Electric Project

The hydroelectric dam (Shaid Abdus H.M, 2011), Ranganadi Hydro Power Project in operation, that adversely effected the discharge, flow pattern of the Ranganadi in the downstream. The minimum of discharge of 14,091.88 m^3s^{-1} in 2008 and maximum of discharge of 38,560.68 m3s-1 were in 2005.The fluctuating nature of water level of river Ranganadi has an impact on downstream. Before commissioned of the RHEP project the Nyshi people take breath in fresh air for their livelihood survival by using Common Property Resources (CPR). But, after commissioned of the dam the scenario drastically changes thereby distressing them from their livelihood.

The fluctuating nature of water level of river Ranganadi has an impact on downstream dwellers. Before commissioned of RHEP, paddy production

was more or less well enough for each household. In a study, Pulak (2011), found that after commissioned of RHEP, the paddy field were fully damaged and washed away. In the year 2009, during summer season due to excess released of water by NEEPCO authority, resulted flood in the downstream of three villages viz. Lichi-I, Lichi-II and Par Lichi and other hill site downstream villages of Papumpare district of Arunachal Pradesh including Bottling Plant up to Kimin and also affected the downstream plain area of Lakhimpur district of Assam. The damaged and washed away plots of land under paddy field of three respective villages are given below:

Table 3: Flooded Plot of Land under Paddy Cultivation

Name of the village	Land Category	No. of Plots	Flooded Plots of Land		
			BCD	ACD	Year
Lichi-I	LPC	15	-	14(93.33%)	2009
Lichi-II	LPC	18	-	13(72.22%)	2009
Par Lichi	LPC	18	-	8(44.44%)	2009

NB: LPC= Land under Paddy Cultivation, BCD= Before Commissioned The Dam, ACD= After Commissioned the Dam. Patentees indicate percentage of the total.

Table 3 depicted that maximum paddy plot were washed away in the year 2009 flood victims. 93.33%, 72.22% and 44.44% in the respective villages Lichi-I, Lichi-II and Par Lichi. The production level was significantly low during that particular year in comparison to unaffected plot of agricultural land even one person was swept away due to the sudden water release. Flash flood like situation not only washed away cattle, but also sets hurdle to the livestock rearing. Mithun, bullock, cow, pig, goat and poultry were mostly affected by sudden release of dam water.

The adult family members of downstream villages are involved in fishing. This is the prime resource that they usually trap from river. After completion of the dam, where water flow in the river has gone down drastically, river fish are totally gone and as a result, their prime source of livelihood were out of their hand.

The loss impacts are clearly visible in the downstream stretch of RHEP in Lakhimpur district of Assam. In the year 2008, devastating flood water washed away 41 kutcha houses, 12 semi pucca house and 5 pucca houses of the village Ujani-Khamti, 2.5 kilometers of road including one 30 meter and one 35 meter breaches and stone spars were also swept away by the flash flood water. Surface communications of the villages were disrupted including National Highway 52. The overflow of river water caused terrible loss of 21 person's life, 35 thousand hectares cattle land amounting approximately Rs. 3000 crore (Saikia P, 2008). 18 (approximately Rs. 2 crore) number of public institutions, 51,200 (approximately Rs. 51.2 crore) house and households assets lost and river water breached road in 15 places of Lakhimpur.

Ranganadi dam is a good example of government's negligence, insincerity and lack of commitment in securing life and livelihood of common people, where basic human rights of majority people are undermined (Saikia Rabin, 2011). Downstream affected people demand compensation and have submitted several memoranda of their plight. Instead of cataclysm distress on downstream in democratic nation where inclusive growth and sustainable development is an objective in the eve of climate change (Bongartz K. et al, 2008; Du Jun, 2001), a government agency circulated such type of shocking circular:"The corporation will not take any responsibility for any loss of life of human, pet animals etc. and damage of property and others due to carelessness of the individual and the responsibility on such losses/damages will be rest on the defaulters only." (Memo No. NEEPCO/HDP/RHEP/6/(C)06-07/245279, 2006). In case of LSHEP too, the different zones of downstream according to the vulnerability of dam impacts they envisages, the downstream dwellers will not get any direct benefit from corporation in the form of irrigation, pisciculture, development of waterways, tourism and other water related activities (The Expert Group, 2010).

Conclusion

In Arunachal Pradesh of North East India, considering people's aspiration towards development, the proximate to ultimate goal of development model is not visible in joint venture model of hydropower development. The system of implementation of development project is byzantine in nature, by keeping the common people in dark so that livelihood, human security and social security of the commons are at risk and tradeoff between hydropower and development is occurring. Freedom of aspects (process and opportunities) is totally missed out in the context of freedom of development. The project executor judges the development, just by economic growth, without realizing the expansion of substantial human freedom.

So the dream of hydropower has witnessed serious opposition from environmentalists, expert groups, social activists as well as indigenous people of the locality. Especially the downstream Assam province experienced RHEP dam impacts and expresses probable doubt impact from construction of big dam on upper stream Arunachal Pradesh. Pressure has been given to both state and central governments, especially from within Assam, to stop construction of big dam in Northeast India which falls in a vulnerable seismic zone-V. In this context, the recent voice against dam construction may create new kind of conflicts vis a vis inter community, inter district and inter-state levels, given that secessionism has been a perpetual problem in Northeast India (Barman Prateeti, 2010), and where armed action has usually been the first, rather than the last option of political poster (Bhaumik Subir, 2009). Thus, we need ontological politics on multiple realities, the decision makers should practice 'Situational Science' and should not behave like 'Stewie' and should not act as an 'Economic Hitman' in incredible democratic nation

not only in dam construction as well as in other development projects to expand the human choice.

Way Forward

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