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Environmental Degradation of Satajaan Beel, Lakhimpur, Assam

Jintu Moni Bhuyan
Dept. of Environmental Science, Gauhati University, Guwahati, India

Abstract: ***Wetlands are most common but very important physical features present in Assam state. Lakhimpur is a administrative district situated on the northern river bank of the mighty Brahmaputra river, having a large number of wetland. Though Satajaan is a very small sized wetland situated on the flood plain area of Ranganadi River but plays a crucial role to the entire surrounding area. Climate change already become a threat to the wetland, at the same time different anthropogenic activities such as encroachment, picnic in the winter and other environmental unfriendly development project have become challenging that lead to affect in water quality and various ecological disturbance to the wetland. Satajaan is well known for hosting local as well as migratory birds, which was created by 1950's devastating earthquake, but it is seem that the numbe of bird visiting to the wetland is decreasing past for few years.***
Keywords: Satajaan, Wetland of Lakhimpur, Wetland degradation.

I. CONCEPTUAL AND THEORITICAL BACKGROUND

A. Introduction

Wetlands are the one of the most important ecosystem present on the earth surface, as define by **RAMSAR CONSERVATION** "wetlands are areas of marsh, fen, peat, and 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". Sometimes Wetlands are also described as 'Liver of the Landscape' for their function of performing as both hydrological and chemical cycle.

The state of Assam that lies on the flood plain of the river Brahmaputra, It has a highest number of wetlands (Beel in Assamese) that works as a reservoir to hold the flooded water and also work as a habitat for various verities of Birds as well as Aquatic animals. Assam has 3513 wetlands covering a total area of 101231.60 hectare, and a majority of them have water with low turbidity (Kalita, 2020).

The Satajaan Wetland - is one of the important small sized Wetland (Beel) situated on flood plain of Ranganadi river in Lakhimpur District, well known for Hosting birds, which was created by devastating earthquake of 1950 (Kakoti, phukan, & devi, 2019, p. 5). The total area of the observed wetland is about 95 acres (as consulted from Wetland sector office, Forest branch, Lakhimpur, Assam) but protected area is only about 34 to 39 acres (Gogoi, Ayam, & Das, 2019), (Ahmed, 2021).

The Satajaan wetland, also known as bird sanctuary is home to numerous bird species that are declared near-threatened by the International Union for Conservation of Nature (IUCN) and also is known for the large presence of the migratory birds in the winter season but the number of birds visiting the wetland has been decreasing past for few year. It has been investigated that beside three types of endangered turtles, about 34 species of residential and 13 species of migratory or long distance birds and 35 species of fish has been recorded in the Satajaan wetland (Gogoi, Ayam, & Das, 2019, pp. 2-3).

Environment is something that we all are very familiar with. It is everything that makes up our surroundings; it includes all biotic and abiotic components that affect our ability to living on the earth. Environmental degradation may be defined as the disintegration of earth through depletion of resources such as the quality of air, water, soil etc.

Water is one of the most important parameter to measure the environmental degradation of an area or a wetland. Water is most indispensable requirement for all living organisms and any alterations in water may lead to the issue of survival for these organisms. Good quality of water is essential for all living organisms for their survival according to their needs (Drinking, Habitat etc.). The quality of water can be obtained by studying the physical and chemical characteristics of the water. Because of vast population and negligence of human being the quality of water is being deteriorated day by day. It is very essential and important to test the water before it is used for any purpose such as drinking, domestic, agricultural or industrial purpose. Water is tested with different physico-chemical parameters.

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Water contains different types of dissolved, suspended, floating as well as microbial or micro bacterial impurities. The physical parameters for waters are Turbidity, Color and Chemical parameters for the water are pH, Electrical Conductivity (E.C), Total Solids (TS), Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Total Hardness, Calcium Hardness etc. By testing those parameters we could say the water is usable or not. And also for, all other living organisms inhabiting in the water body live only if the water has the quality. If the water has a high amount of any elements (eg: Temperature, TDS, and other chemical) than the permissible limit, It may be harmful for all the aquatic living organisms that live in that water.

Water quality testing of a wetland is a crucial a part of environmental monitoring. When water quality is poor, it affects not only aquatic life but the encompassing ecosystem also.

This way, there are different important parameters like- Forest cover decreasing, Habitat losses, Noise pollution etc., plays an important role in environmental monitoring, also play a role in indicating the degradation of environment of an area.

B. Objectives

1) Relative study of water quality of Wetland using Secondary data.
2) Study of all other possible factors that may cause degradation of Satajaan.
3) Find out the occurring problems due to the factors of the wetland.
4) Find out the mitigation and management suggestions.

C. Database and Methodology

Both primary and secondary data have been used in the preparation of the present report. Secondary data on the different water quality parameters has been derived from Different research paper, District handbook, Lakhimpur as well as from FSI (Forest survey of India) data. The map of the observation area is derived from NAKSHEE PORTAL, OPEN SERIES MAP (OSM) that is prepared by SURVEY OF INDIA and from Google earth Pro (Window's Software). The secondary data involved in the study covers data provided by different Govt. publication like Census of India reports, Internet sources, Books, Journals and other published and unpublished (from local people) sources. The present study to carry out the details about the water quality of the targeted wetland and probable consequences that may occur due the water quality, involves both qualitative and quantitative method of analysis. The secondary data that has been collected regarding the report are tabulated in order to arrange for further analysis. However, the understanding of the problems, field work, Data collection, Data tabulation, analysis, Interpretation and suggestion to facilitate this study is carried out by following steps, which are as follows:

1) *Pre Lab Work:* Pre lab work includes:
a) Identification of site for Field work (Site selection)
b) Visit to the site.
c) Identification of the problems.
d) Data collection.
e) Accuracy Assessment.

2) *Lab Work:* As I am using mostly secondary data for the preparation of the present data, so as of now I have not to go through this step of the methodology.
3) *Post Lab Work:* This step of methodology includes:
a) Representation of data.
b) Analysis of data.
c) Identification of problems.
d) Interpretation of analysis.
e) Final report Writing.

D. Significance of the Study

After finishing the analysis of the project report:
1) We will able to get a basic idea about the water quality of the Wetland.
2) We will able to find out the different reasons that are responsible for the degradation of the Satajan Wetland.
3) Will able to know the reason behind the decreasing of migratory birds during the winter season in the Wetland.

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II. GEOGRAPHICAL BACKGROUND OF THE AREA

A. *Study Area*

The geographical knowledge that a person needs to process to operate efficiency is analyzed here.

1) *Location:* The present study is carried out in Satajaan Wetland and bird sanctuary, Lakhimpur District, Assam. Satajaan is one of those surviving wetlands that are under severe threats and is located between 27° 12' 23.7" to 27° 12' 40.00" N latitude and 94° 03' 08.5" to 94° 03' 08.8" E. longitude in the floodplain of Ranganadi at an altitude of 101 m above mean sea level. The infamous wetland situated adjacent to the Pahumara-Kimin state highway and National Highway 15 Satajaan is about 350 Km Away from Guwahati, Assam (Gogoi, Ayam, & Das, 2019) (Sentinal, 2020).

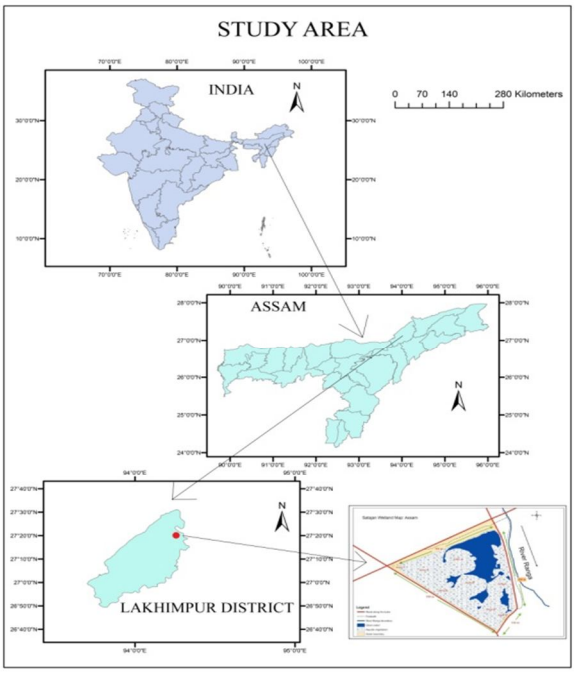

Figure 2 STUDY AREA

2) *Climate:* Geographical condition specially effects on the climatic condition of an area. The climatic condition of the Satajaan wetland is similar to the District Lakhimpur, is directly characterized by tropical monsoon. The highest temperature of the region experienced during the period of southwest monsoon, while humid atmosphere prevails throughout the year. The mean annual rainfall of Lakhimpur district is 300 cm and experiences 31° C and 7° C maximum and minimum temperature, respectively, in the district (NWAA, 2010).
3) *Demography:* Lakhimpur is a administrative district of Assam that lies on the North bank of mighty Brahmaputra river. The Lakhimpur district is multi-cultured and multi-ethnic in nature, where most of the people are Assamese. Other ethnos like Mishing tribe, Bodo tribe, Deori, Tiwa etc live alongside with a unity showing their cultural and traditional bonding. The Satajaan wetland or bird sanctuary is surrounded three small villages of **Mishing Tribe.** The Mishing Tribe get direct benefit from the Wetland and depends on Satajan for their survival and livliood as they collect their daily needs such as Firewood, wild edible plants, medicinal plants for their livelihood purpose.
4) *Natural Vegetation and Biodiversity:* Wetlands are known as "Liver of the Landscape" for their different regulatory function as well as wetlands play an important role as a massive habitat for different types of flora and fauna. The satajan wetland is thickly vegetated, that is mostly covered with immerged, free-floating and root-floating plants. Many surveys that has been conducted by various conservationist groups like Asian Water Bird Census of Indian, Bird Conservation Network and Bombay Natural History Society etc, it has been investigated that beside three types of endangered turtles, about 34 species of residential and 13 species of migratory or long distance birds and 35 species of fish has been recorded in the Satajaan wetland. Satjaan is a breeding site for *Whistling Teal, White Breasted Water Hen* and *Bronze Winged Jacana*, a nesting site for the *Indian Purple Moorhen* and *Coots* and also a visiting site for endangered *White-eyed Pochard* (a migratory bird from pacific Siberia) (Ahmed, 2021).

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Figure 2 Biodiversity of Satajaan

III. IDENTIFICATION AND DESCRIPTION OF ENVIRONMENTAL PROBLEMS

The wetland ecosystem, though highly efficient is easily disturbed by human interference. Many toxic substances are produced as a result of human activities for their livelihood may run off with water and accumulated to water. This may make the water poisonous or may affect on the different parameter (i.e. physical, chemical & biological) of the water. Extensive fishing may damage the micro flora resulting poorer crop in next year. There are various major causes of environmental degradation of a wetland ecosystem including both manmade and natural. Major manmade causes are – Toxic substances accumulation, ecological degradation, Encroachment, Bird hunting and Development work by Government. Natural causes that are responsible for degradation of the environment of the Satajaan Ecosystem are mainly Flood and Siltation.

A. Toxic Substances Accumulation

Wetlands performs major ecological function such as stopping ground for fish and other aquatic wildlife, purification of runoff and Domestic wastewater and exchange of chemicals, Nutrients and other organic and inorganic matter with associated ecosystem. In these processes the wetland comes to touch with many toxic substances that are produced by human beings for their livelihood.

As the Satajaan is covered by three Mishing villages, a large number of household wastes are dumped near wetland. That may produce a huge quantity of toxic substances that will be enough for degrading the whole environment.

1) *Water Quality Measurement:* Water is a primary natural resources and important to all living beings on the earth surface. Water of the wetland may be the most fresh water sources which provide food and habitat for much aquatic life including threatened and endangered species. Water quality of a wetland is highly important and an indicator for the environmental degradation of the area.

Table 1: Some available Physicochemical parameters of Satjaan Wetland (Hazarika, 2013)

Parameter	Maximum	Minimum
Air Temperature (^oC)	34.26 ± 1.15	13.84 ± 1.69
Water Temperature (^oC)	34.26 ± 1.15	13.84 ± 1.69
DO (mg/L)	6.37 ± 0.51	3.20 ± 0.41
CO_2 (mg/L)	17.30 ± 4.77	9.88± 1.24
pH	7.51 ± 0.16	6.41 ± 0.20
TDS (mg/L)	241	

Seasonal variation With Maximum and minimum values of Physico-chemical parameters of the wetland has been given in the table 1. The average maximum air temperature recorded about 34.26 ± 1.15 ^oC in Monsoon and lowest temperature is 13.84 ± 1.69 ^oC in winter. The air temperature is one of the most important factors influencing the aquatic animals and may be a reason for environmental degradation of an area. The air temperature is mainly determined by the climatic condition, time of taking sample, inclination of solar radiation and topography. Air and water temperature play a vital role physiochemical and physiological behavior of biotic component of any aquatic ecosystem.

Dissolved oxygen (DO) in water is due to the atmospheric absorption or by biological oxidation of organic matter. The average DO recorded maximum is 6.37 ± 0.51 mg/L and minimum is 3.20 ± 0.41 mg/L in winter and monsoon season respectively. The minimum amount of DO required for the aquatic animals for their survival is about 4- 6 mg/L.

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DO is a very important parameter of water as well as it is a necessary components to many forms of life including fish, invertebrates, bacteria and plants and microorganism too, for their survival. It has been observed that the amount of DO is little low than the standard limit; it may be because of the abundance of floating vegetation and pit formation. Another one of reason is the disposal of domestic sewage and other Oxygen demanding wastes.

Free CO_2 is another chemical parameter that use for estimating WQI (Water Quality Index). If the amount/concentration of free CO_2 is high than the required limit, it indicates the presence of decomposable organic matter, physiological activities of any biotic component as well as bacterial work on organic matter.

The maximum concentration of Free CO_2 is recorded in monsoon (17.30 ± 4.77 mg/L) and minimum in winter season (9.88± 1.24 mg/L). Normally surface water contains about 10ppm (about 9.98 ^oC). If more Free CO_2 dissolved to water, then it reacts with water and will dissociate Hydrogen ions and Carbonic Acid will be formed. It indicates that the water of Satjaan Wetland is Acidic that may be harmful for various aquatic flora and fauna.

pH in water plays in important role in growth of the phytoplankton specially. Normally in natural water has a pH value ranges between 4 to 9.

Typically Satajaan wetland show slightly acidic (6.41 ± 0.20) in monsoon, turn to neutral stage in winter. Higher pH value is an indicator of high photosynthetic activity in water. Lower amount of pH value in monsoon indicates the runoff from nearby catchment area, having a slightly acidic soil.

Chloride presents in every water body. The sources of chloride in Ground and Surface water are both Anthropogenic and Natural, such as run-off containing road de-icing salts, the use of inorganic fertilizers, landfill leachates, animal feeds, irrigation drainage etc. Chloride is found in Satajaan wetland in moderate range mainly because of domestic sewages from neighboring human habitation and cattle shed (Hazarika, 2013).

From the above tabulation discussion of seasonal variation of physico-chemical parameter of Satajaan wetland, we are able to see a vivid picture of ecological status of the wetland. Although the water quality of the wetland found under the permissible limit, except DO level and chloride content that signifies the sewage contamination (domestic sewage along with cow dung) of the wetland.

B. Ecological Degradation

Changes like overpopulation, Encroachment and other environment unfriendly development have triggered ecological degradation. Though satajaan wetland is a bird sanctuary, it has been noticed that the number of (in winter) visiting birds in the recent past year, decrease dramatically mainly due to the noise (Ahmed, 2021). The main two reasons for the noise are- Picnic, Heavy Machinery use in construction site.

1) *Picnic:* When climate change has already become a threat to the wetland, at the same time several anthropogenic activities have become challenging. Satajaan is one of the best choice for picnic during the winter, when many migratory birds such as *Gadwall* which flies across different demographic conditions to the wetland and other local-migratory birds such as *Lesser-whistling Duck, Fulvous-whistling Duck, Indian Spotbill Duck* etc come to the floodplain to finds its favorable shelter in the wetland. At the same time the local says the primary reason for degradation of Satajaan is winter picnic accompanied by several factor such as littering of plastic waste, clearing of bushes for fire and noise from the loud speaker used. That may create an ecological disturbance to the wildlife (mainly birds) and a cause for the environmental pollution of the wetland.
2) *Domestic Sewage:* As the wetland is covered with three Mishing Villages, the domestic sewage carries used water from the villager's houses that contains micro-pollutant, solid waste, food particles, soap, metal, detergents as well s some amount of chemical waste too that caused a major threat to the aquatic animals of the wetlands and plants too.

C. Encroachment

Encroachment is one of the important factor, face by a wetland for the degradation of the environment, basically the villagers encroach to the wetland for agricultural activity in their individual capacity. The wetland is covered by three villages with theirs agricultural field, so slowly fill-up the surrounding parts of the wetlands for cultivation purposes. Some of the local people contest that the Wetland was created after the Earthquake of 1950, and they have lost their agricultural land belonging to them. So the local peoples gradually start encroachment.

Whereas a group of villagers have created a NGO and demanded Satjaan wetland to be cleared from its aquatic plants and should be transformed into **large Fishery project**, so that they able to generate income.

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D. Bird Hunting

Bird hunting in wetland is one of other important causes of wetland environment degradation. Poaching of birds including both Local and Migratory by the villagers of the local area is common phenomenon. Sounds of flying birds can be easily heard in the winter's morning. The local people select the morning time to trap the birds, as they are little careless in the morning time when they are eagerly busy in search of food for them and their Nestlings.

Till now some of Tribal people hunt birds traditionally at night. A group of 10 to 12 peoples at night uses light, fire, sound of drums, metal or bell in this process. After hearing the noising sounds, to save their lives from danger they fly near to the sources of light, where they are beaten to death.

E. Unfriendly Development Project

The unfriendly development project includes Road construction, railways etc. that may stand as a major problem of the wetland environment. To prepare such development project engineer should carry out some survey about the area. If they prepare a development plane for the area without proper survey, it may prove defective after execution. It is seen that some village links road are constructed by Government agency haphazardly with in a very short time and most of project done by District Rural Development Agency (DRDA) are cited in an example for this regard. In Satjaan wetland also there are some Development projects that may stand as a cause for environmental degradation of the wetland.

1) *Railway:* It is a unique and rich in flora and fauna habituated covering about 34-39 acres of land. But interesting fact is that out of this 35 acres of land, about 21 acres of land belong to North Frontier Railway. The railway track of NF's Rangia-Murkongchelek route crosses the wetland which was inactive for a long period of time till 2015 during its meter gauge system and during the gauge conversion period. Than in 2015 the railway track has become active and started three passenger trains through this route. Running of these three trains start causing noise, creating an ecological disturbance to the wetland and causing scare and disturb to the avian visitors resulting in decline of migratory birds this year.
2) *Road Construction:* Under Assam Darshan for the year 2019-20, Lakhimpur Rural Road division under APWB called for tender for the purpose of road construction in Satajaan. In the work on the Rs. 53, 03,759, the noises of earth movers and other heavy machineries during the construction of the road have disturbed the environment of the wetland and also lead to affect the coming of migratory birds due to noises. The number of migratory birds drastically fallen in this time. It is seen that the development project violates the Wildlife Protection Act, 1972 and also ignore the Wetlands (Conservation and Management) Rules, 2017. Than in January Union ministry of environment, forests and climate change come up with a guideline to support for conservation and management of wetland of the country. The guideline clarified that any wetland from any location, having any size and biodiversity can be notified under the Wetlands Rules 2017, wetlands falling within areas covered under the Indian Forest Act, 1927, Forest (Conservation) Act, 1980, Wildlife (Protection) Act, 1972 and the Coastal Regulation Zone Notification, 2011 (Ahmed, 2021).

IV. SUGGESTION FOR MITIGATION AND MANAGEMENT

Wetland ecosystem are really a important part of hydrological cycle, that is highly productive and rich in biodiversity and also provide a large range of ecosystem services such as- water purification, flood mitigation, microclimate regulation etc. Climate change, population increase, urbanization and changing in consumption pattern are some major threats, which cause degradation of the wetlands. By managing wetlands ecosystem, we will able to give a substantial contribution to biodiversity conservation and restoration. Some of mitigation precautions that we could carry out at local and governmental level are such as- Educating neighboring villagers, announcing as No picnic zone, regularly monitoring, creating buffer zone etc.

A. Community Support

Wetland management, restoration and conservation require an integrated working with local villagers, educational institute, forest department and district administration.

According to present report, domestic sewage, cow dung are two important factors that acidify the water and the local people are also engaged in encroachment, Bird hunting that play a vital role in Satajaan wetland's environment degradation. To mitigate these problems villagers should be educated about the importance of the wetland and how it plays an important role in day to day environment regulation.

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B. Collaboration with school and Colleges

Wetlands need a collaboration research work involving natural, social study, aimed to understanding water quality, biodiversity, and socio- economic dependency for formulating long term conservation strategies collaboration with nearby educational institute, so that the new generation(students) also aware about it and understand the importance of the wetland. District administration, forest department and MoEFCC can organize some workshop among the students and local peoples. This need multi-disciplinary well trained professional educating the essence of importance of manage, regulate and mitigate the environmental problems of the wetland involving schools, college and local people too, this may help in rising the levels of public awareness and comprehension of wetland restoration goals.

C. No Picnic Zone

As according to the local people the main reason of ecological degradation of the wetland environment is yearly winter picnic, by littering of plastic and other substances, clearing of buses for fire and causing noise from loudspeaker. So the area should be announced as a "No Picnic Zone".

D. Creation Buffer Zone of the Wetland

It is an important strategy for restoring and managing a wetland. A wetland buffer zone is an area of adjacent vegetation, which should be undisturbed for reducing adverse affect to the wetland function. It will prevent anthropogenic activities around the demarcated zone.

E. Creation of Regulatory Body

A interagency regulatory can be created comprising well trained personal from Department of Panchayat & Rural Development, Assam, Resource management and regulatory board such as PCB (Pollution control board), Research organizations, Educational institution, NGO along with local communities that will be helpful to introduce effective wetland development programs.

F. Regularly Monitoring

Monitoring and assessment is helpful to determine whether the quality of wetland is improving, neutral or declining. Monitoring of the wetland will provide a vivid picture of it and what are happening surrounding it and why these are happening and how should mitigate them to improve the quality of the wetland. The department of forest, District administration (DA) or related department can take action on it using various developing techniques such as **remote sensing** (satellite imagery).

G. Development Project of the Wetland

To protect, improvement and restoration government along with district officers and local bodies can introduce some development project of the wetland such as National *Wetlands* Conservation *Program and other large-scale and long term wetland development project.*

V. STEPS TAKEN TO PREVENT FURTHER DEGRADATION

As the wetland provides both ecological and geographical benefit for the people of Lakhimpur and habitat for variety of flora and fauna, but human encroachment and other anthropogenic activities already have degraded the water quality and the whole wetland ecosystem, so recently it is seem various Local bodies, and governmental bodies try to take some important steps to prevent further degradation of Satajaan wetland (Beel). Some of serious steps taken for the improvement of Stajaan wetland are:

1) As stated earlier, according some locals the wetland areas were belonging to them before 1950 Earthquake, i.e. only after the earthquake the Satajaan was created. So they claimed their land. After this an NGO named Gr**een Heritage** along with some local people has started a campaign for the preservation and protection of the wetland, then only Guwahati High court ordered to the concerned authority to take action against it with regard to the constitution of bird sanctuary or community reserve in the water body (Lakhimpur to host maiden Bird Festival at Satajan Wetland, 2021).

2) The Lakhimpur district administration in collaboration with the Lakhimpur forest division and various NGOs such as Green Heritage, Xeujia Lakhimpur Amar Xopun, Assam Wildlife Rescue and Research Organisation (AWRRO) has organized Satajaan bird festival 2021 on 10th of January to create an awareness to conserve satajaan wetland environment and the birds and animals that are living in Satajaan. The festival has introduced some activities such as a bird-watching programme, art competition, cycling rally, photography exhibition and popular talk on bird and wetland conservation (Lakhimpur to host maiden Bird Festival at Satajan Wetland, 2021).

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Figure 3 SATAJAAN BIRD FASTIVAL 2021

3) As a road construction project under the Assam Darshan scheme was about to start, that violates Wild Life Protection Act, 1972 and also ignored the Wetlands (Conservation and Management) Rules, 2017,then The ministry of environment, forests and climate change issued guidelines and after that Lakhimpur DC Jeevan B asked the Lakhimpur APWD to stop the road construction and divert it 15 meters away from the wetland towards the Ranganadi river (Ahmed, 2021).

4) To protect the Birds of Satajaan the peoples from nearby villages such as Pahumora, Ujani Mirigaon, Bamundoloni, Khonajan-Ahomgaon, Ujani Khamti, Khagorigaon, Deobeel, Potabeel, Na-bamunia, Dikhowmukhia, Madhabpur and few more villages around Satajan wetland formed the Ranganadi Prakriti Suraksha Samiti a few years ago.

VI. CONCLUSION

The main purpose of the study is to observe the different problems and prospect of Satajaan wetland. Wetlands Play an important role in maintain various natural cycle as a habitat for variety of flora and fauna. Satajaan is a smaller size of wetland popularly known as Satajaan Beel or Satajaan bird sanctuary, having a wide variety of local and migratory bird. In current scenario Satajaan is facing water related issues such as water quality degradation, pollution of aquatic system and some ecological as well geographical issue too. Noise producing from loud speaker during winter picnic, Construction work, heavy machinery, railway transportation is one of the greatest problems that disturb local and migratory birds and scare them, that why it is seem that the number of migratory birds has been decreasing continuously for the past few years. Governmental and local body along with NGO, educational institution, local people can take introduce some management, restoration techniques for the wetland Satajaan so that the possible environmental degradation will decrease. Till now various NGO like Green Haritage, Xeujia Lakhimpur Amar Xopun work for the wetland to protect it from further encroachment and ecological degradation. As the importance of Satajaan is immeasurable for the environment, ecosystem, localities and the district, the government along with the district administration should take some agendas that are positively impactful for Satajaan. If the local people, NGOs, district administration, government and related department and ministry work together to prevent further degradation and improve the wetland's environment, the wetland will serves us forever as "Liver of the landscape".

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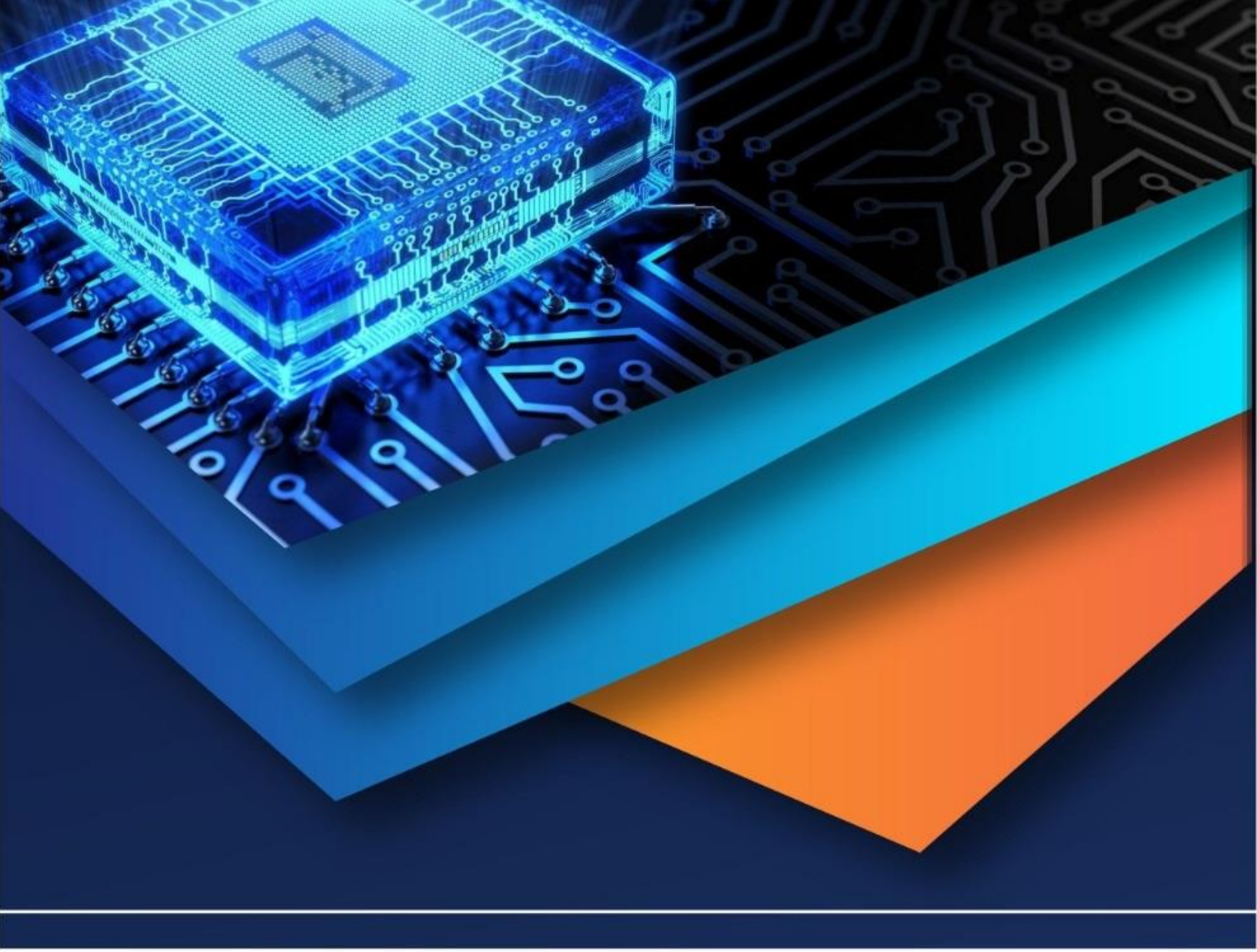

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