



# GEO-ECOLOGICAL STUDIES ON DIVERSITY OF MACRO FLORA IN URPAD BEEL, GOALPARA DISTRICT, ASSAM

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## Abstract

The geo-ecological study on diversity of macro flora in Urpad beel has been carried out from January 2018 to December 2018. The study reveals that Poaceae is dominant family among the families in the urpad beel. Diversity of macro flora is decreasing in the study area due to degradation of habit and altering of geo-ecological condition and physico-chemical properties of water by the anthropogenic activities. Human inducing encroachment, agricultural practices and fishing in the beel are greatly altering the ecological conditions and it leads to extinction of some plant species from the study area. Since, it is surrounded by human habitat tribal villages; it is under great threat of further extinction of biotic community.

**Key words :** Geo-ecology, diversity, macro flora, wetland, Goalpara district.

## Introduction

Wetlands play a vital role in maintaining the geo-ecological system of the earth. Ecologically wetlands are considered as a great significant for an area as they support different food chain, food webs, agriculture and allied sectors, sequestration of carbon, pollution abatement, control flood, regulate hydrological cycle, recharge ground water, retention of toxics, trapping of energy and shelter to large numbers of flora and fauna having great ecological and economical value, maintain biodiversity, support tourism and has cultural significance. Wetlands are the unique ecological resources which are providing numerous products and services to the human society. Wetlands are functioning as source of water for irrigation, fisheries, non-timber forest products, water supply and recreation to human society.

Wetlands occur where the land is covered by water or where the water table is at or near the surface of the land. Wetlands are the only ecosystem in the world whose conservation has been adopted as early as 1971 by the international convention (Ramsar Convention). Ramsar Convention defined wetlands as “areas of marsh, fen, peatland 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”. UICN define wetlands as “all the submerged or water saturated lands, natural or man-made, inland or coastal, permanent or temporary, static or dynamic, or vegetated or non vegetated, which necessarily have a land-water interface”.

Assam is located in the heart of the hill states of North East India and it is drain by the two river system, the Brahmaputra river and the Barak river system. These two riverine tracts of Assam provide favorable geo-ecological conditions for the growth and development of the wetlands and they are most common and integral geomorphic features of the fluvial landscape of Assam. The origin and growth of the wetlands directly linked with geo-physical conditions, tectonic evaluation, hydrologic and fluvio-geomorphic characteristics of the rivers of the region.

Assam Remote Sensing Application Center (ARSAC), 1997, has been recorded the total number of wetlands in Assam is 3474 and total area covered by wetlands is 1,01,229.4 ha., its accounts for 1.29% of total geographical area of the state (Deka and Goswami, 1992 and Bora, 2001). Goalpara districts shares 165 wetlands and 3832.5 ha. from the total number of wetlands and

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**Table 1:** List of plants in Urpada Beel, Goalpara district.

Sl. No.	Botanical name	Family	Habit
1	<i>Ageratum conizoides</i> L.	Asteraceae	MA
2	<i>Alpinia allughas</i> (Retz.) Rose.	Zingiberaceae	EA
3	<i>Alternanthera sessilis</i> L.	Amaranthaceae	MA
4	<i>Alternanthera philoxeroides</i> L.	Amaranthaceae	EA
5	<i>Amaranthus spinosus</i> L.	Amaranthaceae	MA
6	<i>Amaranthus vieidis</i> L.	Amaranthaceae	MA
7	<i>Arundo donax</i> L.	Poaceae	EA
8	<i>Brachiaria ramosa</i> L. Stap.	Poaceae	EA
9	<i>Carex spiculata</i> Boott.	Cyperaceae	EA
10	<i>Ceratophyllum demersum</i> L.	Ceratophyllaceae	FS
11	<i>Colocasia esculenta</i> L. School.	Araceae	EA
12	<i>Commelina benghalensis</i> L.	Commelinaceae	MA
13	<i>Cynodon dactylon</i> L. Pers.	Poaceae	MA
14	<i>Cyperus brevifolia</i> (Rottb.) Hassk.	Cyperaceae	MA
15	<i>Cyperus rotundus</i> L.	Cyperaceae	MA
16	<i>Dichrocephala latifolia</i> D.C.	Asteraceae	MA
17	<i>Echinochloa colonum</i> L.	Poaceae	EA
18	<i>Cleome viecosa</i> L.	Capparidaceae	MA
19	<i>Cassia tora</i> L.	Caesalpinaceae	MA
20	<i>Centella asiatica</i> Urban	Apiaceae	MA
21	<i>Chromolaena odorata</i> L.	Asteraceae	MA
22	<i>Eclipta alba</i> L. Hassk.	Asteraceae	MA
23	<i>Eichhornia crassipes</i> (Mart.) Solms.	Pontederiaceae	FF, EA, MA
24	<i>Elecharis congesta</i> (Spreng.) Don.	Cyperaceae	MA
25	<i>Enhydra fluctuans</i> Lour.	Asteraceae	EA
26	<i>Euryale ferox</i> Salisb.	Nymphaeaceae	FA
27	<i>Hydrilla verticillata</i> (Lf.) Royle.	Hydrocharitaceae	SA
28	<i>Hydrocotyle rotundifolia</i> D.C.	Poaceae	MA
29	<i>Hymenachne pseudointerrupta</i> (C.Muett)	Poaceae	EA
30	<i>Ipomea aquatica</i> Forsk	Convolvulaceae	EA
31	<i>Ipomea carnea</i> Jacq. Var. <i>fistulosa</i>	Convolvulaceae	EA
32	<i>Ipomea obscura</i> (L) Ker Gawler.	Convolvulaceae	MA
33	<i>Juncus prismatocarpus</i> R. Br.	Juncaceae	EA
34	<i>Jussiaea repens</i> L.	Onagraceae	EA
35	<i>Leersia hexabdra</i> Sw.	Poaceae	EA
36	<i>Lemna perpusila</i> Torrey.	Lemnaceae	FF
37	<i>Lindernia indica</i> L. Druce.	Scrophulariaceae	FA
38	<i>Ludwigia hyssipifolia</i> (G.Don) Exell.	Onagraceae	MA
39	<i>Ludwigia prostrata</i> Roxb.	Onagraceae	MA
40	<i>Melastoma malabathricum</i> L.	Melastomatacea	EA
41	<i>Mikania micrantha</i> H. Bk.	Asteraceae	MA
42	<i>Leucus plukentii</i> (Roth) Spreng.	Lamiaceae	MA
43	<i>Mimosa pudica</i> L.	Mimosaceae	MA
44	<i>Monochoria hastata</i> L. (Sotms)	Pontederiaceae	EA
45	<i>Nojas indica</i> (Willd) Champ.	Najadaceae	SA
46	<i>Nelumbo nucifera</i> Gaetrn.	Nymphaeaceae	FA

Table 1 contd....

total area under wetlands of the state respectively.

The wetlands of riverine origin are categorized into fresh water lakes, ox-bow lakes or abandoned channels, marshy tracts, seasonally water-logged areas and swampy and marshy areas. Urpada beel in Goalpara district is under the swampy and marshy category and it is permanently covered by water, mostly having shrubs. The lake like water bodies or swampy and marshy areas are locally known as “beels” “Jalah”, “Doloni”, “Pitoni”, “Doba” and “Hola”, covered with floating aquatic plants and they mostly found close to the river banks.

Geographically, the selected study area Urpada beel is located between 25°28'2" to 26°15'2" N Lat. and 89°42'2" to 90°15'2" E Long. to south of the Brahmaputra river of Goalpara district, Assam (Map.1). Total area covered by the Urpada beel is about 649.38 ha. The average annual rainfall in the district is 1614 mm and the average minimum and maximum temperature are 10°C and 33°C respectively. Most of the rainfall received during the monsoon season. The wetland is fed by the Jinjiram river during the flood which is flowing at the south of the wetland and flowing parallel to the Brahmaputra in western direction before it meets the Brahmaputra at Bahadurghat of the Bangladesh. Urpada beel is located between the levee formed by the Brahmaputra in the north and Garo hills of Meghalaya in the south. The wetland is geologically formed by Archean Gneissic complex consisting of granites, schists, gneisses and amphibolites. The Archean Gneissic is concealed at the basement by the new alluvial soil and formed its valleys. From

Table 1 contd....

Sl. No.	Botanical name	Family	Habit
47	<i>Nymphoides cristata</i> (Roxb.) Oltze	Nymphaeaceae	FA
48	<i>Nymphaea nouchali</i> Buern. F.	Nymphaeaceae	FA
49	<i>Oxalis corymbosa</i> L.	Oxalidaceae	MA
50	<i>Oxalis corniculata</i> L.	Oxalidaceae	MA
51	<i>Panicum maximum</i> Jacq.	Poaceae	EA
52	<i>Panicum paludosum</i> Roxb.	Poaceae	EA
53	<i>Pistia stratiotes</i> L.	Araceae	FF
54	<i>Plantago major</i> L.	Plantaginaceae	MA
55	<i>Polygonum galbrum</i> Willd.	Polygonaceae	EA
56	<i>Polygonum hydropiper</i> L.	Polygonaceae	MA
57	<i>Polygonum orientale</i> L.	Polygonaceae	MA
58	<i>Ranunculus sclheratus</i> L.	Ranunculaceae	MA
59	<i>Rumax dentatus</i> L.	Polygonaceae	MA
60	<i>Rumax nepalensis</i> Spreng.	Polygonaceae	MA
61	<i>Sagittaria sagittifolia</i> L.	Alismataceae	EA
62	<i>Saselia dancifolium</i> C.B.Cl.	Apiaceae	EA
63	<i>Scirpus articulatus</i> L.	Cyperaceae	Ea
64	<i>Scirpus mucronatus</i> L.	Cyperaceae	MA
65	<i>Utricularia Flexuosa</i> (Vaul)	Lentibulariaceae	FS
66	<i>Vallisneria spiralis</i> L.	Hydrocharitaceae	SA
67	<i>Xanthium strumerium</i> L.	Asteraceae	MA

N.B.: MA= Marshy Amphibious, FA= Floating Anchored, SA= Submerged Anchored, EA= Emergent Amphibious, FF= Free floating, FS= Free Submerged.

**Table 2:** Seasonal variation of physico-chemical factors at Urapad Beel of Goalpara district, Assam.

Season	Parameter		
	Water Temperature °C	pH	Dissolve Oxygen (ppm)
Winter	21.1	9.0	7.0
Summer	26.2	8.3	5.8

the geographical antiquity, the numerous low hills called Archaean inselberge found scattered near Goalpara district and outline portion of Shillong plateau and represent the oldest rocks (Allen, 1905 and Evans, 1936 and Deka *et al.*, 2010). Hamilton (1814) had reported that there was a luxuriant sal (*Shorea robusta* L). The large scale deforestation and destruction of natural habitats, like forest, grassland and wetlands seems inevitable (Choudhury, 2001), since large percentage of population in Assam, lives in rural areas and depends on agriculture for their livelihood. Physico-chemical properties of wetland like pH ranges between 7.2 to 8.5 which is highly alkaline due to its waterlogged nature of the wetland. Water temperature ranges between 6.2-19.6, dissolved oxygen ranges from 6.4 mg/l to 10.2 mg/l, alkalinity ranges from 92.2mg/l to 157.3 mg/l, it increases during winter

due to low amount of rainfall.

## Materials and Methods

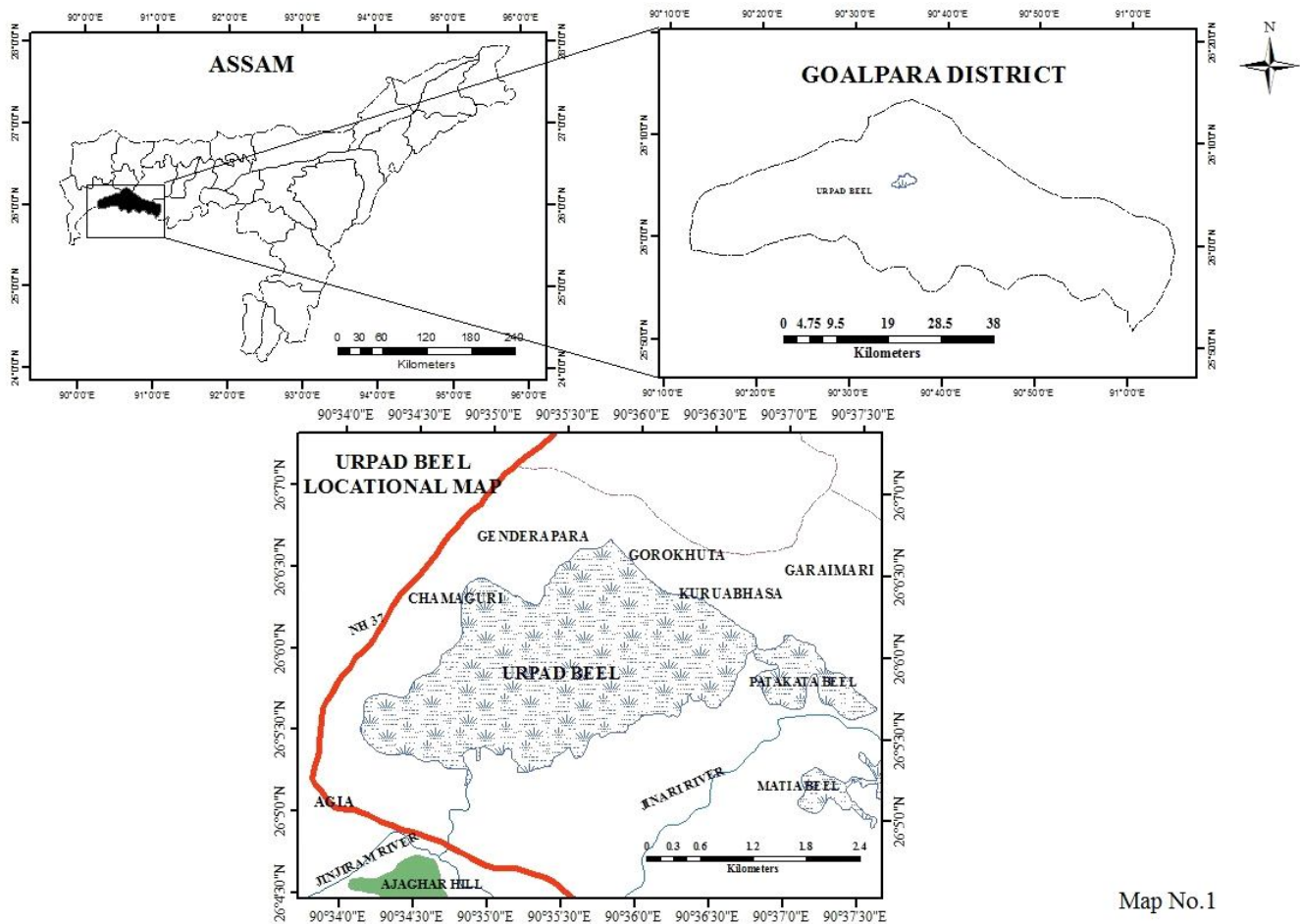
Urapad beel area is under Balijana revenue circle of Goalpara district. The study has been conducted from January 2018 to December 2018. After collection of sample identification and estimation of plants were done. Location map for the study area was prepared under GIS environment (Map 1). To locate the study area on map GPS points were collected from the ground and maps were prepared using ArcMap 10 software. The physico-chemical parameters like water temperature, pH and dissolved oxygen were tested in laboratory using thermometer, electric pH meter and Winkler's method respectively and required samples were collected between 7am to 9am.

## Results and Discussions

Geo-environmental factors greatly influence on the ecological habit of plant community of the study area. The factors like temperature, pH and dissolved oxygen greatly affect on the growth and development of plant and animal communities. In the study area poaceae is the dominant family among all the families (Table 1).

Due to anthropogenic factors like human encroachment, agricultural practices and fishing are greatly impact on the ecological conditions of biotic community in the wetland to a great extent. Since the wetland is surrounded by villages the rate of encroachment for human settlement and agricultural practices are very high which is leading to destroying the natural habit of the plants and animals. Farmers are used chemical fertilizer and pesticides for agricultural production which leads to destroying of natural qualities of water and makes the wetlands unsuitable for plants and animals survival. Fishing is primary activity of tribal people inhabiting in the surrounding villages of the wetland which is responsible for disappearing and destroying of different species of plant and animals from the wetland permanently.

Another important geomorphological factor which affects the ecological condition of the wetland is



Map No.1

sedimentation. Due to back flow of water from the Jinjiram river during the flood carries large amount of sediments to the wetland and leads to rise of its bed. Plants which are live in deep water, they are gradually disappearing from the wetland due to their less tolerance level.

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### References

- Allen, B.C. (1905). Gazetteers of Assam State (District Goalpara) Maligaon, Guwahati; Sreeguru Press.
- Bora, A.K. (2001). Physical background, Geography of Assam, (Ed.) (Bhagabati, A.K., A.K. Bora and B.K. Kar) Rajesh Publication, New Delhi, 18-35.
- Choudhury, A.K. (2001). Biodiversity Geography of Assam, New Delhi, India, Rajesh Publications.
- Deka, S.J., G.C. Sarma, R. Baishya and S.P. Deka (2010). Phenological study of Macrophytes of some selected wetlands of Goalpara district, Assam, India, *Plant Archives*, **10(1)**: 165-170.
- Deka, S.K. and D.C. Goswami (1992). Hydrology, sediment characteristics and depositional environment of wetlands: A case study of Deepor Beel, Assam Science Society, **34(2)**: 62-84.
- Evans, P. (1936). Trans of Mineralogical and Geological Institute of India, **27**: 161-253.
- Hamilton, F.B. (1814). An account of Assam 1808-1814, Published by Sree Guru Press, Maligaon, Guwahati (Reprinted).