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Origin and Distribution of Wetland in Goalpara District, Assam

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Abstract: ***The surface area of the earth is 510 million square kilometer out of which 149 million square kilometer is land surface. According to world conservation and monitoring centre 6% of the total land surface of the earth is covered by wetland. In Assam, approximately 7% of total land surface is covered by wetlands, but in Goalpara district the percentage is remarkably high. In Goalpara district 18% of land surface is covered by wetlands. Therefore wetland plays a pivotal role in the land use planning and economy of the district. In this paper, an attempt has been made to analyse the origin and distribution of the wetlands in the district.***

Keywords: Classification, distribution, origin, wetland

1. Introduction

Our planet, the earth has a surface area of 510 million km squared out of which 29% is land and 71 % is covered by water bodies. Out of which 29% land surface, only a small portion is fit for human habitation. Other places excluding human habitation are also equally significant for occurrences of plentiful natural resources on which human habitation is directly or indirectly depended. Wetland are occupying 6% of the worlds land surface and the store house of flora and fauna and supply fish and other animal products for human consumption. In Assam 7% of total land surface is covered by wetlands. So a proper scientific study of origin and distribution of wetlands of Goalpara district deserves much attraction. The subject wetland gained its popularity after the convention of wetlands held in the Iranian city Ramsar on second February 1971 and scientist and researchers of multiple disciplines came forward to study the subject. In this paper an attempt has been made to make proper analysis on origin and distribution of wetland in Goalpara district based on scientific data.

2. Methodology

To access the origin and distribution of wetland, self visited different parts of the district. Primary as well as secondary data have been collected from different sources. To collect secondary data, offices like Assam Remote Sensing Application Centre, Guwahati, Office of the Director of Geology and Mining, Guwahati, D.C Office, Goalpara, Circle Offices of Rongjuli, Dudhnoi, Matia, Balijana and Lokhipur etc. were visited to collect relevant data for the study. To collect primary data a survey schedule was prepared and relevant data relating to origin and distribution of wetland were collected from different parts of the district.

3. Location

The district Goalpara is located between 25°33´N to 26°12´N latitude and 90°07´E to 90°50´E longitude. It comprises an area of 1824 km square. Northern boundary of the district is covered by the Brahmaputra River and Garo hills is located on the south. The Kamrup district is located in the eastern boundary and Dhubri district covers the western boundary. All the rivers flowing throughout the district originate in Garo hills and flow from south to north direction as per natural slope and meet the Brahmaputra river in the north. Most of the wetlands are distributed throughout the district but concentration is more near foothill and the Brahmaputra basin.

Definition of Wetlands

Wetlands have been defined by different people and agencies for different purposes based on objective and need. There is worldwide confusion about what constitutes a wetland. But definition offered by the International Union for Conservation of Nature [IUCN] is most acceptable according to which “all the submerged or water saturated lands, natural or man-made, in land or coastal, permanent or temporary, static or dynamic, vegetated or non – vegetated which necessarily have a land water interface are defined as wetlands.

As per the definition agreed upon by the convention wetlands on International importance held in Ramsar, Iran on 2nd February, 1971, “the wetlands are area of submerged and water saturated land whether both natural or artificial or permanent or temporary and whether the water is static or flowing or fresh, the brackish saline including areas of marine water, the depth of which at low tide does not exceed 6 metre”.

Origin of wetlands

The age of earth is now 4.5 billion years. It has undergone so many changes since its origin. Both external and internal forces are active on the surface of the earth. These forces are responsible for producing different geomorphic features on the surface of the earth. Wetlands are geomorphic features produced by external and internal forces of the earth.

Wetlands can be originated in the following ways:

1. Earth movement
2. Volcanic eruption
3. Action of rivers
4. Action of sea waves and current
5. Man made

1) **Earth movement**
   Because of earthquake a plain or hill area may go down to the interior of the earth which ultimately formed the wetland. The wetland of this kind is very common in case of Assam. For example earthquake of 1897 creates Chandubi beel in Kamrup district near Garo hills.
2) **Volcanic eruption**
   When lava eruption completed in volcano, it becomes extinct volcano. These volcanoes remain as surface depression on the surface of the earth.
3) **Action of river**
   Ox-bow lakes or cut off meanders created by the action of river which remain as wetland. Formation of ox-bow lakes is a continuous process of numerous large and small ox-bow lakes created every year by the river action. In Assam, most of the wetlands are created by river.
4) **Action of Sea wave and current**
   Sometime sea wave and current also create wetlands/lake near the sea. For example, Chilika lake in Orissa.
5) **Man made**
   Human beings also created wetlands, for example reservoirs, tank, water logged, abandon quaries, Ash pond etc. remain as wetland.

Origin of wetland in Goalpara district

The origin of wetland reflected by geology and physiographic condition of the area. The physiography of the district is of very peculiar nature. Most of the area of the district is covered by small hills and hillocks. Large and elongated plains are not found in the district except the flood plain belt of the North-Western part of the district. It clearly indicates that it is an extended part of Meghalaya plateau. The plain areas are very small in size and not continuous. Within the plain areas there is some erosional high land in the district. It may be considered that the entire district was high land and continuous part of Garo hills. The natural slope of the district is from south to north, tributaries originated in Garo hill and eroded the high land and deposited materials in low lying areas forming the small plain. The flood plain area near the Brahmaputra river formed by the depositional work of Brahmaputra river. Physiographically the district can be divided into three divisions, and are Southern hill region in foothill of Garo hills, the flood plain in the north near the Brahmaputra river and small plain areas are in the middle part in between hill and flood plain.

The wetland situated in the areas near the river and the flood plain near the Brahmaputra river was created by action of river. But the wetland situated near the hill which does not even meet any channel is appeared to be tectonic in origin. Out of them four major wetlands namely Sildubi, Digholi, Satabari and Haldibari which falls parallel to the Chandubi beel of Kamrup district. Moreover the Urpad beel which is situated in the middle part of Goalpara covering a huge area and largest in the district have the possibility to be tectonic in origin, because it is bounded by hills. Its northern boundary is covered by Sri Surya Pahar, in east there is denudational high land. In south there is Garo hills, in west there is denudational high land. All of these indicated that before millions of years, this depression occurred because of tectonic activities of the earth. It was very large and elongated in size but gradually became smaller and shallower because of sedimentation from the surrounding hills. In western part of Goalpara district, the wetlands are created by the action of river Jingiram. Most of the area in this region falls under plain region according to physiographic division.

Classification of wetlands

There is no comprehensive inventory of wetland classification in our country. In order to fill this void, a classification system using remote sensing data was proposed in a draft proposal prepared for discussions in the standing committee on bio-resources and environment in 1991. This system was sent to 22 eminent scientists/ academicians/ manager for their comments. In the light of the above, the 1991 system was revised and a classification/system for national inventory of wetlands was proposed.

This further discussed in a meeting of experts called by the Ministry of Environment and Forest in March, 1992 where it was finalized. The final wetland classification system, besides including all the wetlands, incorporates all the deep water habitats and the impoundment such as ponds/cooling ponds and abundant quaries. This will not only help to inventorying the wetlands but will also generate information base for taking conservation measures for aquaculture development.

The main criteria followed in this system are:
1. Wetland hydrology and
2. Wetland vegetation

The wetland can be divided into two division 1. Inland wetland and 2. Costal wetland. These two again subdivided into 1. Natural wetland and 2. Man made wetland. The following shows the wetland classification:

Inland Wetlands

1. Natural 1.1 Lakes/ponds
 1.2 Ox-bow lakes/cut off meander
 1.3 Waterlogged (seasonal)
 1.4 Playas
 1.5 Swamp/ Marsh

2. Man-made 2.1 Reservoirs
 2.2 Tank
 2.3 Waterlogged
 2.4 Abandoned quaries
 2.5 Ash pond/cooling pond

Coastal Wetlands
1. Natural 1.1 Estuary
 1.2 Lagoon
 1.3 Creek
 1.4 Backwater (kayal)
 1.5 Bay
 1.6 Tidal flat/ mud flat
 1.7 Sand beach/ Spit bar
 1.8 Coral reef
 1.9 Rocky coast
 1.10 Mangrove forest

1.11 Salt marsh/ marsh vegetation
1.12 Other vegetation

2. Man-made 2.1 Salt pans
2.2 Aquaculture ponds

Note: River has not been included in the classification

According to this classification, Inland wetlands are available in Assam. In Goalpara district there are 165 wetlands occupying an area of 3882.50 hectare having a size greater than 2.25 hectare. But the district has numerous wetlands which are smaller than 2.25 hectare. According to survey conducted by Assam Remote Sensing Application Centre, the district has the following classification having number and area:

Table 1: Inland wetland in Goalpara district

Name	Number	Area in hectare
1. Lake/ Pond	31	822.50
2. Ox-bow like/ cut off meander	32	255
3. Waterlogged (seasonal)	31	232.50
4. Swamp/ Marsh	68	2515
5. Reservoir	-	-
6. Tank	3	7.50

Source: Assam Remote Sensing Application Centre: Guwahati

1) Lakes/ponds
A lake is non flowing body of water held in depression on the surface without direct access for mixing with the ocean like a pond, a lake has a wave washed shoreline. In contrast, a pond is a natural body of standing fresh water filling a surface depression, usually smaller than a lake. In Goalpara district, there are 31 lakes/ponds occupying an area of 822.50 hectare.

2) Ox-bow lakes/ cut off meanders
These are located along a stream in an abandoned ox-bow after a neck cut off is formed and the ends of the original beels are silted up. The fringe zones as well as the ends of the bands are vegetated in most case and sometimes, they are characterized by presence of complete vegetation cover. Sometime, they have feeder channels controlling the inflow and out flow of water. In Goalpara district, the number of ox-bow lake is 32 and its area is 255 hectare.

3) Waterlogged (seasonal)
These waterlogged areas play significant role in the state's economy as they are present in large numbers in the rural areas containing good amount of fishes and other aquatic fauna and providing habitat to a variety of migratory as well as domestic birds. Waterlogged areas occur in low lying areas in irregular shapes. Usually with a feeder channel and without presence of any vegetation. The water spread areas of these wetland varies in different seasons of the year and are perennial in nature. In Goalpara district, there are 3 waterlogged areas occupying an area of 232.50 hectare.

4) Swamp/ Marsh area
A swamp is an area intermittently or permanently covered with water having shrubs and trees but essentially without accommodation of peat. On the other hand, the term marsh is often restricted to water logged ground with a large mineral basic in contrast to the peat of bog and fen. In Goalpara district, most of the wetland areas are covered by swamp/marsh. There are 68 swamp/marsh occupying an area of 2515 hectare in winter season. The area may even double in rainy season.

5) Reservoirs
Reservoirs are artificial impoundments of water for irrigation, flood control, municipal water supplies, hydro-electric power generation and so forth. In Goalpara district, there are no such man made wetlands to exist so far.

6) Tank
A tank is an art artificial pond or lake formed by building a mud wall across the valley of a small stream to retain the monsoons. As is implied by the definition, these are artificially made by men to fulfill the demand of water during dry period or in areas where there is scarcity of water. There are three such tanks having an area of 7.50 hectare in Goalpara district.

4. Conclusion

From the above discussion it is clear that the district is rich in wetland from natural to man made. The Urpad beel which is the largest in the district must have been formed due to diastrophic movement on the earth as its area and depth indicates. The formation of wetland is a continuous process. The wetlands in the district are un-evenly distributed which reflects its physiographic condition.

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