



Biodiversity of Pahupuri *Beel* of Central Brahmaputra Valley Zone and its Sustainable Development

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ABSTRACT

Beels come under the wetlands and are one of the most productive environments in the world. *Beels* of Assam are storehouse of nutrients and supports a rich diversity of flora and fauna. Due to natural and man-made factors this most productive environment is presently under threats of loss of its many valuable indigenous flora and fauna along with reduction of its original geography. During the present study, an attempt has been made to evaluate the status of flora and fauna of the Pahupuri *beel* of Central Brahmaputra Valley Zone of Assam. Out of the total revenue area 38.0 hectare, presently 35.8 per cent is reduced due to encroachment. The study showed that, 25 per cent of the different plants were in under anthropogenic threat in the *beel*. Similarly, 25 per cent fish species and 44 per cent birds were also facing anthropogenic threat. Moreover, the endangered level of flora and fauna of the *beel* was also found at an alarming state. There is a need of enactment of wetland act and enforcement of existing wild life act in letter of spirit.

Key Words: Biodiversity, Endangered, Flora and Fauna, Threat.

INTRODUCTION

Wetlands are among the world's most productive environment. They provide tremendous economic benefits to mankind through the production of fish and other plants and animals. Wetlands include a differential habitat with permanent or temporary water bodies with variety of function and value like diversity of organism included threatened and endangered species, nutrient recycling, purification of water and ground water recharge (Pramod *et al*, 2011). Floodplain wetlands (locally known as *beel* in Assam) usually represent the lentic component of floodplains and exclude the lotic components. They are a source of protein and other nutrients required for human health (fish, birds, edible plants), water (for drinking and irrigation), house building materials (reeds and timber), transport and communication routes, effective sewage treatment system, fertile soils for agriculture, and buffer against flooding, erosion and nutrient loss.

In addition, flood plain wetlands present diverse aquatic habitats from deep lakes to shallow marshes and from lotic (open *beel* retaining riverine connection) to lentic (closed *beels* that have lost riverine connection) environments, which support rich floristic and faunistic biodiversity including fishes and waterfowl. Thus, existence of these diverse habitats is necessary for *in situ* conservation of aquatic biodiversity. Unfortunately, wetlands which include the *beels* are among the world's as well as Assam's most threatened habitats mainly due to accelerated drainage, land reclamation, encroachment, pollution and overexploitation.

India has extensive areas covered by floodplain wetlands which are an integral part of Brahmaputra and Ganga river systems. These wetlands together cover an area of 0.2 mha and often regarded as rich biodiversity resources. Assam is gifted with 3,513 number wetlands covering an area of 1,00,815 ha, around half of national wetland coverage and is

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capable of producing 1000 kg/ha/yr of fishes with moderate level of management (Pathak, 2000). Although, there are 3,513 wetlands in Assam, only 1,392 are listed as floodplain wetlands, of which 423 are registered and remaining 9669 are unregistered. The latter are under the control of both government (505) and private (464) ownership (Chandra, 2011). The present level of fish production from these *beels* is only 1/5th of the potential i.e. 173 kg/ha/yr on average (Sugunan and Bhattacharjya, 2000). The *beels* of Assam contribute to the major chunk of fishery and other resources covering approximately 72.45 per cent of the lentic areas of the state.

Pahupuri *beel* is situated in Nagaon district of Raha Agricultural Subdivision under Central Brahmaputra Valley zone. The *beel* is in western direction, 22 km away from the Nagaon town. At present the geographical area of the *beel* is 25.40 ha and it was 38.0 ha in 1970 according to Circle office, Raha. The *beel* is full of flora and fauna, but due to encroachment and misuse of resources some of the plants and animal species which were available earlier are not recorded during the present study from the *beel* and most of the remaining are in endangered level. A small number of different birds and fishes are available at present as informed by the stakeholders. Therefore, a study was undertaken with a view to record the different flora and fauna of the *beel* and to formulate different means of management and conservation.

MATERIALS AND METHODS

The study was based on the primary data of the respondents of the locality collected in the year 2019. Along the periphery of the *beels* there were four villages, viz. Pubdighaldari, Madhyadighaldari, Kakatigaon and Pahupuri village within a radius of 4 km. Study was conducted by selecting the aforesaid villages and also selecting the newly inhabitant people in the encroachment area of the *beel*. The name of the households was collected from the village head and listed accordingly. A total of 325 households were obtained. A cluster sampling technique was used to get sample size of

65 respondents. The respondents were grouped into three categories according to their age. The first group belonged to those respondents were of more than 60 yr of age (12) , followed with the second group of age between 25-60 yr (35) and the third group of below 25 yr (18) of age. The respondents were asked questions related to flora and fauna of the *beel* through a structured interview method and recorded accordingly. The collected information was processed and appropriate statistical tools were used for the analysis of data.

RESULTS AND DISCUSSION

The present study of different natural resources and their availability in the past (about 45 years ago) of the *beel* were studied.

Plant diversity

Different plant species available earlier and their present status in the studied *beel* are depicted in Table 1. It was seen that most of the plants in terms of volume and number were reducing. These were economically important from the respondents' point of view. A total of 10 households of these villages earned their livelihood by selling mats from matrush and common reed. The total area covered by vegetation in the *beels* was reduced by 35.8per cent. Some of the plant species had already disappeared (25%) from the catchment area. Again, plants like matrush were presently fall under endangered level (50%). Dependence on water and other resources in this environment has placed enormous pressures on the ecosystem worldwide resulting in direct impacts to species diversity and populations (Molur et al, 2011 and MEA, 2005). Similar reasons could be attributed to the loss of plant diversity in the Pahupuri *beel*.

Fish diversity

A good number of different species of fishes were harvested by the villagers. The existing status of fish species with their past availability are presented in Table 2. The respondents reported that 31per cent of the fishes were in endangered level in

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Table 1: Status of different plants in the Pahupuri *beel*.

Sr. No.	Local name	English name	Scientific name	Status	
				Past	Present
1.	Ichora	Common reed	<i>Phragmites karka</i>	Abundant	Abundant
2.	Azar	Indian Lilac	<i>Lagerstroemia flosreginae</i>	Abundant	Endangered
3.	Hijal	Hijal	<i>Barringtonia acutangula</i>	Abundant	Abundant
4.	Nal	Giant reed	<i>Arundo donox</i>	Abundant	Not recorded
5.	Khagori	--	<i>Phragmites sp.</i>	Abundant	Not recorded
6.	Birina	--	<i>Vetiveria zizanioides</i>	Abundant	Endangered
7.	Patidoi	Matrush	<i>Phynium dichotoma</i>	Abundant	Endangered
8.	Satamul	Asparagus	<i>Asparagus officianalis</i>	Abundant	Endangered

the *beel*, 25 per cent of which were seen earlier were not found now a days (*Nandus nandus*, *Channa* spp., *Pseudotropius atherinoides*, *Mystus* sp. etc.) and the remaining 44 per cent were available in lesser quantity. This loss of fish biodiversity may be attributed to over exploitation, water pollution, habitat degradation etc. Padmavathi and Srinu (2017) also reported similar cause for the loss of wetlands floral and faunal diversity.

Birds diversity

Birds like white wood duck, black diver cormorant etc. which were very common earlier as reported by the respondents not at all seen now a days in the studied area. Most of the birds which were abundant in past are in the line of endanger now. The birds were – vultures, spotted billed, pelican, stork, water hen etc. (Table 3). It was obtained that 31 per cent of the birds were endangered, 44 per cent were not seen presently and the remaining was available (Fig. 3). This loss of birds' diversity could be attributed to habitat degradation, over exploitation of natural resources in the wetland, water pollution, global climate change etc. MEA (2005) and UNESCO (2007) also reported similar causes for the loss of birds' biodiversity in the wetlands.

Sustainable development measures

The conservation of biodiversity was required at local, national and international level for the benefit and welfare of human population for all times to come. Based on the findings of the present study on the biodiversity of Pahupuri *beel* some measures for restoration of the habitats and the rehabilitation of the endemic and threatened species was suggested here to promote biodiversity in the studied *beel*.

Conflicting pattern of land use, water management and deforestation in the catchment area should be discouraged to conserve the biodiversity of the *beel*. In this case NGOs may be involved to free the catchment area of the *beel* from encroachers. In doing that the state government should make alternative arrangement for their dwelling.

Total ban on capture of different flora and fauna with special emphasis on fish species from the *beel* was required. Those people who were depending on the *beel* for their livelihood for them some alternative source of their livelihood may be created.

Effort should be made to develop breeding protocol and ranching of the endangered species.

The *beel* may be declared as sanctuaries for safe haven of different flora and fauna.

Table 2: Status of different fishes in the Pahupuri *beel*.

Sr No.	Local name	English name	Scientific name	Status	
				Past	Present
1.	Gadgadi	Bhetki	<i>Nandus nandus</i>	Abundant	Not recorded
2.	Rau/Row	Rohu	<i>Labeo rohita</i>	Abundant	Abundant (Lesser quantity)
3.	Koi	Climbing perch	<i>Anabas testeudineus</i>	Abundant	Abundant (Lesser quantity)
4.	Magur	Walking catfish	<i>Clarias magur</i>	Abundant	Endangered
5.	Singhi	Stinging catfish	<i>Heteropneutes fossilis</i>	Abundant	Endangered
6.	Arii	Long-whisked catfish	<i>Aorichthys aor</i>	Abundant	Endangered
7.	Cheng/ Garaka/ Cheng	Spotted snake head/ Barca snake head	<i>Channa barca</i>	Abundant	Not recorded
8.	Goroi	Green snakehead/ Spotted snakehead	<i>Channa punctatus</i>	Abundant	Abundant (Lesser quantity)
9.	Shol/Sol	Striped snakehead/ Banded snakehead	<i>Channa striatus</i>	Abundant	Endangered
10.	Bordaia	India Potasi	<i>Pseudotropius atherinoides</i>	Abundant	Not recorded
11.	Selkona	Large razorbelley Minnow	<i>Salmostomar bacalia</i>	Abundant	Abundant (Lesser quantity)
12.	Singorah/ Tingorah	Striped dwarf catfish	<i>Mystus vittatus</i>	Abundant	Not recorded
13.	Kurhi/Kuria	Kurialabeo	<i>Labeo gonius</i>	Abundant	Abundant (Lesser quantity)
14.	Bhangone	Bogalabeo	<i>Labeo boga</i>	Abundant	Abundant (Lesser quantity)
15.	Bhakua/ Bahu/ Dhekera	Catla	<i>Labeo catla</i>	Abundant	Abundant (Lesser quantity)
16.	Kharia	Humped featherback	<i>Chitala chitala</i>	Abundant	Endangered

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Table 3: Status of different birds in the Pahupuri *beel*.

Sr. No.	Local name	English name	Scientific name	Status	
				Past	Present
1.	Deoanh	White winged wood duck	<i>Cairima scutulata</i>	Abundant	Not recorded
2.	Sagun	Vulture	<i>Pseuelegytes bengalensis</i>	Abundant	Endangered
3.	BanariaRajhanh	Wild goose	<i>Branta canadensis</i>	Abundant	Not recorded
4.	Jikar	Water Fowl	--	Abundant	Not recorded
5.	Bhela	Spotted billed pelican	<i>Pelecanu sphilippensis</i>	Abundant	Not recorded
6.	Bartokola	Black naked storke	<i>Lettotyus javarica</i>	Abundant	Not recorded
7.	SaraliHanh	Whistling teal	<i>Dendrocgna javanica</i>	Abundant	Abundant (Lesser quantity)
8.	Hytha	Green pigeon	<i>Treron phoenitocoptera</i>	Abundant	Endangered
9.	Dowk	Water hen	<i>Amaurorni sphoenicurus</i>	Abundant	Endangered
10.	Kana Muchari	Paddy bird	<i>Ardcola gragii</i>	Abundant	Endangered
11.	Panikaury	Black diver cor-morant	--	Abundant	Not recorded
12.	Bagoli	Stork	<i>Bulbulaus idisdusus</i>	Abundant	Abundant (Lesser quantity)
13.	Kapow	Dove	<i>Zenaida macroura</i>	Abundant	Abundant
14.	Bhatow	Parrot	<i>Psittacula krameri</i>	Abundant	Abundant
15.	Koha/ Kuruah	Fishing eagle	<i>Haliacetus leocoriphus</i>	Abundant	Endangered
16.	Ghilahanh	Teal	--	Abundant	Not recorded

The water depth in *beel* was decreasing year by year because of siltation from flood waters of surrounding rivers (Kolong and Haria). This needs habitat restoration measures for the *beel*.

The state government should take necessary steps for implementing existing acts related to protection of wetland ecosystems in letter and spirit.

CONCLUSION

The present study revealed that the biodiversity of Pahupuri *beel* was under threat from various factors like climate change, over exploitation of its resources, water pollution, siltation etc. The *beel*

was increasingly facing anthropogenic pressure. Out of the total revenue area 38.0 ha, presently 35.8 per cent was reduced due to encroachment. From present study it was found that 25 per cent of the different plants seen earlier were not recorded now a day. Similarly, 25 per cent of fish species and 44 per cent of birds were also facing anthropogenic threat. Endangered percentage of flora and fauna of the *beel* was also indicated loss of its ecological balance. Therefore, it is the high time for sustainable management to safeguard the flora and fauna of the *beel*. There is a need of enforcement of existing wild life act and other acts related to management

of wetlands for conservation of this precious ecosystem.

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