



কটন বিশ্ববিদ্যালয়
Cotton University



भारतीय प्रौद्योगिकी संस्थान गुवाहाटी
INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI

WORLD WETLANDS DAY 2021

আদৃত আদৃত্বাশ্রম

Wetlands - Nature's water treasury



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World
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2 February 2021

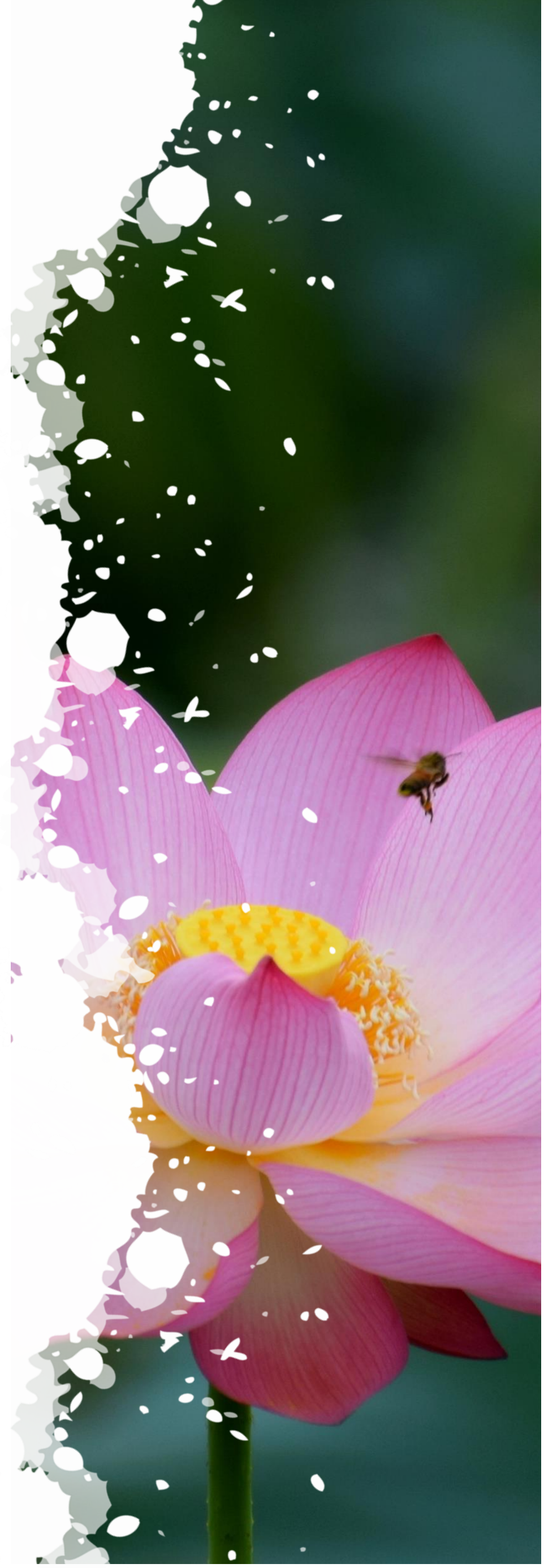
Wetlands and water



Join us - visit WorldWetlandsDay.org #RestoreWetlands

This booklet is a compilation of the entries for research communication. The objective of this is to reach more people with wetland and water research without scientific jargons.

Photograph: © Chandan Mahanta



Foreword from IIT Guwahati



Prof. Chandan Mahanta
HOD & Professor
Dept. of Civil Engineering

That wetlands are of critical importance to life and livelihood no longer needs to be re-emphasized. That many of them are dying and many more are under severe stress is too a harsh reality. Despite our best intentions and efforts, we are losing them rather too rapidly by our own irresponsible actions or lack of sensitive actions. While conventional development pathway is never generally pro-wetland, the stark reality is that often wetland damages are irreversible, even if we argue that all such losses are not unavoidable. While the current wetland discourse can be directed in many directions about their peril, it should also be acknowledged that the recognition and acceptance of their critical importance are perhaps more realized and regretted more than ever today. It's heartening that a growing number of youths are inspired by the dire need of preservation and conservation of these unique ecological entities.

Water is of course at the heart of wetland discourse and conservation initiatives. There is no sustainability of wetlands without healthy water. Arguably besides threat to their physical existence in terms of encroachment and degradation, particularly in urban backdrops, clearly an increasing number of wetlands are threatened by lack of wetland-friendly water. Depleting water quality is a serious threat and needs specific focus from the point of remediation and conservation. Recognizing this non-negotiable need of healthy water for wetlands, and with the realization how these wetlands act as water retaining sponge and natural purifier, there would not be a more appropriate theme for World Wetlands Day 2021!

In alignment with the ongoing wetland discourses, we are excited and motivated to hold this modest event called *Aadrita Ardrabhumi* - primarily to celebrate this unique and prized gift of nature, while aspiring to achieve a greater goal of building a consortium of different people and institutions towards wetland restoration, rejuvenation and conservation, besides protecting the pristine ones. We have reason to be happy at the enthusiastic response that our modest initiative has received by a wide section of students and professionals and academic community and practitioner community at large, engaged with wetlands. We thank you all and hope that this is a befitting beginning to create a regional forum to bring together citizen science, practise and knowledge from varied sources towards one single goal of protecting our precious wetlands. We are eagerly looking forward to your continued productive participation in this endeavour. Let's hope that all the knowledge shared in this event becomes a first yet firm step towards building a sound knowledge base for a regional wetland conservation action plan, particularly in the northeast region. We sincerely look forward to your unstinted support, participation and goodwill. Thank you!

Foreword from Cotton University



Dr. Narayan Sharma
Assistant Professor
Dept. of Environmental
Biology and Wildlife Sciences

Foreword from Association of Civil Engineers IIT Guwahati



Dr Budhaditya Hazra
Associate Professor
Dept. of Civil Engineering

First and foremost, I would like to congratulate my dear students for organizing such a wonderful conference on the occasion of World Wetland Day. The rich realm of the bountiful Wetlands in the Brahmaputra basin, or more lovingly our own *Aadrita Ardrabhumi*, is facing serious challenges of modernisation, commercialization and somewhat lackadaisical approach of the human beings to nurture and protect their own environment. There have been some efforts towards protection of our Wetlands, but the question remains, are they enough.

These questions should be addressed from a more scientific and mathematical viewpoint before mooting scientific policies towards the protection of Wetlands. Isolated studies towards understanding the harmful effects of Wetland exploitation, water quality and the depletion of flora and fauna go a long way to bolster our understanding of the same. Yet, these studies should be actuated by rigorous mathematical principals of Wetland dynamics, incorporating the various facets of the complex physico-chemical-bio and social interactions. Without adequate modelling and simulation studies in the backdrop of various aleatoric and epistemic uncertainties, it is difficult to arrive at suitable maintenance, restoration and conservation policies.

This conference, I believe, will set the tone for proper awareness, training and knowledge dissemination pertaining to our Wetlands. I hope that students utilize this as a springboard to develop a more scientific temperament towards Wetland research. I wish all the success to this unique and beautiful conference and pledge my allegiance towards more of WWD conferences in the subsequent years. *Let there be knowledge, let there be light.* With Namashkaars to all of you!

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Are we a plasticterian?



Fig: A graphical representation of Plasticterian in the food chain

Are we a plasticterian?

Dr. Chingakham Chinglenthaoiba
Manipur, India

Loktak Lake, the pride of Manipur, is the largest freshwater lake in North-East India. Loktak is considered one of the most unique and vital wetlands of international importance under the Ramsar Convention. Keibul Lamjao, located at the Loktak lake, is the only floating national park globally and home to the highly endangered *Rucervus eldii eldii*, popularly known as *Sangai*, the dancing deer. Its uniqueness has attracted numerous tourists every year to observe the richness of Loktak Lake. Nevertheless, sadly, due to irresponsible tourists, the littering of plastic wrappers and bottles in the lake has become a critical challenge to the local people of the Loktak region. These plastics have been introduced as a new pollutant in the form of microplastics.

Microplastics come from different sources, including from more significant debris that degrades into smaller pieces. Microplastics are tiny bits of made polyethylene plastic added as exfoliants to health and cosmetics, for example, face cream and toothpaste. These microplastics are rapidly carried by rivers and end up in the ocean or large lakes, representing a likely danger to aquatic life. Both microplastics and these chemicals may accumulate up the food chain- Zooplankton to Human. Microplastics in the water we drink and the air we breathe can likewise directly or indirectly cause harm human health.

The Loktak Lake is the primary source of fish production in the state of Manipur, India. The *Nambul* river runs through the densely populated city of Imphal (capital of Manipur) as it takes its course to the Loktak Lake. We believe that there are high chances of microplastic in fishes found in Loktak Lake collected by the *Nambul* river. However, no researcher has experimented with the fishes found in Loktak lake. These are the same fishes that are served on our plates. Lastly, we all should realize that whatever we discard to mother nature will always impact us adversely. Therefore, let us learn to be responsible citizens and protect our pride, the Loktak lake.

I am Chingakham Chinglenthaoiba from Manipur, India. I just graduated from NIT Calicut with a doctorate degree from the School of materials science and engineering under the supervision of Dr. V Sajith of SMSE, NIT Calicut. Recently, I got a post-doctoral fellowship from NUS, Singapore for microplastic research in Singapore



Importance of Wetland and it's Biodiversity

“The more important reason is that the research itself provides an important long-run perspective on the issues that we face on a day-to-day basis.”- Ben Bernanke

Importance of Wetland and it's Biodiversity

Rubina Azmeera Begum

Cotton University, Assam

The role of water in the maintenance of an aquatic ecosystem is indispensable. Globally, wetlands like ponds and small lakes dominate both the area of freshwaters and the number of basins. Wetlands often referred to as 'Earth's kidney' because they provide the function of absorbing wastes such as contaminants or pollutants, nutrient soils viz. nitrogen and phosphorus; collect water during peak of the flood; removes sediment from water that passes through them. Source: Internet Above all, wetland contains much of the world's freshwater biodiversity and is significant habitats for uncommon and common species of conservation importance. There are such species which play a unique role in aquatic ecosystems by effectively breaking down the organic deposits to release energy thereby serving as a vital link in the freshwater food chain as fish food. There are many different kinds of aquatic species as almost every type of freshwater environment habitats from puddles to river to lakes, including both lentic and lotic habitat. Among them aquatic insect constitute a dominating group of benthic, limnetic and littoral fauna of aquatic ecosystems. The distribution of aquatic organisms is the result of interactions among their ecological role, the physical conditions that characterize the habitat and food availability. Aquatic organisms are also important bioindicators of water pollution, triggering substantial applied ecological research. Because they reflect environmental changes which indicates the effects of human activity on water system and provide information on habitat and water quality. Aquatic systems are influenced by the changing climatic conditions which in turn determine the ecological distributions of organisms. Changes in key physical and chemical parameters at the landscape scale are very likely to affect aquatic community and ecosystem attributes such as species richness, range and distribution of species and consequently alter corresponding food web structures at primary and secondary production levels. The specific effects of environmental changes due to anthropogenic activity like global warming on diversity of aquatic species are complicated and could render loss of habitats and species extirpation which remain largely unexplored. A regular and systematic sampling of wetland species can be used to record the process of any changes that have been made and to address the unpleasant changes. Thus research is important to epitomize the current status diversity of wetland species worldwide and to prepare an outline for the conservation of their habitats

Rubina Azmeera Begum. I am a research scholar from Zoology Department, Cotton University



Anthropogenic activities in Son Beel



Anthropogenic activities in Son Beel

Baishaki Dey

Undergraduate Student, Gurucharan College

INTRODUCTION AND LOCATION

Son beel, also known as Shon beel, as the name suggests, is a beel (a beel is a lake-like wetland with static water) situated in Karimganj, Assam, India. It is the second largest seasonal wetland in Asia and the largest wetland in Assam. The most outlandish part of this Beel is that during the dry winter season it becomes a fully functional farm land where one can cultivate rice. And during rainy season, this stretch of land swells up with water and becomes a lake. Researchers reiterate that Son Beel has all prominent potential to be designated as a Ramsar Site (a designation given to a wetland site to be of international importance under the Ramsar Convention).

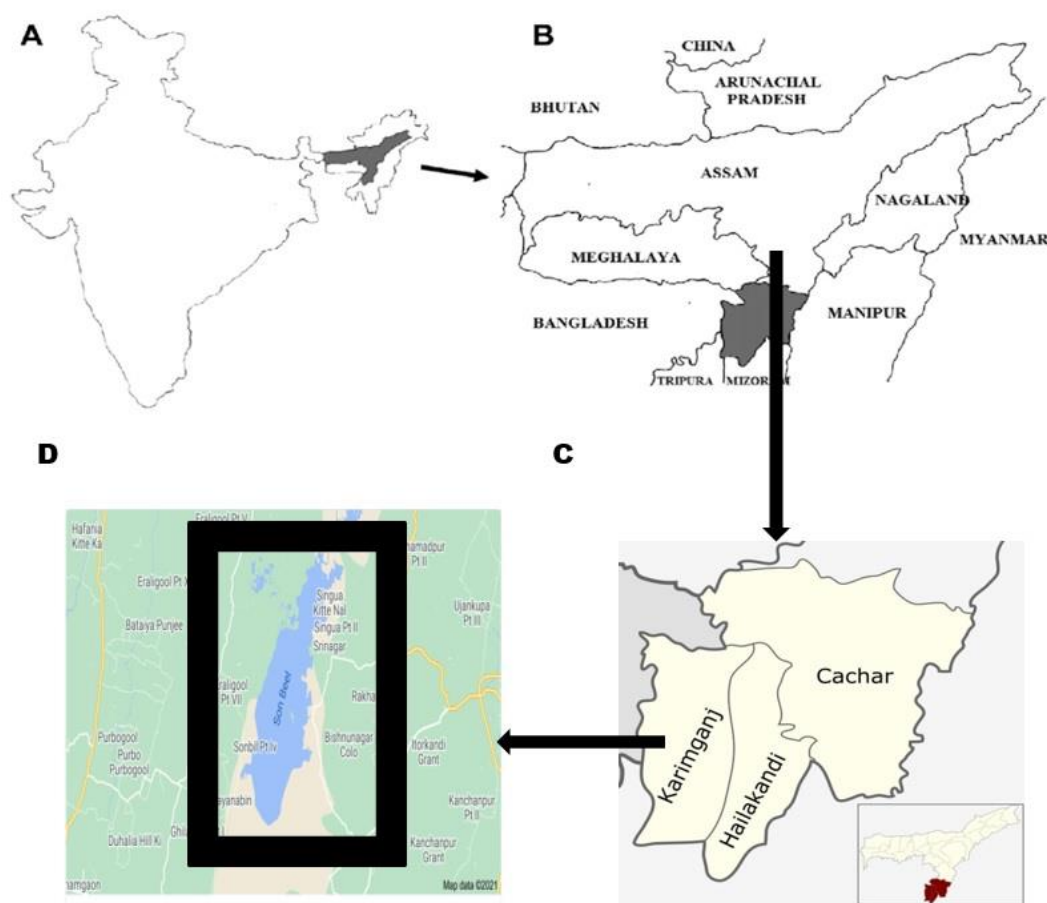


Fig: Location of Son Beel in Map

OBSERVATIONS MADE IN THE SITE OF VISIT - ANTHROPOGENIC ACTIVITIES IN SON BEEL

a) Farming - One of the distinct features of the Wetland is that it turns into a Farming land in dry seasons. For the same reason, the Wetland tempts local communities to make their settlements nearby.

Merits

Provides a source of income to the locals during the dry seasons. The wetland gets enough time to replenish its nutrient content as farming is done in alternative seasons thus don't much harm to the wetland.

Demerits

Eutrophication – A situation where a water body becomes excessively enriched with minerals and nutrients which induce excessive growth of algae, leading to over utilization of oxygen of that area which further triggers the formation of dead zones (low-oxygen, or hypoxic, areas in the world's oceans and lakes).

Anthropogenic... (Cont...)

Baishaki Dey

Undergraduate Student, Gurucharan College

b) Overfishing: Overfishing is the removal of a species of fish from a water body at a rate that species can't replenish, resulting in those species becoming underpopulated in that area. Son Beel turns into a huge fishery in summer when the water level rises up.

Merits

Provides a source of income to the locals during summers.

Demerits

Makes it less suitable for the piscivorous birds to visit. A huge population of ducks are reared in Son Beel by the locals, these ducks further decrease the population of certain small fishes by eating them. Commercial fishing leads to a decrease in population of Fish species whose demand in the market is more.

Conclusion: Son Beel holds a great potential if protected from Anthropogenic activities and Encroachment. The government with locals' cooperation can take steps to conserve the wetland. Without awareness among people about sustainability, government restrictions alone can't deal with the issue.



Fig: Farming in Son Beel during dry seasons.



Fig: Eutrophication in Son Beel due to the use of fertilizers in Farming.

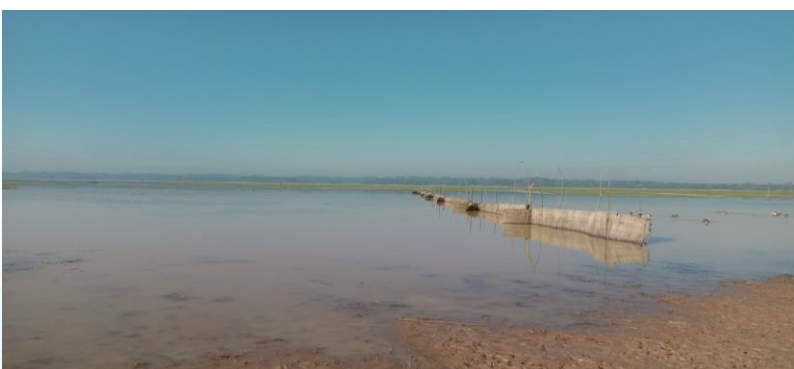


Fig: Commercial Fishing in Son Beel



I'm Baishaki Dey, a 5th semester Zoology honors student from Gurucharan college, Silchar.

Basai Wetland: A future desert



Basai Wetland: A future desert

Dr. Chiranjibi Pattanaik
Environment, Water & Safety Division,
Engineers India Limited, Haryana

Basai wetland is situated near Dhanwapur in north and Basai village from south directions in Gurugram district of Haryana. The wetland is permanent shallow wetland covering an area of about 250 acres and comprising of open water Water Hyacinth and Typha reed beds. It receives water supply from rainwater and a breached water channel which brings waste water and treated sewage from the Gurugram Water and Sewage The wetland supports a high diversity of birds including migratory ones from Europe and Central Asia inhabit the wetland during winter.

It has been recognised as an Important Bird Area by Bombay Natural History Society. In May 2017, eBird has recorded 282 bird species at the site including many listed in threatened category by International Union for Conservation of Nature. The wetland is an ideal grazing ground for Barheaded Geese *Anser indicus* which flock here during winters. The area around the wetland also provides refuge to wild animals. Concerned have been raising alarm over increasing construction activities, real estate development, and resultant disturbance affecting the wetland and birds. Rapid urbanisation has raised fresh concerns over habitat loss & biodiversity, dust pollution, and disturbance to the wetland and its rich bird life. Wetlands, one of the most productive and efficient ecosystems of the world, are facing the threat of extinction and Basai wetland is one of them. Basai wetland, located in the sectors of Haryana Urban Development Authority can help prevent water logging in the city during heavy rains because wetlands are the best source for ground water recharge apart from supporting agriculture and serving habitat for birds and aquatic life even in sewage treated water. Increasing urbanisation and industrialisation have rapidly shrinkage the wetland area.

The lack of coordination and non-cooperation from state government can result in an irreversible ecological equation, thus converting the wetland into a desert in the near future. Declaring Basai wetland as a community reserve will not only protect the bird habitat, but also save the wetland from further degradation.

Basai Wetland (Cont...)

Dr.Chiranjibi Pattanaik

Environment, Water & Safety Division,

Engineers India Limited, Haryana



Congregation of Bar-headed geese



Basai wetland

Date of Photography: 26/01/21

Dr. Chiranjibi Pattanaik is presently working in Environment, Water & Safety division of Engineers India Limited, a PSU under Ministry of Petroleum and Natural Gas. He has more than 17 years experience in Ecology & Biodiversity projects carried out in different vegetation types of India. He worked in National Remote Sensing Centre under Indian Space Research Organization, where he awarded PhD degree in Ecology & Biodiversity. He also worked in Salim Ali Centre for Ornithology & Natural History, an autonomous body under Ministry of Environment, Forest and Climate Change, where exposed to Wetland and bird conservation projects.



The background of the slide is a vibrant blue watercolor splash that radiates from the center, creating a sense of movement and depth. The splash consists of various shades of blue, from light sky blue to deep cerulean, with soft, feathered edges and some darker, more saturated spots. The overall effect is reminiscent of a large drop of paint or a splash of water on a white surface.

Chandubi Lake (Wetland) in Kamrup district, Assam

Chandubi Lake (Wetland) in Kamrup district, Assam

Mary Ann Pao

University of Science and Technology Meghalaya

Scientists are always backed up with scientific analysis, having much deeper perseverance and logical thinking that often overpowers the basic understanding of what a citizen may have towards it.

It is simply about amalgamating complex scientific values into simpler ecological importance. The gap between a researcher and citizen is basic. It requires a bit of attention which is not, obviously next to impossible.

One can achieve amendable goals within a possible time frame with these simple observations that I have made with my own sense of knowledge and understanding.

My personal thoughts about how one can bridge the gap between the scientists and the citizens are as follows-

GENERAL AWARENESS- The scientific importance of Wetlands which have been suitably analysed and interpreted by the scientists, have to be made conveniently clearer to the citizens about why these wetlands are given more emphasis on.

The awareness isn't only about making the Wetlands a landmark for a budding growth of concern but also the emphasis on its vicinity and whereabouts of the wetland area altogether.

EDUCATION- Education is important to make citizens understand the social and cultural values of their surroundings. It is vital to learn, evaluate and analyze the benefits of wetlands and the need to preserve them to the core. It may take long for people to understand, but it will be immensely effective in a longer run.

RELIGIOUS/ SENTIMENTAL ASPECT- Religion plays an important role in bridging the gap between scientists and citizens, as far as conservation of a vulnerable site / endangered flora/ fauna is concerned. There are many examples whereby successful conservational operations have taken place where religion was plainly correlated with nature. This is a simple technique where sentiments of people are amalgamated with conservation and preservation of nature and its natural resources.

VOLUNTEERING and PARTICIPATION- Volunteering and Participation benefits both scientist (researchers) and the citizens to enhance effectual co-operation and mutual understanding. One such example is Joint Forest Management.

IDEAS – Ideas of local people towards environmental sustainability and conservational practices should be given enough recognition, in this case- protection of Wetlands.

My name is Mary Ann Pao, currently pursuing my Masters degree in Environmental Science from University of Science and Technology Meghalaya, Ri-bhoi. I graduated from Uttarakhand Technical University, Dehradun where I opted for Forestry as my under-graduation degree. I have extreme interest in my subject. It makes me immensely happy to have had such great opportunity to take part and contribute as little as I could to raise an awareness for the World Wetland Day, 2021.



Pong dam: A home of migratory birds



Pong Dam: A home of migratory birds

Aafreen Sami

Roorkee, Uttarakhand

This is a reservoir which is constructed on the river Beas in the wetland of Shivalik hills of Kangra district of Himachal Pradesh. The reservoir stretches to an area of 24,529 hectares (60,610 acres), and part of the lakes is 15,662 hectares (38,700 acres). This wetland is a famous wildlife sanctuary and one of the 42 international wetland sites declared under the Ramsar convention in India. With blue dazzling water, green vast stretches of grasslands, endless beautiful clouds, and alluring sunsets, Pong dam is one of the most beautiful embarkments in India. Apart from supplying the surrounding areas with water, this place boasts a splendid environment and is home to many migratory bird species especially Bar-headed goose, Graylag goose, Black-necked grebe, northern pintail, and many more. Apart from our migratory feathered friends, this place is also a home of vultures (as out of 9 vulture species found in India more than 4 species of vulture viz. Egyptian vultures, Himalayan griffon, White-rumped vulture can be seen here), larks, swallows, pipits and other bird species. Pong dam sanctuary is a perfect example of the co-existence of humans with other organisms especially birds and this could have been possible with the joint's efforts of government forest authorities and local communities. This is a wonderful place to visit for all the bird lovers, ornithologists, naturalists, and conservationists to explore these feathered beauties and the involvement of local communities in the conservation of our winter feathered guest. More than 220 species of birds have made this sanctuary their home. A visual treat for all the avid bird watcher



I am Aafreen Sami from Roorkee, Uttarakhand. I have completed my M.Sc in Environmental Sciences and also qualified UGC NET JRF



Shon Beel- The nature's best



Shon Beel- The nature's best

Sripali Deb

Gurucharan College, Silchar

BRIEF INTRODUCTION

In the midst of a busy and bustling world, we often find ourselves in search of stillness. It is tough to find a way to go within when we are constantly in an outward facing mode. So many flock to nearby gardens, parks or the seafront to find calmness and rejuvenation, One such place is definitely Shonbeel – A wetland.

It is situated in Karimganj, Assam, India. Every year, the whole beel becomes full of water during rainy season and in winter the beel dries up (Fig 1).

OBSERVATIONS OR FINDINGS

- **Drying up of Beel-** the lean season, it offers a highly productive soil for rice cultivation. It holds an enormous amount of water that overflows during the rainy season because of the shallow depth in the beel (Fig 2).
- **Livestocks and human intervention have led to the degradation of the wetland-** Due to the presence of livestock, cattle, ducks and public fragmentation a variety of species can not be seen. This area is dominated profoundly by the livestock (Fig 3).
- **Tourism AND Fishing acting as major threats-** The place entertains tourist activities, thus allowing contamination of water, rampant use of plastics by the tourists as well as the locals. The making of the Eco-park has also contributed to the downfall of the area. Continuous fishing of freshwater fishes also acts as a danger to the ruination of the wetland (Fig 4).
- It's a swampy area with paddy fields for rice cultivation (Fig 5)
- **Wetland acting as a carbon dioxide sink** -Generally, undisturbed, or intact **wetlands** tend to **act** as 'carbon **sinks**' due to their dense vegetation, algal activity and soils.
- Different species of birds were observed, along with few species of Molluscs and Anurans were observed (Fig 6).
- The change in landscape was noted- From plain swampy areas to short trees and shrubs to mosses was seen. Lichen, showing symbiotic relation was a treat to the eyes (Fig 7)
- Water turning red due – The most common cause for reddish ponds is the leeching of organic colour, called tannin, into the surrounding water due to decomposition of matter (Fig 8).

I am Sripali Deb, a 5th semester student of Gurucharan college pursuing Zoology as my core subject. I am basically a curious, candid and an optimistic learner. I am known more as an eco-nut than a student. I love to find Art in everything, because at the end no one sees what you see even if they see it too. Happy Learning!



Shon Beel (Cont...)

Sripali Deb

Gurucharan College, Silchar

SCIENTIFIC NAME	VERNACULAR NAME	SCIENTIST WHO DISCOVERED THE Sp.
<i>Anastomus oscitans</i>	Open Bill Stork	Bonnaterre, 1791
<i>Dicrurus macrocercus</i>	Black Drongo	Viillot, 1817
<i>Ardea alba</i>	Great egret	Linnaeu, 1758
Hirundininae	Swallow	Rafinesque, 1815
<i>A.platyrhynchos</i>	Domestic Duck	Linnaeus, 1758
<i>Cygnus cygnus</i>	White Swan	Linnaeus, 1758
<i>Vanellus indicus</i>	Red- Wattled Lapwing	Boddaert, 1783
<i>Streptopelia risoria</i> var.	White Dove	Linnaeus, 1758



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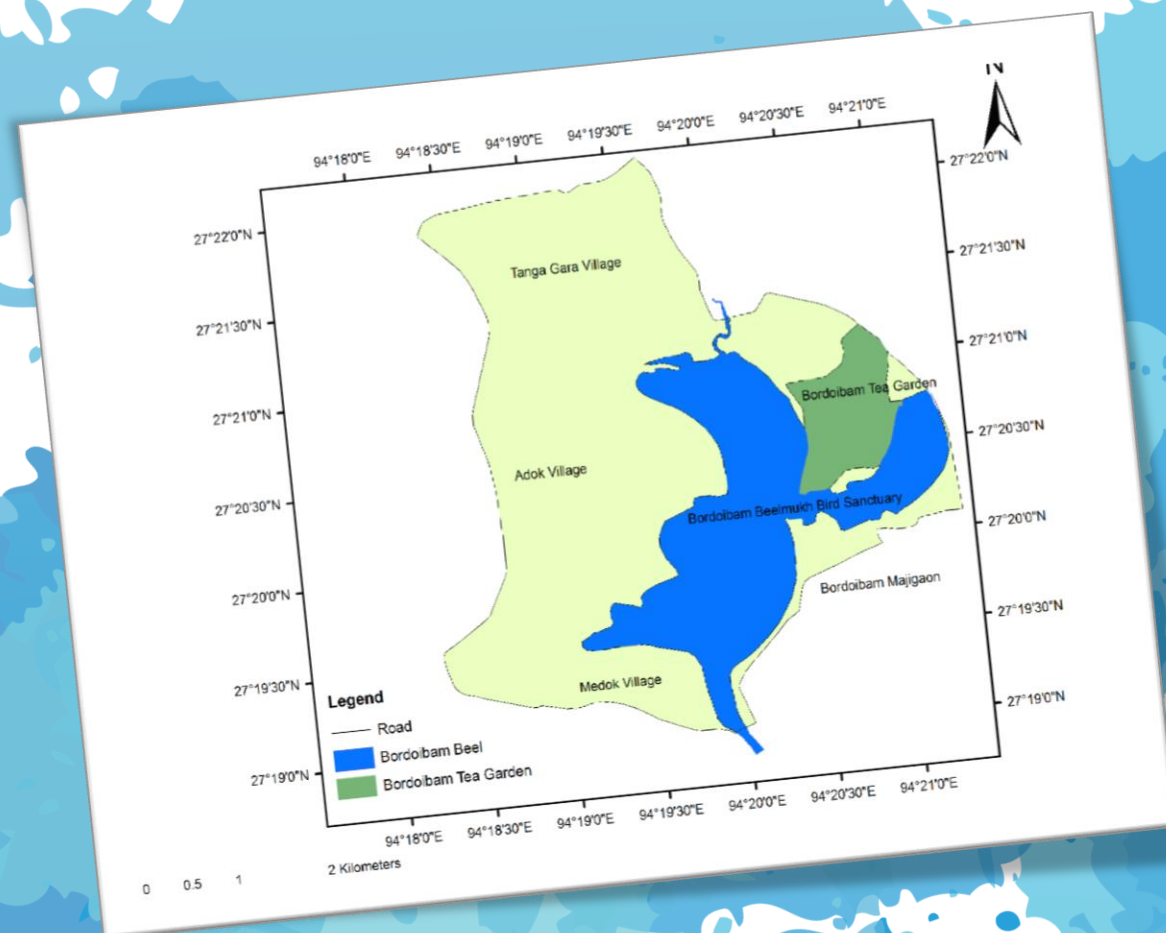


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Water quality assessment of Bordoibam Beelmukh, an Important Bird Area Site of Assam



Water quality assessment of Bordoibam Beelmukh, an Important Bird Area Site of Assam

Kaustav Rakshit

**Junior Technical Superintendent, Centre for the Environment,
IIT, Guwahati, Assam**

Bordoibam Beelmukh is an ox-bow lake formed due to course change of the river Subansiri after 1950's massive earthquake. Bordoibam Beelmukh is situated 35 and 50 km away from headquarters of Dhemaji and Lakhimpur districts of Assam. Geographical position of the wetland is in between 27°20'N (Latitude) and 94°20'E (Longitude). The present study focuses on the basic water quality parameters of the lake. Water quality in Bordoibam Beelmukh during the study period from March 2019 to February 2020 are as follows: Air temperature 23.54- 29.47°C, Water temperature 21.04 - 27.24°C, pH 6.70 - 7.40, Conductivity 392 - 600 $\mu\text{S}/\text{cm}$, Turbidity (NTU) 5.0- 12.0, Total Dissolved Solids 161.2 - 325.1 mg/L, Chloride (Cl⁻) 0.26 - 1.34 mg/L, Nitrate (NO₃⁻) 0.26 - 1.46 mg/L, Biological Oxygen Demand (BOD) 1.49 - 1.80 mg/L..

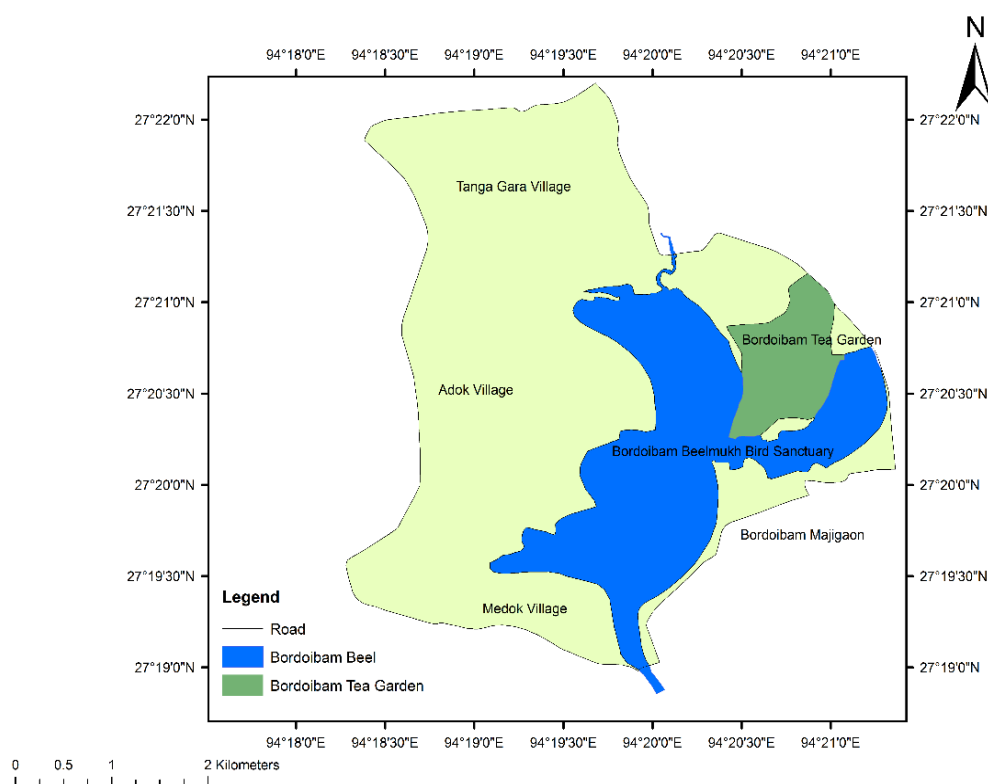


Fig: Map of Bordoibam Beel

Kaustubh Rakshit is presently working as Junior Technical Superintendent at Centre for the Environment, Indian Institute of Technology Guwahati, Assam, India. He has 12 years of experience in the field of environmental education, science and technology.



Low cost, Reusable, Durable, Nature friendly Material for Wastewater Treatment

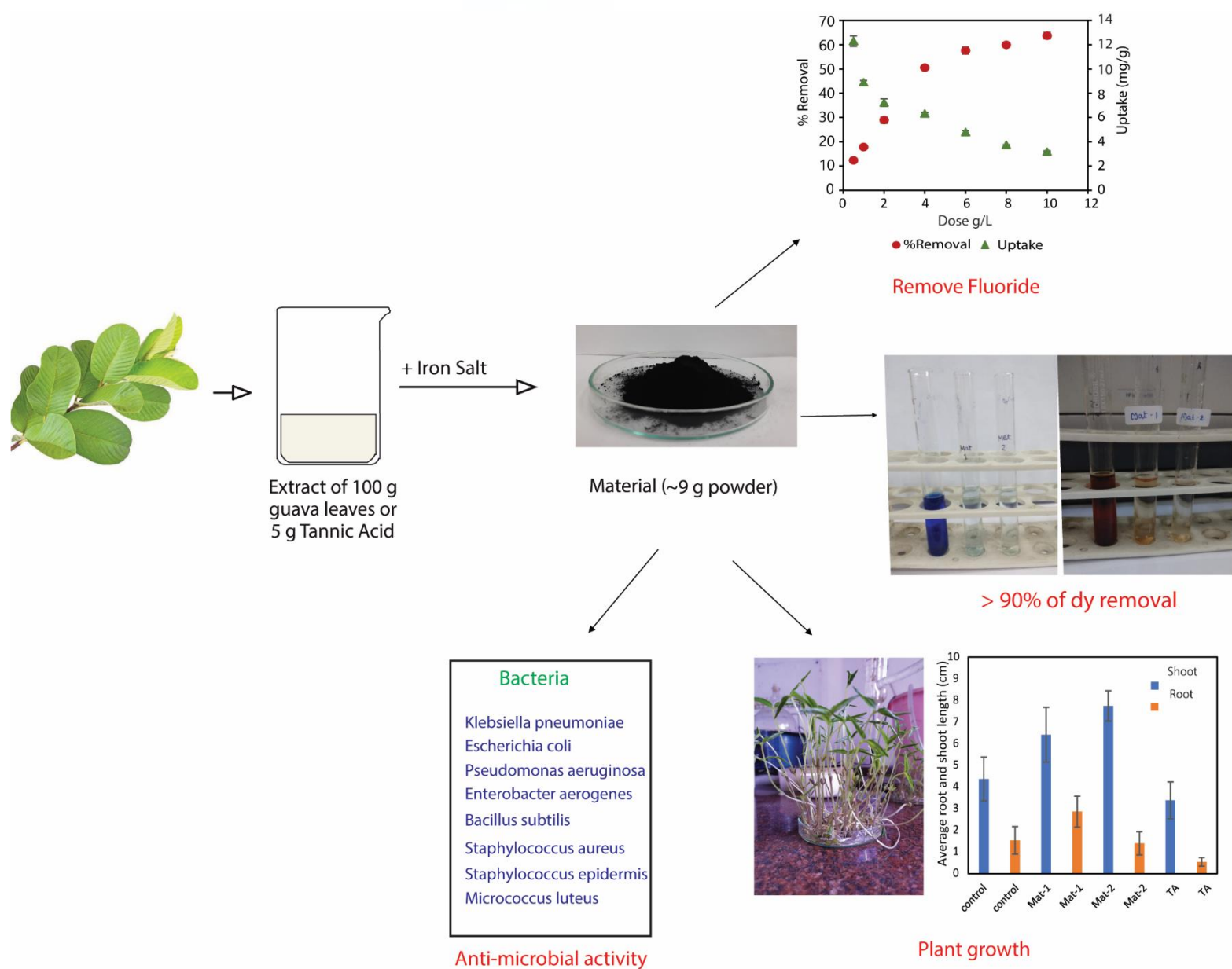


Low cost, Reusable, Durable, Nature friendly Material for Wastewater Treatment

Jinat Aktar

IIT Guwahati, Assam

Water covers 3/4th area of the Earth. However, all the water is not suitable for consumption due to unprecedented human activity and geogenic pollution. Science have introduced various artificial ways to purify wastewater. Among them, green synthesis of nanoparticles and its application in water treatment is also well known.



In green synthesis, different kinds of plant's root, leaf, shoot extract are used because of the presence of polyphenols. However, the exact synthesis process, characteristics of polyphenols and the components, which are responsible for synthesis of nanoparticles present in the mentioned natural products are yet undefined.

Low cost, Reusable, Durable, Nature friendly Material for Wastewater Treatment (Cont...)

Jinat Aktar

IIT Guwahati, Assam

In our research experiments, we have synthesized two types of iron-polyphenol nanoparticle with guava leaf and tannic acid (a known polyphenol present in plant). The aim of our work is to find out the components responsible for nanoparticle synthesis and thus, by using ESI mass we successfully identified the type of polyphenols. Moreover, by using FESEM, TGA, EPR and XPS analysis we have thoroughly characterized it, which is helpful for understand the mechanism of work in application. The efficacy of post-synthesis materials was investigated for removal of fluoride in water. In Assam, fluoride contamination of water is a big health issue. Water samples from different parts of Guwahati collected and treated the fluoride present using synthesized materials. We also tested our materials to remove different kinds of dyes from wastewater and archived more than 90% removal of high concentration dye using very less amount of the materials. While checking its reusability we found that it can be used more than three times. These materials also have significant antibacterial capacity against different disease-causing pathogenic bacteria like, *Klebsiella pneumoniae*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus*, *Staphylococcus epidermis*, *Micrococcus luteus*, etc. Therefore, the versatility of synthesized materials can be justified by its action against disease causing bacteria, fluoride and different dyes removability. As the materials are used in water treatment, it is also important to know if it has any toxic affect or not. Therefore, we tested its toxicity on Mung bean seeds. After checking the microscopic and chemical analysis data, we found that it helped in the plant growth rather than any negative effect.

I am a Research Scholar from Centre for the Environment, Indian Institute of Technology Guwahati, pursuing my PhD on the topic Iron-Plant polyphenol complexes synthesis, characterization and application



Skimming the Chambal



Skimming the Chambal

Raghav Gupta
IRS Officer

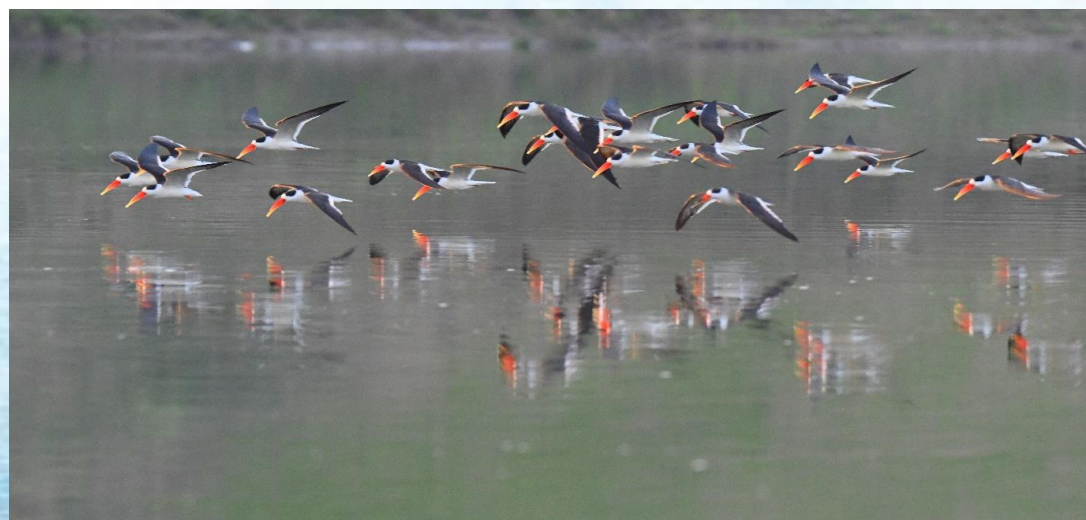
Even a glimpse of the famed (and infamous) ravines of Chambal establishes it as a geomorphologic wonder. The towering alluvial levees dotted with holes—homes of owlets, swallows, parakeets, and pigeons—are a sight to behold. But what stole the show was the river itself, with myriad lotic flora and fish clearly visible amid the clear blue water: Chambal as a wetland was a mighty revelation. I was on way for Indian Skimmer Count – Phase I being organized by the Bombay Natural History Society (BNHS), Mumbai.

We set off in a small motorboat. En route, I saw crocodiles, turtles and several species of water birds on the shore. I even saw the rare black-bellied tern, and took some time to recover after seeing such a rare bird. Finally, I saw a sand bar jutting into the river. There they were, hopping, skipping and surely, skimming: the Indian skimmers! I scrambled out of excitement, causing the boat to bob precariously. But I didn't care: I was lost in them.

I took several pictures of the skimmers—so named because they “skim” the surface of the river to catch prey with their longer, lower bill. Earlier literature, and some references even today, name this bird the “scissorbill” for this very reason. They are quite unmistakable owing to their orange and asymmetrical bills.

The population of Indian skimmers is declining, and Chambal riverbanks are one of their last strongholds. Immediate conservation of this wetland is crucial to their survival because of sand-mining activities and human disturbance. Right next to skimmers, I saw three gharials: unique crocodilians, also endangered. Once plentiful in all north-Indian rivers, gharial population plummeted. However, thanks to breeding centres and conservation efforts, their numbers are improving.

It was heartening to see nearly 28 skimmers and gharials on that small piece of land: hanging on to it as if that was their last and only refuge. The boat had turned towards the shore. I looked at them one last time, hopeful that they would continue to call this place their home.



Skimming the Chambal (Cont...)

Raghav Gupta
IRS Officer

Raghav Gupta is an Indian Revenue Service (IRS) officer of 2012 batch and belongs to Kanpur. Mr. Gupta's love for wildlife turned into photography about ten years back. Since then, he has constantly tried to improve his craft.

He has written for various magazines and newspapers including The Hindu, Saevus, Sanctuary Asia and others and has conducted wildlife conservation photography webinars for institutions across India. He is a lifetime member of Bombay Natural History Society (BNHS) and was appointed as Advisory Member of the ERDS foundation which is undertaking a Great Indian Bustard (GIB) conservation program. As lifelong learner, he has completed various wildlife conservation courses from Cornell Lab, National Geographic, IIT Kanpur and IUCN.

He is an ardent quizzer and through his writing, photography, and webinars, he wishes to spread awareness about wildlife diversity and conservation. His other interests include astronomy, Egyptology, writing poetry and teaching.



Assam's Infamous Wetland- Is it slowly vanishing?



Assam's Infamous Wetland- Is it slowly vanishing?

**Bhuyashi Baidya,
Cotton University, Assam**



Source://theshillongtimes.com/2020/12/31/section-144-imposed-in-deepor-beel-wildlife-sanctuary/

Deepor Beel, is a lake in Guwahati, Assam. Under Ramsar Convention, it has been listed as a wetland. It is a home to 232 birds (Spot billed pelican, Baers Pochard, Ferruginous Duck etc) 50 fauna, 20 amphibian, 12 lizard and 18 snake species out of which 10 are in List of Red listed species by IUCN. However, quick and impromptu improvement of urbanization is a major threat to this wetland. Boragaon dumping site has polluted the Beel. The NFR constructed railroad has resulted in the water flow blockage of the Beel which disturbs the entire ecosystem of the Beel. State govt banned fishing which affected the lives of fishermen. Guwahati oil refinery waste is directed to the Beel which convey other modern and emergency clinic waste to the Beel. Sewage release into water have caused the fall in oxygen levels causing fishes death and the lives of fishermen went for a toss. The local people have also complained of smell from the water. Many have started rearing pigs for extra money as the number of fishes are going down in the Beel.

Therefore, stress on ecology, food, environment is getting low day by day. Proper conservation measures and awareness among citizens is necessary to reduce environmental degradation. The Beel has a high potential for tourism. Activities like eco park, bird watching, forest camps, picnic area etc. are already attracting a lot of tourists. With that being said, Deepor Beel is an excellent spot for eco tourism which not only will fetch money and improve our economy but also ensure a safe and clean environment for its species and might serve as another home for the famous Gangetic Dolphin apart from Brahmaputra along with being a livelihood source for locals.

Assam's Infamous Wetland- Is it slowly vanishing? (Cont...)

Bhuyashi Baidya,
Cotton University, Assam



Industrial wastes polluting the Beel
Source: assaminfo.com/tourist-places/37/dipor-beel.htm



Waste from Boragaon dumping ground
accumulated on the bank
Source: pratidintime.com/deepor-beel-more-polluted-than-ever-despite-govts-plans



Common people depend on the wetland
for their daily bread
Source: m.facebook.com/deepor-beel-695993650580576



Migratory birds that attract tourists
Source: telegraphindia.com

Bhuyashi Baidya is an undergraduate student from the Department of Zoology, Cotton University. Her interests range from nature conservation to waste management and wildlife conservation



The Phantom of the wetlands

"... I haven't seen with these eyes
What two steps from my home lies
On a sheaf of paddy grain, a glistening
drop of dew." - Rabindranath Tagore

The Phantom of the wetlands

Anish Paul

Pondicherry University, Pondicherry

“... I haven't seen with these eyes

What two steps from my home lies

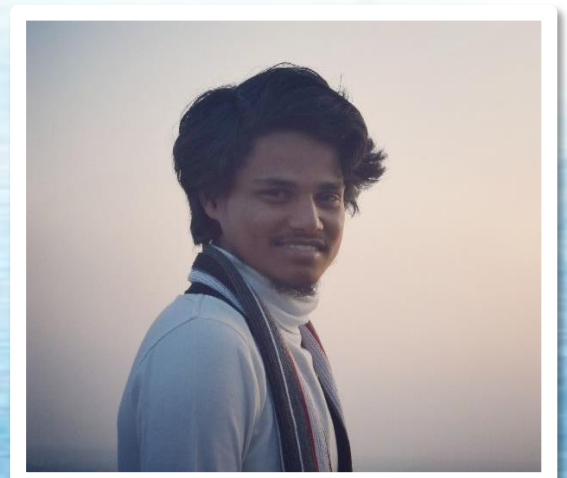
On a sheaf of paddy grain, a glistening drop of dew.” – Rabindranath Tagore

Tagore's words are still relevant after almost 100 of years even for wildlife enthusiasts. Century old perception of wild animals living only in the wild, far away from the urban settlements, has been proven wrong. One such ill-fated animal is the Fishing Cat, *Prionailurus viverrinus*.

One of the 15 cat species known to be found in India, Fishing Cats are medium sized felids that are mainly nocturnal in habit and remain solitary during most of their lifetime except for the reproductive season. This elusive cat is a resident of the wetland and marshland ecosystems and thrives on mostly fishes as well as rodents, birds, crabs etc. The cat, unlike most of its cousins of the Felidae family, loves the aquatic habitat and is perfectly adapted to live by the water. Their partially webbed feet make them an efficient swimmer as well as facilitate their walk in the muddy soil. Their body is covered with a double layer of fur that acts as a water resistant material and also helps in thermoregulation. The dark brownish colour of the animal makes it almost invisible at the night, the time when it remains in the most active state. The Fishing Cats are efficient predators. To catch fishes, they have developed a fascinating technique that involves mimicking the movement of an insect on the water surface. When the fishes come to catch their prey, they are predated upon. Thus, over the long period of its existence in the planet, Fishing Cats have become highly habitat specific.

Fishing Cats have long been neglected in the Indian wildlife studies. Very little information is available about the ecology and behaviour of the species. In 2012, West Bengal government declared the Fishing Cat as its state animal. The IUCN status of the species is „Vulnerable“. Thus to ensure a good population of Fishing Cats, conservation of wetland ecosystem is one of the utmost priority.

Being born and brought up in Kolkata, I have spent most of my life in the jungle of concrete. Yet, nature and it's elements have inspired me a lot since childhood and I am currently looking forward to shape my career in the study of nature and it's components. As of now, I am pursuing my Master's in Ecology from Department of Ecology and Environmental Sciences, Pondicherry University. I completed my undergraduation in Zoology from Visva-Bharati University, West Bengal. I am interested in Conservation Biology, Wildlife Ecology and Human- Wildlife Conflict and its mitigation and Science Communication. Apart from studies, I am interested in singing, writing and listening to various types of music



Invisible changes of Deeporbee!



Invisible changes of Deepor Beel

Dr. Moitrayee Banerjee Chakraborty

Cotton University, Assam

Deeporbeel , a beel (or wetland) for *Dipa* (meaning Elephant in Sanskrit) is a water body covering 9.27 sq km area and located south west of Guwahati city .The wetland is the only storm water storage basin of this area fed by rivers like Bashishtha and Kalamoni carrying the monsoon runoff water to the lake and outflows to mighty Brahmaputra through Khonajan channel.

Deeporbeel supports a huge diversity of flora and fauna along with the migratory birds elephants and even people. Due to its ecological and environmental importance it was listed as Ramsar site in 2002, asper convention in 1971, in the Ramsar city of Iran for the conservation and sustainable use of wetlands . In spite of this in January 2017, death of about 20 Greater Adjutant **storks**, hit the new headlines. Although the exact cause of death could not be pinpointed, but the adjacent landfill site at Boragaon was suspected to be the cause.

Amidst hypotheses that dumping of solid wastes at Boragaon has no effect on Deeporbeel, microbiology students and faculties of the Department of Botany ,Cotton University, carried out comparative a study on the microbial diversity of the soil adjacent to Boragaon and that adjacent to Deeporbeel. A striking difference in the microbial diversity of soil near the dumping site with that near deeporbeel was observed. The higher microbial diversity of the soil near dumping site might be due to addition of diverse carbon sources and also introduction of newer microbes brought along with the garbage. Runoff water due to rain or seepage of liquid substances from the dumped waste is likely to carry these microbes to adjacent water body of Deeporbeel. The microbes which are not adapted to the ecosystem are can disturb the balance of the aquatic ecosystem. Some pathogenic bacteria and fungi may cause waterborne diseases in man and animals drinking it or enter the food chain. Thus such incidents of loss of diversity and life forms may become so common to not even become news unless we all contribute in every way possible, even if it means reducing the number of polythene carry bags or ensuring waste segregation into degradable and non degradable or processing the biodegradable wastes at home.



Invisible changes of Deepor Beel (Cont...)

Dr. Moitrayee Banerjee Chakraborty
Cotton University, Assam

Dr. Moitrayee Banerjee Chakraborty serving as assistant professor at cotton university completed her post graduation from Assam, University in Life Sciences with specialisation in Microbial Ecology and has research interest in microbiology and metagenomics. She is deeply interested in finding solutions to environmental issues and being a management graduate with specialisation in agriculture looks forward to sustainable development of this region along with the entire world.



Story of two wetlands



Story of two wetlands

Shibarshisha Baruah
Cotton University, Assam

The wetlands of Assam has not only captivated minds of great scholars and scientists but also has been able to cultivate a researcher in everyone. It is not only about the wetland biodiversity but the social, economic and cultural heritage of wetlands that attracts curious minds from across the world. Son beel, located at the Southern part of Assam, in Karimganj district has a breathtaking picturesque landscape. It is the largest wetland in Assam. The half submersed Hizol trees and sky reflecting at the time of sunset and sunrise give a beautiful dramatic view for people to be mesmerized. Deepor beel, located at South West of Guwahati city, Kamrup district, Assam is another treasure of the state especially loved by bird watchers. It is rich in Avian fauna and is visited by many migratory birds. Both have unconventional landscapes and are tourist attractions but differ in some grounds. Son beel is a seasonal wetland but Deepor beel is a permanent wetland. Son beel becomes farmland for the cultivation of rice during winter and when the water fills in during the rainy season, it becomes a lake. Deepor beel is listed as a Ramsar site at Ramsar Convention in November, 2002. Son beel isn't a Ramsar site though its protection and maintenance is important since it serves livelihood to many rural families. Tourism flourishes in Deepor beel because of the scenic beauty and being in proximity to the Guwahati city. Tourism can be more developed in Son beel.

The aim was to put a light on the differences of the two wetlands since it helps us and our community to have a better understanding of the wetland environment and need for preservation. Vast biodiversity of flora and fauna is observed. Wetlands also provide various ecosystem services. Many families whose traditional way of livelihood is fishing are directly dependent on the beels. Appropriate wetland governance will ensure the maintenance of the wetlands. Covid 19 pandemic was an alarm for us to start restoring the natural environment and protecting it as it an important aspect for the survival of mankind. It is high time for us to nurture our minds and take actions against wetland destruction.



Image: Son beel
Source: tourmyindia.com

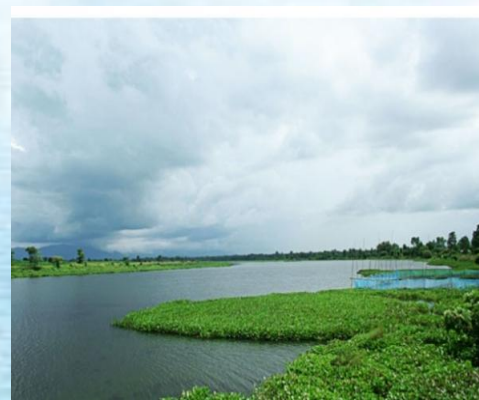
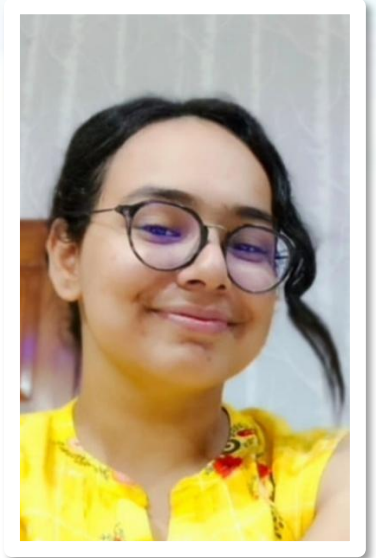


Image: Deepor beel
Source: theshillongtimes

Story of two wetlands

Shibarshisha Baruah
Cotton University, Assam

Hi I am Shibarshisha Barua, a third semester student from Department of Zoology, Cotton University.





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