

# CHANGING LAND USE PATTERN AND HUMAN IMPACT ON WETLAND: A CASE STUDY OF MORIKOLONG BEEL, NAGAON, ASSAM

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## Abstract:

The natural wetlands are considered as an important resource. Morikolong is one of the largest wetlands of Nagaon district situated in the middle Brahmaputra valley of Assam. It is formed by the abandoned path of the river kolong during the course of time. This wetland is the home of various flora and fauna. Traditionally it fulfils the needs of local people in various way. The land use of the surrounding region is one of the important factors that influences on the wetland which is gradually changing with time. With the alarming rate of population growth, the land use pattern changes drastically in recent decades. Due to large scale human encroachment the wetland has been gradually disappearing. The changing land use pattern has both direct and indirect impact on the wetland. Shrinkages of the wetland for various anthropogenic purpose leads to change the landscape of the wetland area as well as the water quality and drainage characteristics. The study is to reveal the changing land use pattern in the peripheral areas of the Morikolong wetland due to human activities and their impact on the wetland.

**Key words:** Morikolong beel, land use change, human impact, encroachment.

## Introduction:

The Brahmaputra valley of Assam is blessed with numerous waterbodies and swamps. The natural waterbodies are locally called as "Beel" while the swamps are known as "Jalah", "Doloni", "Pitoni", "Duba" or "Hola". All these are as a whole termed as wetland. These wetlands are geomorphologically and ecologically very important features. These comprise a major component of hydrologic regime of the state. They act as storage basins during flood and thereby reducing the impacts of the flood. Wetlands are home of various aquatic flora and fauna and provide a good example of an aquatic ecosystem. Besides the socio-economic value of the wetlands are also significant. These beels are traditionally used as the natural fisheries of Assam. Morikolong is one of the largest wetlands of the Nagaon district situated almost nearby the township area. Infact, it is an ox bow lake formed due to the changing course of the kolong river. It is almost 7 km long. The wetland and its numerous aquatic resources are utilised in various ways by the local people. Land use pattern of any place is ever changing. The gradual land use change in the surrounding region of wetland has also some impact on it. The recent decades experience a very high growth of population. With it, the land use pattern also changes drastically. Besides, the human impact on the wetland also increasing at an alarming rate. Major portion of the beel has been gradually disappearing due to the ever-increasing human encroachment. A large portion of the beel has been deposited by the garbage and converted to the human settlement and commercial areas. The bank vegetation cover is being destroyed and replaced by residential areas. At present, a small vegetation, grasses and only a small tract of the paddy field is available. This changing land use leads to change the original characteristics of the wetland and thereby reducing its quality as source of rich natural resources.

## Objectives:

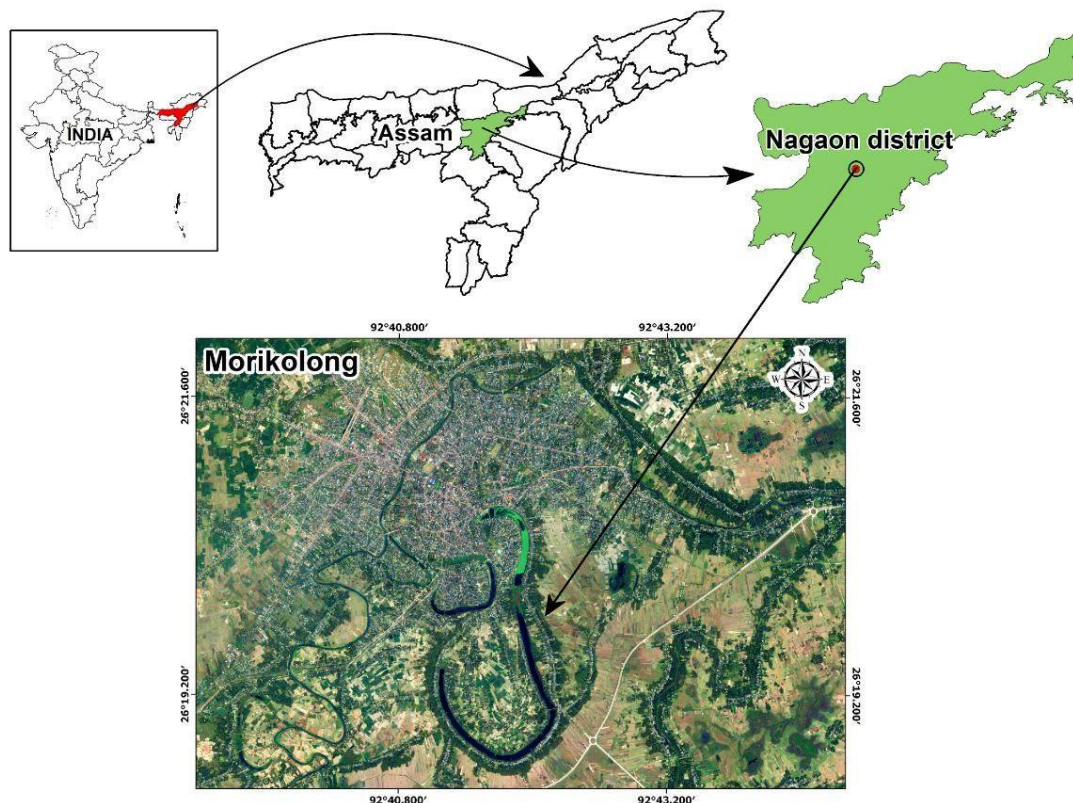
The basic objective of the study is to examine the changing land use pattern in the surrounding areas of the wetland caused by various human activities and their impact on Morikolong. The issues being addressed in this respect are –

- To examine the land use pattern near the wetland.
- To make a brief analysis of changing this land use pattern in recent years.
- To examine various human impact on the wetland.

**Methodology and Data Base:** With the help of both primary and secondary data the analysis of the study has done. The primary data are collected by visiting the area and interacting with the local people. For the collection of the secondary data the help of various offices and websites are taken. For making the research easy and for better understanding a critical review of the previous work have done in this regard. The important data and information are extracted from the survey schedule. After that, the analysis has been represented in simple statistical techniques.

**Study Area:** The Morikolong wetland is one of the largest wetlands of Assam situated in the south bank flood plains of mighty Brahmaputra in Nagaon district. Its location is just 1.5 km from the Nagaon main town in the south direction along the 36 National Highway. It extends from 26°19' N to 26°22' N and 92°40' E to 92°43' E. Its elevation is 60.6m from the mean sea level. The physiography of the Morikolong area is plain with a very gentle slope. Due to various earthquake from 1670 to 1950 the kolong river changes its course from time to time. As a result of the shifting of the course of the river, this wetland has got origin in the sub urban zone of the Nagaon town. The whole area is formed by the fertile alluvial deposit of the

**LOCATION MAP OF THE STUDY AREA**



Kolong river. It is an extremely a flat land with various water logged areas. Kolong river is the only drainage system in the study area. Morikolong wetland is situated in the Kolong basin. Monsoon climate prevails in this area with distinct four season. Average maximum temperature during summer is 35°C while the average minimum temperature during winter is 19°C. The temperature variation is more during the summer months while less in the winter season. The rainfall of this region is relatively high which is more than 150cm on an average in a year. The summer season enjoys much of the rainfall than the winters. Soil is basically alluvial yet peat soil is also found in a narrow tract of water logged areas. Monsoon deciduous forest along with savannah and swamp vegetation are dominant type in this area. According to the 2011 census the population in the study area is more than 15000 and density is 711 persons per sq. km. Population distribution in this area is uneven. The area is mainly comprising of Hindu population of different communities among which Assamese are being dominant one. Muslim also comprise a significant proportion. Besides very few Christian and Sikh group of population are also found in this region. Traditionally Agriculture is the basic livelihood of the people. But in present time due to the rapid land use changes, paddy fields are decreased and people are now shift to either small scale manufacturing or service sectors.

**Result and Discussion:**

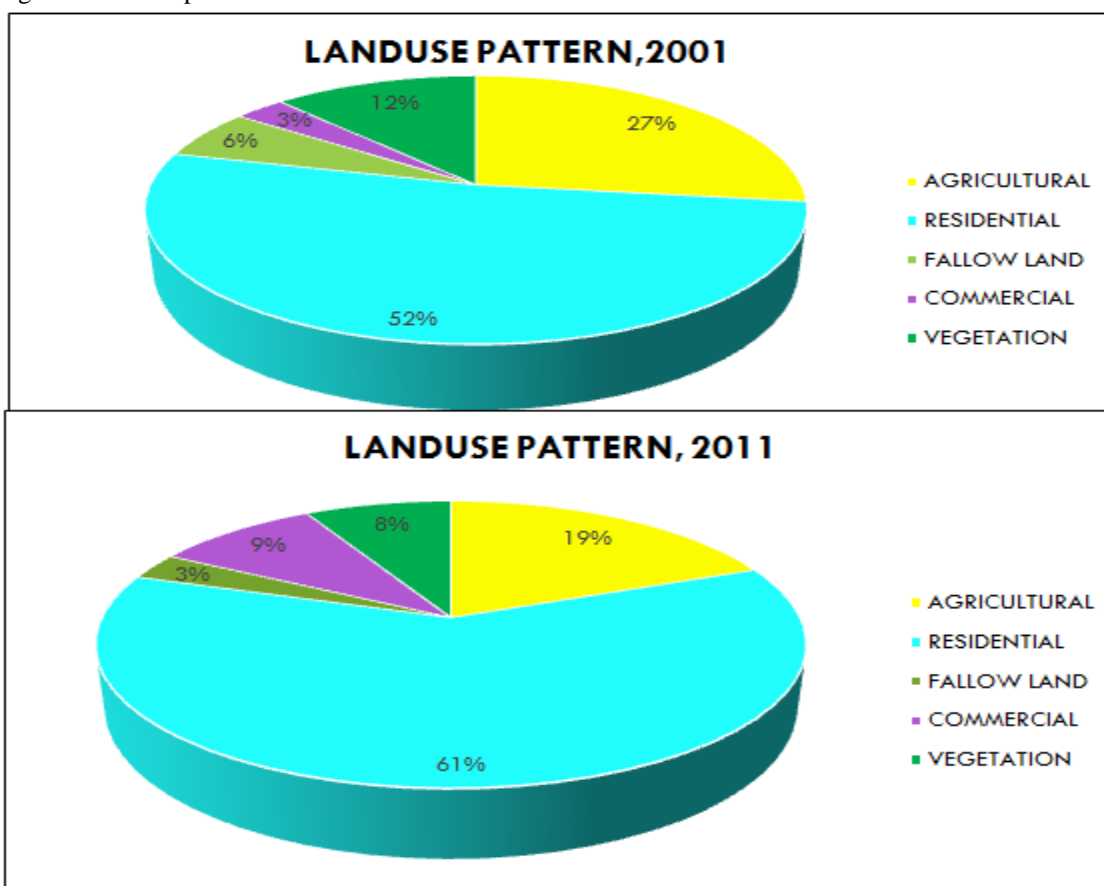
The Morikolong is an ideal freshwater ecosystem containing both organic and inorganic materials. Although it is a part of the kolong river in far past but now it is an ox bow lake having no connection with the mainstream of Kolong river. The wetland is perennial. In recent times the land use changes in surrounding areas due to man made factors have left huge impact on the wetland. These land use changes and human impacts are discussed below –

Land use of an area is nothing but a representation of different physical as well as cultural elements which play an important role in the socio-economic development of a particular geographical area. Various anthropogenic

activities have resulted into changes in land use and landcover pattern. The land use pattern effects the beel in a various way. At present major portion of the beel is under human settlement. On an average 68% of the area in the surrounding region of the beel is used for residential purposes. Except it, the existing land cover is used for agriculture, plantation and fallow land. Approximately 15% area is used for agriculture while 3% under vegetation cover and another 2% is used for fallow land. The fringe area of the beel is used for paddy, jute, sugarcane, mustard and another crop production. As soon as the flood water recedes the fertile banks becomes ready for the cultivation of paddy, jute and other crops. Boro, a coarse variety of rice is normally cultivated in the areas during the winter season.

A few decades ago, most of the land is used for cultivation. The proportion of the fallow land is also very high. But due to the increasing population at an alarming rate most of the fallow and cultivated land is converted to the residential areas. From of the field study it is revealed that most of the people are migrated from outside of Nagaon district and settled here except the local Assamese people. Thus, density of the population is increasing day by day. So, most of the vegetation cover is being destroyed for the use of the residential purposes and thereby remaining only a small tract of the vegetation cover in present days. Along with the residential areas the commercial areas are also developed and now a vast portion of the land of the wetland is used for commercial purposes. The market centres are growing day by day. Besides, some portion of the wetland is also used for constructing various institutes like school, temple, mosque, library, club etc.

Agricultural land, open spaces and the green belt is now converted to either residential or commercial purposes. Even the low-lying areas along with the banks is also being used for various construction. Bus stand, schools, junior colleges, commercial farms also cover a considerable portion of the wet land. Open spaces are mostly used by the families for vegetation production. A major portion of the wetland is now converting into the dumping place of the urban and domestic garbage's. As the urbanization process of the Nagaon town is extended to the sub urban or peripheral regions the commercial activities also increase and this altogether change the land use pattern.



The Morikolong wetland and its surrounding areas have experienced some problematic phenomena during recent years. These arises due to the rapid land use changes caused by the human activities. These changes have resulted some impact on the wetland such as:

**Degradation of the water quality:** The rapid increase of the residential areas leads to increase in the waste products which are often directly dumped into the wetland. So, a large portion of the wetland is deposited with waste products and garbage etc. Besides, some people use open defecation near the beel. In some portions, pipe



and drain of the domestic toilets are open into the wetland through which the waste products are drained into it. All these leads to the degrade the water quality and resultant water pollution.

**Disappearing of the wetland:**

Due to the more human encroachment some portion of the wetland is disappeared. For his own benefits people construct a no. of bridges, culverts across the wetland leading to the fragmentation of the wetland into small segments. A decade ago, a bus stand was constructed on the wetland by filling a considerable portion of it. All these leads to the disappearing some portion of the Morikolong wetland.



FIG 1: DEGRADATION OF WATER



FIG 2: CONSTRUCTION OF BUS STAND ON IT



FIG 3: CONSTRUCTION OF BRIDGE



FIG 4: CONSTRUCTION ON THE WETLAND IT



FIG 5: GARBAGE SITE ALONG

**Destruction of the bank vegetation:** A few years ago, this area is under enormous green belt. But with the changing land use pattern man destroy this vegetation covers for their own purposes. The decreasing vegetation cover also have a negative impact on the environment.

**Loss in aquatic biodiversity:** Traditionally the Morikolong wetland is the home of various fauna and flora. Due to more human encroachment the quality of the wetland starts to degrade which leads to decrease aquatic floras. Extraction of the fishes from it also increasing in present day. Moreover, for their own profit the businessmen mix hybrid species of fish fauna in the wetland. It harms the local fish species and extinction of some local species such as Darikana, Selekana, Kholihana etc. In past years, the natural calm environment of the wetland attracts a large no of the migratory birds during autumn and winter which are now decreasing in large no due to increasing human presence and destroying the natural vegetation.

There is no doubt that Morikolong wetland has every possibility to develop a site of recreation where people can enjoy the natural beauties and refresh themselves. But the ever-increasing human activities in this region reduce this possibility very fast. More over with the increasing no of commercial fisheries the local poor fishermen have to suffer as they are not allowed to catch fish. They are now compelled to change their traditional economic activities.

**Conclusion:**

The study reveals that human activities are the main cause of the changing land use pattern nearby Morikolong wetland. Some necessary steps should be taken as soon as possible to revive this natural ecosystem. Afforestation, protecting the remaining vegetation, cleaning the wetland from time to time, regulated human encroachment strictly, stop dumping waste into it etc are some measures that should be taken to upgrade the quality of the wetland. Under eco-tourism management plan govt can develop the wetland as aneco-friendly tourism spot. In this regard government, local people as well as NGO's should concern the matter seriously and work in an integrated manner to upgrade the condition of Morikolong as soon as possible otherwise it goes beyond the limit of modification.

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