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Wetland Degradation and its Conservation: A case study of some selected wetlands of Golaghat district, Assam, India

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Abstract

Wetlands are the 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. Wetland plays a significant role in regional ecosystem, such as the regulation of climate, cleansing of environment and balancing of regional water. The wetland provides critical habitat for a large number of flora and fauna. In India, the total area under wetlands was estimated to be 11.69 m ha. This accounts for 3.66 per cent of geographic area of the country. In Assam, total wetland area estimated is 764372 ha that is around 9.74 per cent of the geographic area. Wetlands act as important repositories of aquatic biodiversity. The present paper is an attempt to investigate the human activities including agricultural practices and the influence of solid waste causing a significant change in the land use,landcover and subsequent loss of wetlands. The present paper will discuss human interference and its impact on some selected wetlands of Golaghat district of Assam. The data analyzed and presented in this paper is based on both primary and secondary data (collected from different sources).

Keywords: Wetland, human interference, conservation.

Introduction

Wetlands are defined as 'lands transitional between terrestrial and aquatic eco-systems where the water table is usually at or near the surface or the land is covered by shallow water[1]. The Ramsar convention defined wetlands 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 metres"*[2]. The United States Geological Survey (USGS) defined wetland as a general term applied to land areas which are seasonally or permanently waterlogged, including lakes, rivers, estuaries, and freshwater marshes; an area of low lying land submerged or inundated periodically by fresh or saline water[3].

The value of the world's wetlands are increasingly receiving due attention as they contribute to a healthy environment in many ways. They retain water during dry periods, thus keeping the water table high and relatively stable. During periods of flooding, they mitigate flood and to trap suspended solids and attached nutrients. Thus, streams flowing into lakes by way of wetland areas will transport fewer suspended solids and nutrients to the lakes than if they flow directly into the lakes. The removal of such wetland systems because of urbanization or other factors typically causes lake water quality to worsen. In addition, wetlands are important feeding and breeding areas for wildlife and provide a stopping place and refuge for waterfowl. As with any natural habitat, wetlands are important in supporting species diversity and have a complex of wetland values[4].Wetlands perform numerous valuable functions such as recycle nutrients, purify water, attenuate floods, maintain stream flow, recharge ground water, and also serve in providing drinking water, fish, fodder, fuel, wildlife habitat, control rate of runoff in urban area, buffer shorelines against erosion and recreation to the society.

Wetlands are one of the most threatened habitats of the world. Wetlands in India, as elsewhere are increasingly facing several anthropogenic pressures. Thus, the rapidly expanding human population, large scale changes in land use/ land cover, burgeoning development projects and improper use of watersheds have all caused a substantial decline of wetland resources of the country. Significant losses have resulted from its conversion threats from industrial, agricultural and various urban developments. These have led to hydrological perturbations, pollution and their effects. Unsustainable levels of grazing and fishing activities have also resulted in degradation of wetlands.

Study Area: Golaghat district, the present study area is physiographcally a part of the Brahmaputra valley of Assam covering about 335879.83 hectares (figure-1). Although the valley exhibits quite a monotonous landscape, the study area is a combination of landscape with altitudinal variation in the valley itself from flood plain areas of the Brahmaputra and its tributaries through high old alluvium to still higher foot hills areas of the tertiary folds in Nagaland and the Cambrian land

mass in Karbi Anglong to the south and to the west respectively. The extension of the district from $25^0$45' N to $27^0$55'N and from $89^0$4' E to $96^0$2' E longitude.

The annual variation of the mean monthly temperature ranges from 24^0 to 37^0 C in the month of August and 10^0 to 32^0C in the month of January. This condition is very much suitable for crop growth. Moreover the region also receives good amount of rainfall every year. In the month of July it has been recorded as 377 mm, making it an ideal environment for cultivation. According to 2001 census, the total population of the study area is 9,46,279 persons.

The state of Assam holds around 430 registered Beels, 1192 swamps and low lying areas and 185825 tanks covering about 134134.12ha involving rivers. According to ARSAAC report, about 10123 sq km area in Assam has been occupied by wetland out 78438 sq km, which is the total area of the state. As per the survey conducted by Assam remote sensing application center,there are about 5213 nos of wetlands in Assam distributed in its 23 Districts[5].

Total wetland area in the Golaghat district is 43635 ha that includes 165 small wetlands (<2.25 ha). River/stream occupies 88.45% of wetlands. The other major wetland types are Lake/pond (5.16%), Waterlogged-natural (3.49%), and Ox-bow lakes (2.52%). Aquatic vegetation is mainly observed in Lake/pond, waterlogged wetland types. The area under aquatic vegetation is slightly more during pre monsoon (2304 ha) compared to post monsoon (1437 ha). Seasonal fluctuation of open water spread of wetlands showed slightly more spread during pre monsoon. The turbidity of water is moderate in both the seasons.

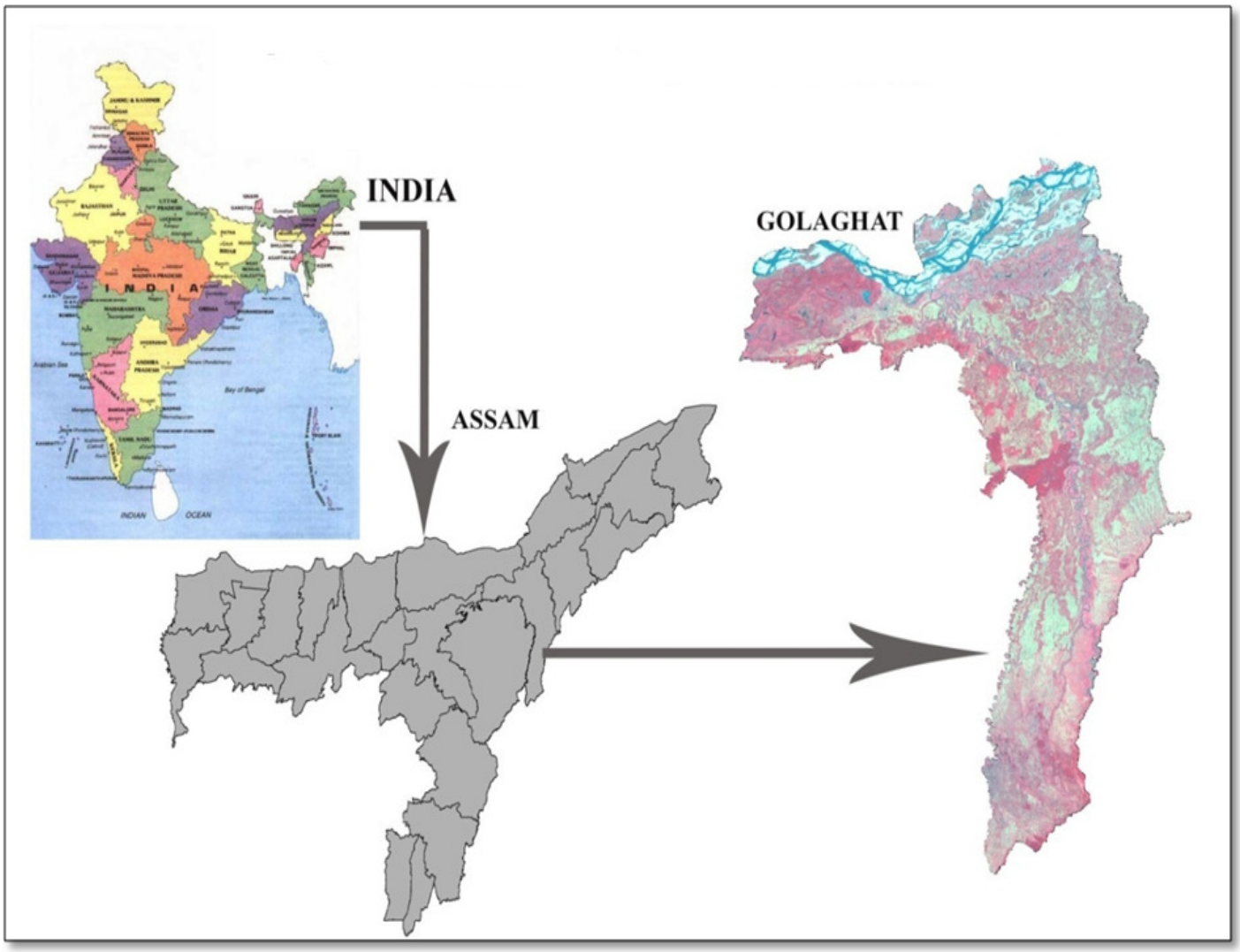
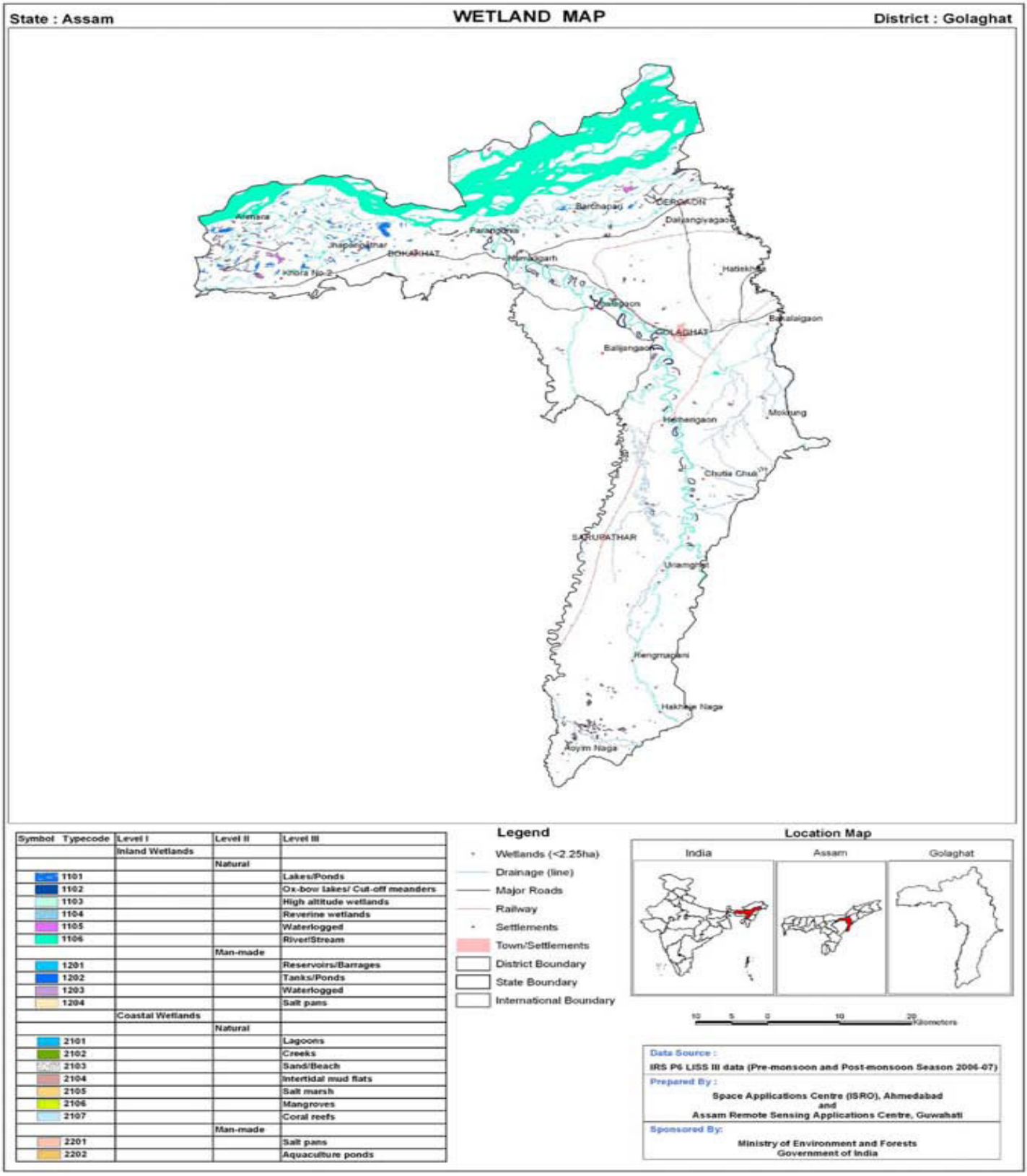


Figure-1
Location Map of the Golaghat District



Symbol	Typecode	Level I	Level II	Level III
		Inland Wetlands		
			Natural	
	1101			Lakes/Ponds
	1102			Ox-bow lakes/ Cut-off meanders
	1103			High altitude wetlands
	1104			Reverine wetlands
	1105			Waterlogged
	1106			River/Stream
			Man-made	
	1201			Reservoirs/Barrages
	1202			Tanks/Ponds
	1203			Waterlogged
	1204			Salt pans
		Coastal Wetlands		
			Natural	
	2101			Lagoons
	2102			Creeks
	2103			Sand/Beach
	2104			Intertidal mud flats
	2105			Salt marsh
	2106			Mangroves
	2107			Coral reefs
			Man-made	
	2201			Salt pans
	2202			Aquaculture ponds

Figure-2
Wetland map of Golaghat district

Objective: The objective of present study is to explore and examine the human interference on the wetlands of Golaghat district and its effects on the present study area. To delineate this basic objective, some wetlands are selected as sample of the study and surveyed to fulfill the following objectives: i. To study the impact of human interference on the selected wetlands of the study area. ii. To suggest measure for conservation and management of the wetlands.

Methodology

The study is based on primary and secondary data collected from various sources such as journals, books, internet and other published and unpublished works. Both qualitative and quantitative parameters have been used in order to carry out the whole study. We have selected some wetlands randomly for sample survey. The name and extent of the wetlands are listed below.

Table-1
Name of the sample Wetlands with geographic co-ordinates

Sl no	Wetland name	Geographic co ordinates
1	Kolaburia	26º39′50″N 93º42 ′150″ E
2	Daphlong	26 º38′068″ 93º21′458″ E
3	Ahajati	26º41′972″ N 93º51′849″ E
4	Borbeel	26º42′455″ N 93º 49′ 957″ E
5	Sahala	26□40'454" N 93□40'765" E
6	Kaathpura	26º85′856″ N 93º25′09″ E

The names of the villages adjacent to the selected wetlands are; Kurabahi, Merkangaon, Shinakangaon, Upertemera, Pothalipam, Borchapori, and Kanchachapori. Three welands are selected namely Daphlong, Sahala and Kaathpura from Kaziranga reserve forest to show the comparison between human and natural interference.

Results and Discussion

Six selected wetlands are surveyed to find out the use of wetlands and human interference on them. Waste disposal is the main concern issue if we talk about the human interference on wetlands. In the Golaghat District there are three major Municipality Area namely, Golaghat Town Municipality, Dergaon Municipality and Bokakhat Municipality Area. The average municipal waste material used to dispose in the Golaghat Municipal area is average 14 Ton per day on the otherhand in case of Dergaon Municipality the amount is average 1 Ton per day as reported by Golaghat Town Municipality office.It was also found that there are two major Municipality waste dumping sites in the district namely Nagabali Dumping area and the other is near Gela beel.The best part of this study is that there are no prominent waste municipal solid waste disposal duming site in the sample wetlands of the present study area ie Golaghat District. The major cause of absence of the waste disposal and dumping sites in the sample wetland is their location. Most of these wetlands are situated at allong the riverside of mighty river Brahmaputra and some of the wetland situated under the area of Kaziranga National Park which is a protected area.

In our study, we have found out that the the use of wetlands are mainly for Fishing and then agriculture irrigation purposes. In three other selected sample wetlands we cannot mark out the uses as they are situated at Kaziranga national Park, which is a restricted area.

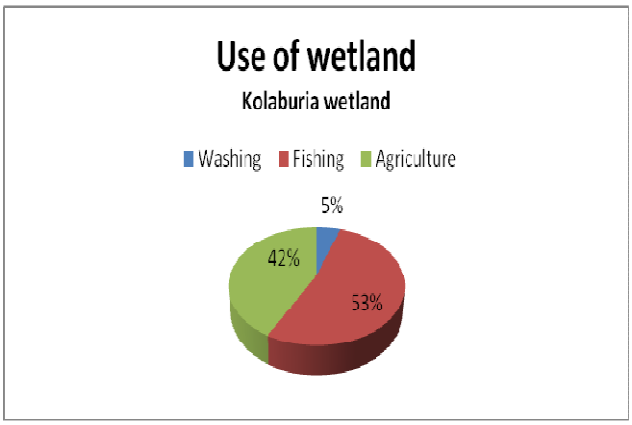


Figure-3
Use of Kolaburia Wetland

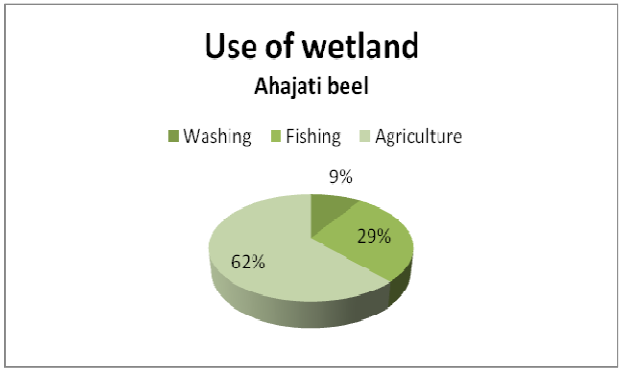


Figure-4
Use of Ahajati Wetland

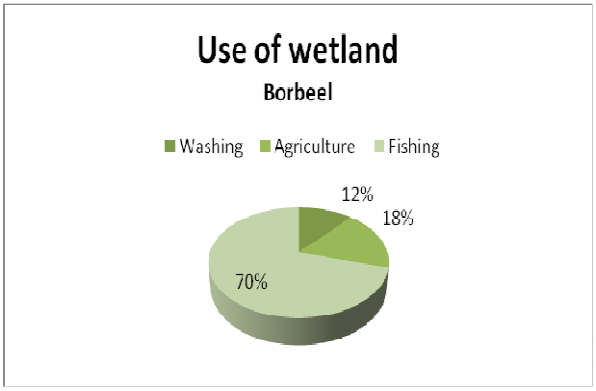


Figure-5
Use of Borbeel Wetland

To know the change of wetlands over a period of time we used toposheets of 1967 and recent LISS IV 2009 satellite data.By comparing the two maps it is noticed that vast changes has occured during this time period. The maps below clearly show the change of pattern of the selected wetlands.

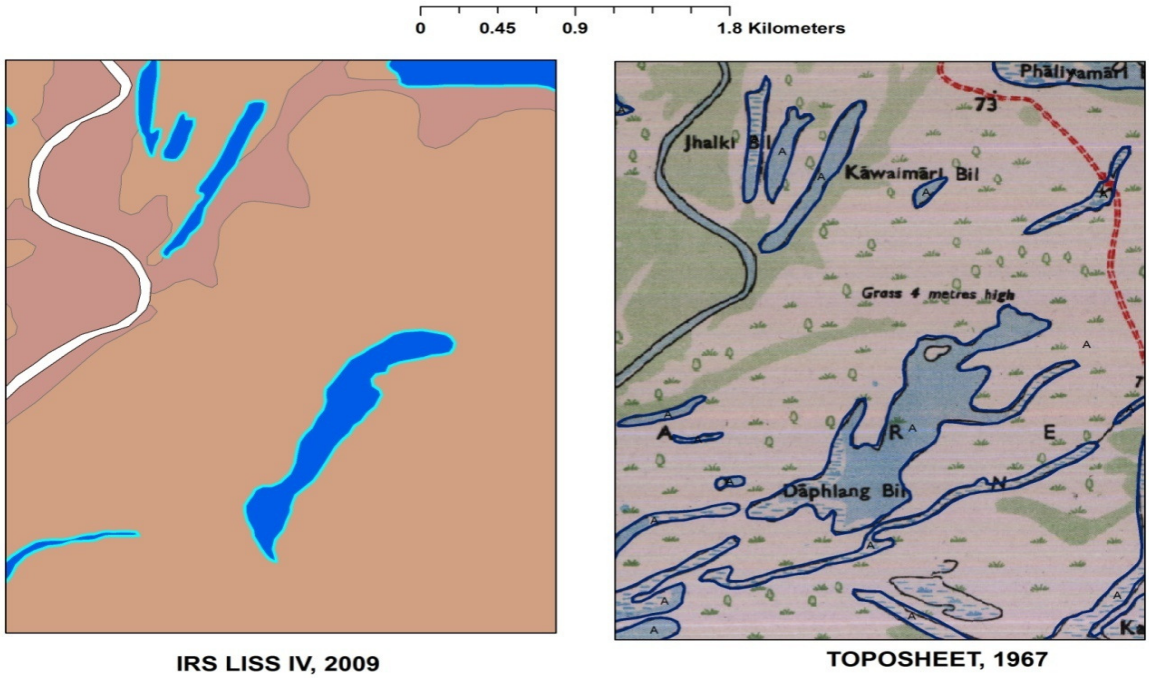


Figure-6
Change detection of Daphlong Beel

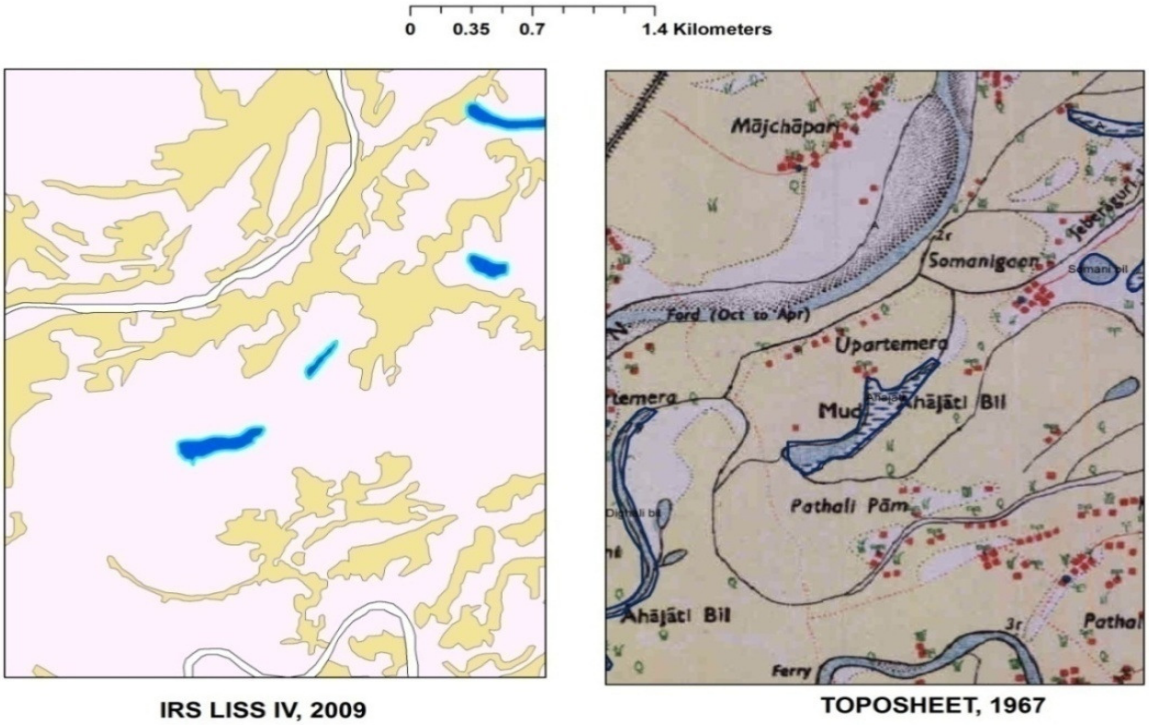


Figure-7
Change detection of Ahajati Wetland

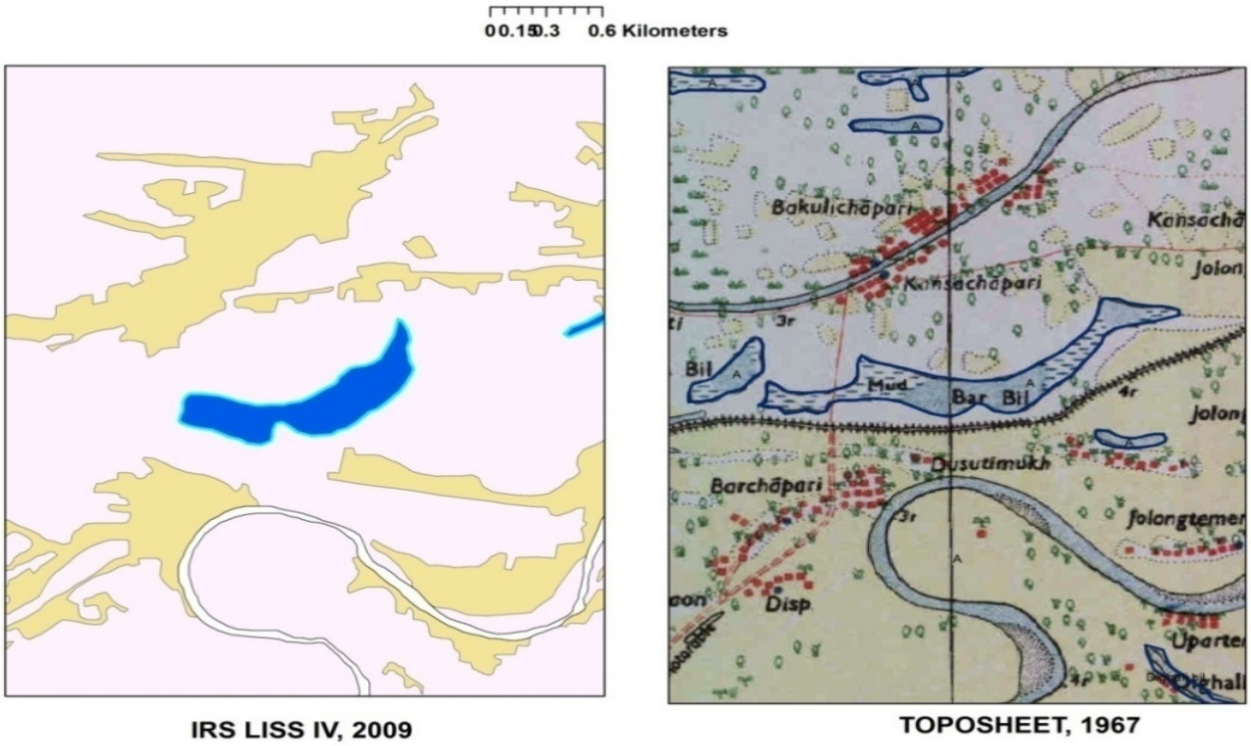


Figure-8
Change detection of Barbeel

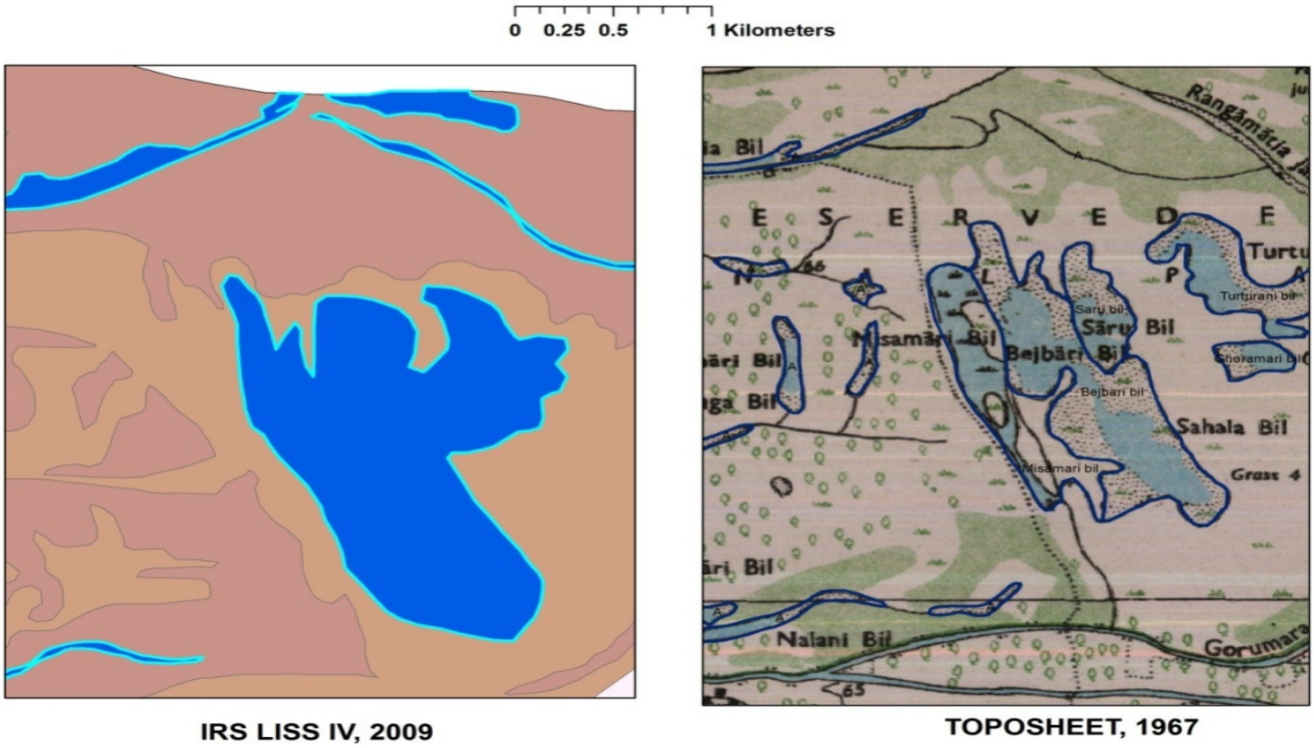


Figure-9
Change detection of Sahala wetland

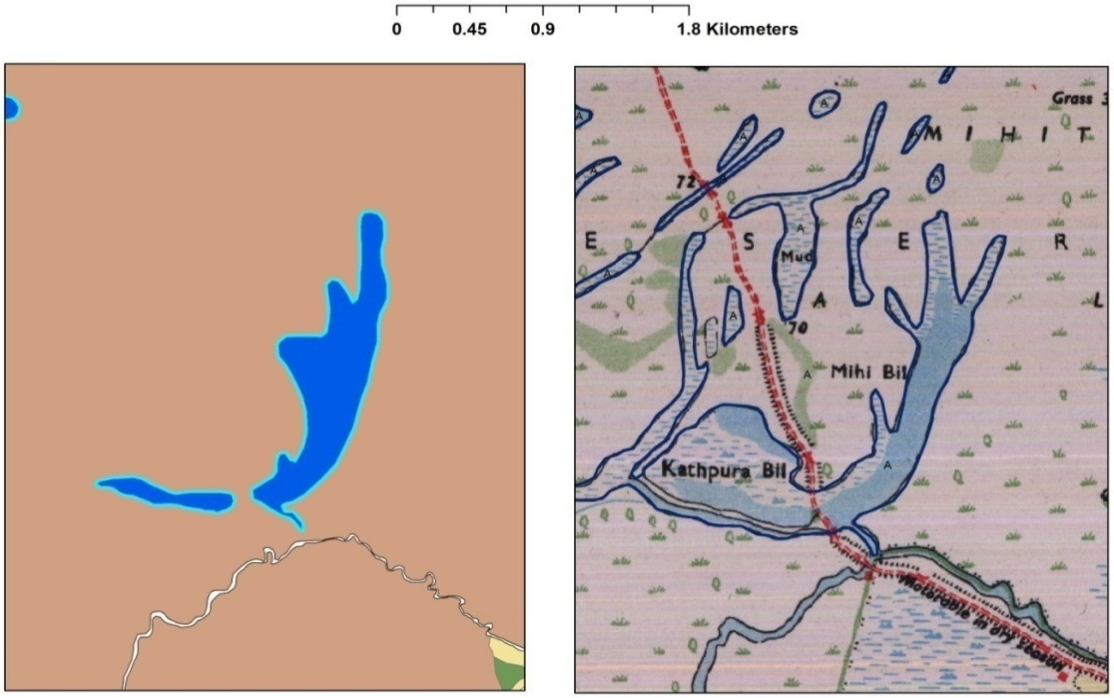


Figure-10
Change detection of Kathpura Beel

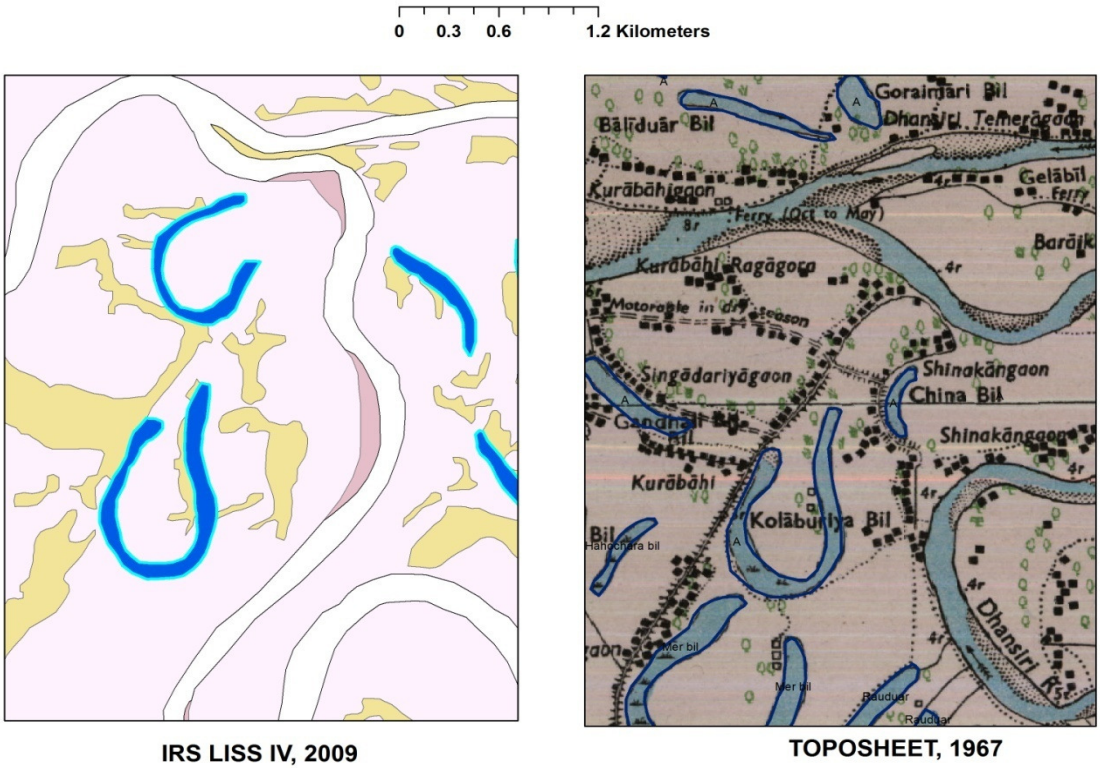


Figure-11
Change detection of Kolaburia Wetland
Table-2

Change detection of sample Wetlands

Name of the beel	Area in2009 Image(sq km)	Area in Toposheet 1967 (sq km)
Kolaburia	0.24	0.25
Kathpora	0.62	1.58
Daphlong	0.41	0.92
Sohola	2.36	1.91
Ahajati	0.05	0.15
Borbeel	0.33	0.4

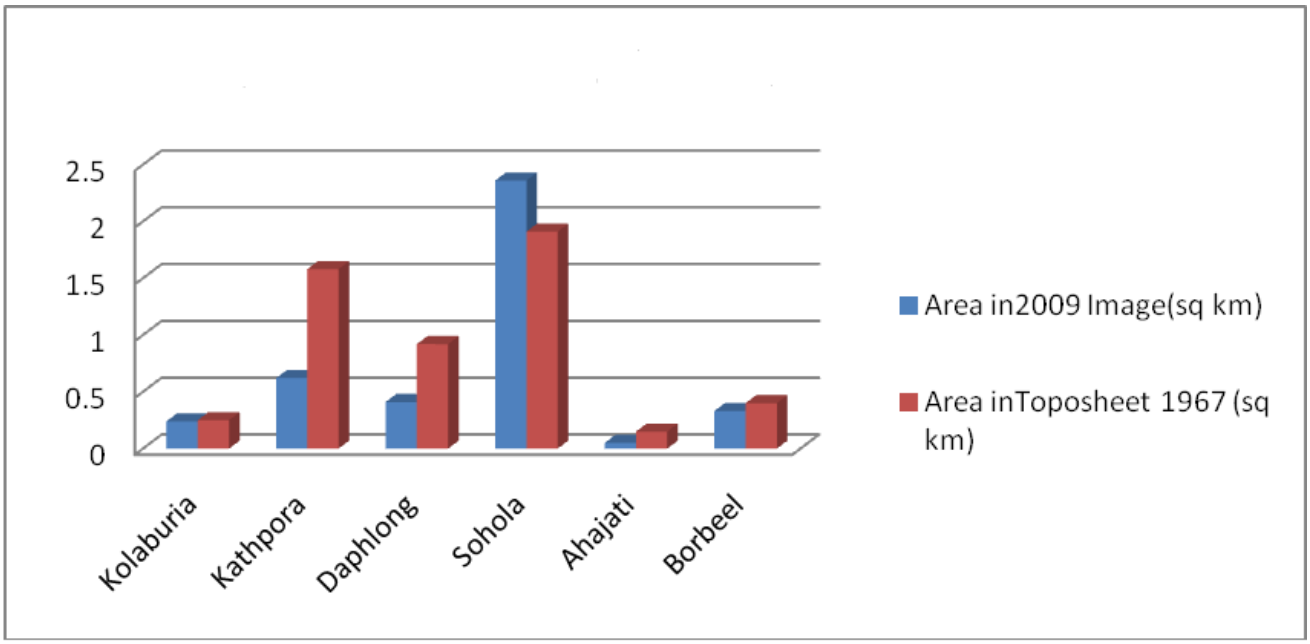


Figure-12
Change detection of sample wetlands

Decrease in volume of the sample wetland Kolaburia, Kathpura, Borbeel and Ahajati is for the human encrossment for cultivation in the banks. Increase in the volume in Sohola wetland can be attributed to zero human interference because of its location in reserved area. A natural increase in size is a result of continuous hydrological processes.

Suggestion: i. Dumping of any garbage and others on proximity of the beel should be stricly prohibited. ii. A multi-disciplinary study on the status and threats of wetlands could provide a key to conserving these wetlands. iii. Public awareness programme should be organized to among the people of the region. iv. Sanitary landfill should be used for final solid waste disposal to avoid acute pollution problem associated with discharging waste into wetlands. v. Composting municipal refuse to convert it into a fertilizer appears to be a good way to recycle the resources. vi. State government must formulate and adopt a wetland policy and ensure its proper implementation

Conclusion

When we destroy wetlands,there can be enormous impacts. If we preserve the health of wetlands and restore wetland ecosystems, it simply follows that we generate associated environmental, social,and economic benefits.

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