

HUMAN IMPACT ON WETLAND: A CASE STUDY OF HNAHILABEEL, NAGAON DISTRICT, ASSAM

S. S. Hazarika¹ and B. Singh²

Department of Geography, Gauhati University, Assam, India

¹silpihazarika.5@gmail.com, ²singhbhalndar@gmail.com

ABSTRACT

Wetlands are considered as one of the most important landscape in almost all part of the world. During the recent years there has been great interest in wetland studies because of their significance as a natural habitat and the various flora fauna they support. Assam is endowed with aquatic wealth with numerous rivers, beels, ponds and swamps. Nagaon district which is located in floodplain areas of Brahmaputra valley also witnessed such aquatic richness by covering almost 379 wetlands accounting for about 11.15% of total land area. But the richness in wetlands degrading gradually due to increasing pressure of population which threatened the wetland biodiversity. The present investigation reveals different form of human impact on the Hnahilabeel and its deteriorated environment. The data to carry out the present study is based on both primary and secondary sources.

Keywords: Wetland, Human Encroachment, Indiscriminate Fishing, Biodiversity

Introduction

Wetlands are one of the most important natural resource which is closely associated with the distribution of human settlement. Wetlands are most often described as “the kidneys of the landscape” for their function (Mitch and Gosselink, 1986). These are viewed as transitional between terrestrial and aquatic ecosystem (Lee. et al. 2006) Wetlands are generally saturated with water either permanently or seasonally. The Ramsar convention defined wetlands as “as areas of marsh fen peat land or water, whether natural or artificial, permanent or temporary with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters” (Ramsar convention, 1971, article 1.1). Wetlands are considered as a resource to human society, meeting many crucial needs for life. Wetlands play an important role in regional ecosystem such as regulation of climate, cleansing of environment, flood control etc and retain water during dry period and by doing this keep the water table high and stable. Thus it mitigate flood during the flood period. Wetlands are locally known as *beel* and other words such as bog, marsh and swamp are use to denote wetlands. Normally *beels* are represented by sheets of water with varying shape size and depth, areas which are shallow and covered with weeds grasses and shrubs are known as swamp or marshes. Marshes are low

lying area and rich in mineral resources. All these are developed in river margin and these natural water bodies are collectively known as wetlands.

Wetlands being one of the most important landscape in the world, it occupies about 6% of the earth’s surface and the extent of the world’s wetlands is generally thought to be from 7 to 9 million square kilometer. In India the total area under wetland was estimated to be 11.69 Mha. This accounts for 3.66% of geographic area of country. Assam is also well endowed with swampy areas which are commonly known as *beels*. In Assam there are about 690 ponds as recorded covers an area of 15494.00 hectare which constitute 0.20% of total geographical area. District wise Assam has 861 ox-bow lakes/cut off meanders, 712 swampy/marshes, 10 numbers of reservoirs which constitute 2.63% of total area of the wetlands and 115 numbers of tank which is estimated from satellite data.

In recent time it is realized that increasing population pressure on earth surface brings various environmental problems which threaten the very existence of most of the ecosystem. Wetlands which are endowed with aquatic resources which harbour a wide variety of flora and fauna facing such threaten at a large scale. If encroachment towards wetlands will continue, then wetlands will be disappearing from earth in near future (Rahman, 2016). Wetlands are threatened

natural habitat due to land reclamation, pollution and accelerated drainage (Jhingram,1993). Due to agricultural runoff of pesticides and fertilizers, industrial and municipal waste discharge water in most of the rivers are degraded which cause eutrophication (Liu & Diamond,2005; Prasad *et al*, 2002). Despite their value, wetlands are rapidly disappearing. Assam is not an exception in this

Table1: Area Estimates of Wetland in Assam

Wetland category	Wetland type	Number of wetland	Total wetland area	% of wetland area
Natural wetland	Lake/ponds	1175	51257	6.71
	Ox-bow lake	873	14173	1.85
	High altitude wetland	-	-	-
	Riverine wetland	139	4258	0.56
	Water logged	2461	47141	6.17
	River/stream	213	637164	83.63
Man made	Reservior/barrage	2	2833	0.37
	Tank/pond	180	921	0.12
	waterlogged	54	544	0.07
	subtotal	5097	758291	99.20
	Wetlands(<2.25 ha)	6081	6081	0.80
	Total	11178	764372	100.00

Source: National wetland atlas.

Study area

Geographically Hnahilabeel is located between 26°16'13" and 26°16'47"N latitude and its longitudinal extension is from 92°42'40" E and 92°43'54" E. The Hanhilabeel host of a large number of residential and migratory birds specially different species of duck, fish, snakes, unidentified insects and a large number of aquatic species. It is situated near Nonoi at about 11 km south-east of Nagaon town by the side of the national highway -36 and is accessible by roads and comes under the revenue village Bhelaigaon of PakhimoriaMouza under Nagaon police station in the district of Nagaon in the state of Assam. The total area occupied by the beel is approximately 400 bigha.

It is located in central part of Nagaon district and is surrounded by Mudaioni, Badalgaon and Nam Gumutha village in its East, North East and South Eastern side respectively.

regard. Assam, the land of Brahmaputra and Barak valley provide suitable geo-ecological condition for development of various form of wetlands including 430 registered *beels*, 1192 swamps and about 185825 tanks covering about 134134.15 hectare involving rivers (Phukan and Saikia,2014) also face such anthropogenic impact which causes degradation of wetlands.

Bhelaigaon is located on the South and Deurigaon on South West of Hnahilabeel. The name of the *beel* "Hnahila" is derived from Assamese word " Hnah" which means duck and *beel* meaning wetland. Therefore local people believed that due to abundant availability of duck in the wetland it is named as Hnahilabeel.

Materials and methods

The study is based on the data collected from primary and secondary sources. The observation has been confined within the study area of the wetland. Both primary and secondary information has been used to arrive at a clear conclusion. Interview has been conducted among some nearby residents of the wetland area to collect primary information regarding the history of the wetland as well as the changes that has been taken place due to increasing human encroachment through time. At the same time Secondary sources like published book, journal, census records has been consulted to conduct the study. In the present study along with the primary and secondary data personal observation in the field is another important source.

Biodiversity of Hnahilabeel; an overview

Hnahilabeel is rich in aquatic resources which helps in maintaining the biodiversity of the *beel*. The wetland is rich in flora and fauna. The fauna resources include both birds and fishes. Both aquatic and terrestrial floras (table 1) are spotted there.

Table 1: Flora of the Hanhilabeel

Flora (Aquatic)	Vegetation (terrestrial)
PistiaStrtiotes	Centellaasiatica
Lemna Minor	Chenopodium album
Clinogynedichotoma	Partulcaoloracea
MonochoriaBastaefolia	ImperataCynlindrica
Arundodonax	Bombaxmalabaricum
Psendostachympolyorohum	MagniferaIndica

LpomoeaAquatica	Ziziphus jujube
Enhydraflucturusion	Artocarpusintegrifolia
SolanumIndicum	Anteterophyllis
Mimosa Pudica	Ficusreligiosa
Hyacinth	Musa Domestica
Water grass	Bambusatulda
Singera	Grewia multiflora
Dallgrass	Albizziaodoratissima

Source: Pakhimoria Science Society, Nagaon, Assam.

Among 269 different varieties of both commercially viable and ornamental fish species found in different wetlands, rivers, ponds in Assam, following varieties of fishes (table 2) are spotted in the Hnahilabeel.

Table 2:List of the ornamental and consumable fishes of the Hnahilabeel

1. Badis Assamese	21. Noemacheilusruppelli
2. LabeoRohita	22. Schistura Savona
3. CatlaCatla	23. Ompakbimacultus
4. GadusiaCharpa	24. Puntius sahyadriensis
5. Daniodevario	25.Labeo sp.
6. Puntius frazarii	26.Aorichthys aor
7. Botiarostata	27.Chandra ranga
8. ColisaChuna	28.Botia lohachata
9. Nandusnandus	29.Macrones sp.
10. Puntius parrah (Red silver barb)	30.Puntis canius
11. Bariliusbarna	31.Colisa Ialia
12. CtenopsNobilis	32.Botia Dario
13. Rohteeogilbii	33.Mystus tengara
14. Arias sp.(Cat fish)	34. Noemacheilusruppelli
15. Gadusiacharpa	35.Schistura savona
16. Cirrhinamrigala	36. Lycodontis tile
17. Anabas sp.	37. Macrogenthusa culeatus
18. BotiaStraita	38. ColisaLalia
19. Clariasbatrachus	39. Notopterusnotopterus
20. Anabas testudineus	40. Botia Dario

Source: Pakhimoria science society, Nagaon, Assam

The Hnahilabeel is also the natural habitat and feeding and breeding ground for several domicile as well as migratory birds. Migratory birds arrive at the beel during the winter season. Besides the migratory birds the residential birds of the beel are Hargila, (Greater adjutant), Bortokola , Sorali etc. but increasing anthropogenic impact in an around

the wetland bring serious threat to this rich biodiversity of the wetland.

Human encroachment on Hnahilabeel

Wetlands are vital as they are the home for various fishes and wildlife, improves water quality, store floodwater and maintain surface water flow (Kaleel, 2017). This naturally enriched wetlands have been facing various problems for years. Hnahilabeel which is one of the important wetland in Nagaon district having great ecological, socio-cultural and economic importance in the surrounding region. The beel plays an important role in that area as it provides home for various aquatic plants and animals as well as provides suitable environment for migratory birds in the winter season which enhance the scenic beauty of the region. The livelihood of the nearby villages including NizPakhimaria, Badalgaon, Dewrigaon, Jalah, Nonoi, Katonigaon dependent on the wetland. As the wetland provides various sources of income in the form of fishing, grazing ground for animals, firewood people use this wetland as the source of their economic benefit which deteriorates the wetland ecosystem. Therefore in recent times, this naturally rich wetland faces various problems due to human intervention and a clear indication of human encroachment can be seen in terms of reduction in the arrival of migratory birds. The beel nearly cover about 400 bighas of land but due to man’s activities the beel area reduces to a great extent. Two major form of Human impact have been seen in the wetland area that is unscientific fishing and deforestation. Besides these two major impacts, people of that region encroaches the wetland by constructing artificial embankments, roads, agricultural lands and houses. As stated above while discussing the human encroachment on Hnahilabeel over fishing by the local people is stands as a major problem to the wetland. Leasing out a portion of the beel to the department of fisheries for commercial catching of fish has taken its toll and had some undesirable consequences on the habitat of the beel. The aquaculture develop by some self help groups eliminate the mass area of the wetland. This affects the ecosystem of the wetland. Due to reduction of thebeel area the

problem of extinction of various flora and fauna taking place in the wetland.

Indiscriminate fishing done by the local people hamper the wetland to a great extent. The

wetland “Hanhilabeel” is rich in various species of fishes commercial value. But many of the fish species are under threat.



Fig 1: View of Hnahilabeel Fig 2: Migratory birds in Hnahilabeel Fig 3: Development of fish farming in Hnahila beel

Some of the valuable fish species become extinct and some are rarely found and their numbers is very less. People use various methods for fishing. Indiscriminate fishing method is responsible for reduction of fish production of the area. The increasing uses of net (*jal*) decline the fish production of the area. During monsoon period people of that area adopt several methods to block the water of the *beel* for fishing which hinder the migration of fishes and reduce the fish population. The people whose economic condition is not good they mostly involved in catching and selling fish by adopting unscientific method. This unscientific method of fishing harms the various species of fish in the *beel*. Besides the fishing activity, deforestation is one of the other human impacts which is primarily observed in Hnahilabeel. Deforestation of the area around the wetland has lead to the erosion of surrounding area with the deposit leading to huge sedimentation in the wetland thereby leading to shrinkage of the area of the *beel*, which has fallen out in terms of reduced biodiversity. The process of industrialization in the locality polluting the wetland environment with smoke which affects the wetland.

Due to human interference Hnahilabeel almost converted to agricultural field and fishing ground. All the modern agricultural activities adopted effect the biodiversity of the wetland.

One of the most important impacts on the *beel* is the conversion of *beel* into paddy field. Human impacts specially the changing land use pattern in an around the wetland bring changes to wetland environment. Besides these various big budget project launched in the last one or two years for commercial purpose completely change the environment of the Hanhilabeel. These projects not only affect the wetland ecology but also reduce the agricultural development. Besides this adding salt to the wound are the various types of development activities, exploitation by overgazing, water fowl hunting etc. Use of chemical fertilizers and insecticides in the nearby agriculture field, has negatively affected the wetland. Dumping of various wastes is one of the major problems faced by the wetland.

Conclusion

Undoubtedly the Hnahilabeel of Nagaon district play a vital role in socio economic condition of the study area as well as maintain the environmental quality of that area. But with time due to illegal encroachment of the land and illegal killing of the migratory birds as well as unscientific fishing by the local people, the wetland is now in the verge of extinction. Keeping this changing scenario of the wetland it is very necessary to implement some conservation measures by government as well as local people and NGO's to save the wetland ecosystem from severe damage.

References

1. Bora, A.K. & Barman, B. (1998). A Geo-Ecological study of the wetlands of Barpeta District, Assam. *North Eastern Geographer.*, 29(1-2). Pp. 44– 51.
2. Deka, N & Bhagawati, A.K. (2015). “Wetland in a village environment: A case from Brahmaputra flood plain”, *Transection*, vol.37. No.1, p.45
3. Dutta, I. (2008). Save Deeporbeel now or never, *Indian folklore research journal*, vol. 2.
4. Jhingram, V.G. (1993). *Fish and Fisheries Ind.*, Hindusthan publishing corporation, New Delhi. pp. 195– 220, 415–419.
5. Liu, J.G. & Diamond, J. (2005). “China’s environment in a globalizing world”. *Nature*, Vol. 435. pp.1179–1186.
6. Kar, M. (1997). ‘Flood Hazard Management of Assam: A Case study in Nagaon and Morigaon Districts of Assam’, *Journal of Institute of Landscape System and Ecological Studies*, Vol.20, No.1, pp. 29-44.
7. Kaur, R. (1999). *The Significance of Wetlands: Their problems and prospects with reference to Nagaon District*, *My Green Earth, Nagaon*, Vol.1, No.1, pp. 11-14.
8. Rahman, A. (2016). “Impact of human activities on wetland : A case study from Bongaigaon district, Assam, India”, *International journal of current micro biology and applied sciences*, vol.5. No. 3, pp392-396
9. Saikia, D. and Datta, L. (2006). “Degradation of Wetland Environment in Nagaon District of Assam; A Rural Urban Scenario”. *North Eastern Geographer*, Vol.34, No.1 &2, pp 80-89.
10. Sahariah, D. and Bora, A.K. (2006). “Hydro-Geomorphic Considerations for Management and Conservation of Wetlands in Darrang District, Assam.” *North Eastern Geographer*, Vol.34. No.1&2, pp 36-51.
11. Sarma, P. (1993). *Geocological study of beels and swamps in Nagaon and Marigaon districts of Assam*. Unpublished Ph.D. Thesis, Department. of Geography, Gauhati University, Guwahati.