A NATIONAL WEBINAR

ON

"BIODIVERSITY CONSERVATION: ITS CHALLENGES AND OPPORTUNITIES"

Resource Persons

Mr. Bikash Ranjan Dash

Divisional Forest Officer, Mangrove Forest Division, Rajnagar

Dr Nabin Kumar Dhal

Chief Scientist, IMMT, Bhubaneswar

Dr. Sudam Charan Sahu

Assistant Professor, Department of Botany,

North Orissa University, Baripada

On

19th November 2020

DEPARTMENT OF BOTANY

PATTAMUNDAI COLLEGE

PATTAMUNDAI

KENDRAPARA

754215

REPORT

A national webinar was organized by Department of Botany, Pattamundai College, Pattamundai on dated 19.11.2020 on the topic **"Biodiversity Conservation: its challenges and opportunities".** Mr. Bikash Ranjan Dash, D.F.O, Mangrove Wildlife Division, Rajnagar, Dr. Nabin Kumar Dhal, Chief Scientist, IMMT, Bhubaneswar and Dr. Sudam Charan Sahu, Assistant Professor, Department of Botany, North Orissa University, Baripada graced the webinar as resource persons.

The webinar was started at 10.30 am with the welcome address by our esteemed Principal Prof. Adhikari Laxminarayan Dash which was followed by guest introduction by Dr. Anjali Kumari Dash, Head of the Department of Botany. She also explained the aim and objectives of the webinar and the aim of the topics to be discussed by our resource persons. 160 participants were participated in this webinar all over India including faculties, academicians, researchers and students. The resource persons gave keynote address on their respective topics with question-answer session at the end.

The webinar was ended with a vote of thanks by Mrs. Suchismita Biswal, Lecturer in Botany at 2.00 pm.

OFFICE OF THE PRINCIPAL
Mobile : 9437376724

PATTAMUNDAI COLLEGE

NAAC ACCREDITED B+ GRADE
PATTAMUNDAI, KENDRAPARA, ODISHA - 754215

Ref No. : 1108 Date 17/11/2020

To

Dr. Nabin Kumar Dhal
Chief Scientist
IMMT, Bhubaneswar

Sub – Request to act as resource person in national webinar to be conducted on the topic "BIODIVERSITY CONSERVATION: ITS CHALLENGES AND OPPORTUNITIES"

Sir,

I am pleased to request you to kindly act as resource person in national webinar on the topic ***"Biodiversity Conservation: its challenges and opportunities"*** to be organized by the department of Botany of this college at 10.30 am on 19th November 2020.

Your kind consent in this regard is highly solicited.

Yours Faithfully,

17.11.20

Principal
Pattamundai College

Principal
Pattamundai College

www.pattamundaicollege.ac.in,
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PATTAMUNDAI COLLEGE

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PATTAMUNDAI, KENDRAPARA, ODISHA - 754215

Ref No. :.....1106..... Date.....17/11/2020.....

To

Mr. Bikash Ranjan Dash, D.F.O
Mangrove Forest Division (Wild Life)
Rajnagar, Kendrapara

Sub – Request to act as resource person in national webinar to be conducted on the topic "BIODIVERSITY CONSERVATION: ITS CHALLENGES AND OPPORTUNITIES"

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PATTAMUNDAI COLLEGE

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Ref No. : 1107 Date 17/11/2020

To

Dr. Sudam Charan Sahu
Assistant Professor
Department of Botany
North Orissa University, Baripada

Sub – Request to act as resource person in national webinar to be conducted on the topic "BIODIVERSITY CONSERVATION: ITS CHALLENGES AND OPPORTUNITIES"

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Your kind consent in this regard is highly solicited.

Yours Faithfully,

17.11.20

Principal
Pattamundai College

Principal
Pattamundai College

Bikash Ranjan Dash

Working as Divisional Forest Officer, Mangrove Forest Division (Wildlife), Rajnagar

PG in Botany from UU, working in State Forest Service

Diploma in Forestry from State Forest Service College, Burnihat, Assam

Advance PG Diploma in Wildlife Management from Wildlife Institute of India, Dehradun

Training from International Lake Environment Committee Institute, Japan on Integrated Lake, River and Coastal Basin Management.

Worked previously in Chilika Wildlife Division and Similipal Tiger reserve

Dr. Sudam Charan Sahu
Assistant Professor
Department of Botany
North Orissa University, Baripada (Odisha)
E. mail: sudamsahu.bdk@gmail.com

Sudam Charan Sahu, M.Sc., Ph. D, F.I.A.T. is working as an Assistant Professor in the Department of Botany, North Orissa University, Baripada (Odisha), India. He did his Ph. D from CSIR-IMMT, Bhubaneswar (Under Utkal University, Bhubaneswar), India and Post-Doctorate from Indian Institute of Science, Bangalore (India). His specialization and research fields include plant taxonomy, ethnobotany, forest ecology, climate change and biodiversity conservation. He has research experience of 16 years and participated/handled 04 major projects funded by different National/State funding agencies. He has published more than 40 papers in various national and international journals, 02 books, 12 book chapters and edited 02 books (Publisher-In-Tech, Croatia, U.K.). The published books namely, **"Parasitic Plants of Odisha"** and **"Trees of Chandaka Wildlife Sanctuary"** are well appreciated by the readers. He is recognized as **Fellow of Indian Association for Angiosperm Taxonomy.** He was also awarded with **DST-Young Scientist from Science & Engineering Research Board (SERB), DST, Government of India.** He is a member of Research Advisory Committee in Centre for Environment Studies, Department of Environment & Forests, Government of Odisha. He is a well-recognized reviewer of many Science Citation Index (SCI) and Non-SCI journals.

DEPARTMENT OF BOTANY

PATTAMUNDAI COLLEGE, PATTAMUNDAI

(A NON-GOVT AIDED COLLEGE AFFILIATED TO UTKAL UNIVERSITY, ODISHA)

ORGANISES

A NATIONAL WEBINAR ON

BIODIVERSITY CONSERVATION : ITS CHALLENGES AND OPPORTUNITIES

DATE: 19.11.2020 , TIME : 10.30 A.M

RESOURCE PERSON
DR. NABIN KUMAR DHAL
CHIEF SCIENTIST
IMMT, BHUBANESWAR

RESOURCE PERSON
MR. BIKASH RANJAN DASH, D.F.O
MANGROVE FOREST DIVISION
(WILD LIFE) RAJNAGAR, KENDRAPARA

RESOURCE PERSON
DR. SUDAM CHARAN SAHU
ASSISTANT PROFESSOR
DEPT. OF BOTANY,
NORTH ORISSA UNIVERSITY,
BARIPADA

PROF. A.L.N DASH
PRINCIPAL
PATTAMUNDAI COLLEGE,
PATTAMUNDAI

DR. ANJALI DASH
H.O.D BOTANY,CONVENER

MRS. SUCHISMITA BISWAL
CO-CONVENER

NO REGISTRATION FEES

E- CERTIFICATE TO ALL PARTICIPANTS

Regd. Link : https://forms.gle/jDcvACBxULqkEtUA8

WHY SHOULD WE PROTECT BIODIVERSITY?

Dr. N. K. Dhal, Chief Scientist

IMMT, BBSR

Biodiversity is the foundation of ecosystem services to which human well-being is intimately linked. No feature of Earth is more complex, dynamic, and varied than the layer of living organisms that occupy its surfaces and its seas, and no feature is experiencing more dramatic change at the hands of humans than this extraordinary, singularly unique feature of Earth. This layer of living organisms—the biosphere—through the collective metabolic activities of its innumerable plants, animals, and microbes physically and chemically unites the atmosphere, geosphere, and hydrosphere into one environmental system within which millions of species, including humans, have thrived. Breathable air, potable water, fertile soils, productive lands, bountiful seas, the equitable climate of Earth's recent history, and other ecosystem services are manifestations of the workings of life. It follows that large-scale human influences over this biota have tremendous impacts on human well-being. It also follows that the nature of these impacts, good or bad, is within the power of humans to influence.

Defining Biodiversity

Biodiversity is defined as "the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species,

between species and of ecosystems." The importance of this definition is that it draws attention to the many dimensions of biodiversity. It explicitly recognizes that every biota can be characterized by its taxonomic, ecological, and genetic diversity and that the way these dimensions of diversity vary over space and time is a key feature of biodiversity. Thus only a multidimensional assessment of biodiversity can provide insights into the relationship between changes in biodiversity and changes in ecosystem functioning and ecosystem services.

Biodiversity includes all ecosystems—managed or unmanaged. Sometimes biodiversity is presumed to be a relevant feature of only unmanaged ecosystems, such as wildlands, nature preserves, or national parks. This is incorrect. Managed systems like plantations, farms, croplands, aquaculture sites, rangelands, or even urban parks and urban ecosystems—have their own biodiversity. Given that cultivated systems alone now account for more than 24% of Earth's terrestrial surface.

Measuring Biodiversity: Species Richness and Indicators

In spite of many tools and data sources, biodiversity remains difficult to quantify precisely. But precise answers are seldom needed to devise an effective understanding of where biodiversity is, how it is changing over space and time, the drivers responsible for such change, the consequences of such change for ecosystem services and human well-being, and the response options available. Ideally, to assess the conditions and trends of biodiversity either globally or sub-globally, it is necessary to measure the abundance of all organisms over space and time, using taxonomy (such as the number of species), functional

traits (for example, the ecological type such as nitrogen-fixing plants like legumes versus non-nitrogen-fixing plants), and the interactions among species that affect their dynamics and function (predation, parasitism, competition, and facilitation such as pollination, for instance, and how strongly such interactions affect ecosystems). Even more important would be to estimate turnover of biodiversity, not just point estimates in space or time.

Ecological indicators are scientific constructs that use quantitative data to measure aspects of biodiversity, ecosystem condition, services, or drivers of change, but no single ecological indicator captures all the dimensions of biodiversity. Ecological indicators form a critical component of monitoring, assessment, and decision-making and are designed to communicate information quickly and easily to policy-makers. In a similar manner, economic indicators such as GDP are highly influential and well understood by decision-makers. Some environmental indicators, such as global mean temperature and atmospheric CO_2 concentrations, are becoming widely accepted as measures of anthropogenic effects on global climate.

While the data to hand are often insufficient to provide accurate pictures of the extent and distribution of all components of biodiversity, there are, nevertheless, many patterns and tools that decision-makers can use to derive useful approximations for both terrestrial and marine ecosystems. North-temperate regions often have usable data on spatial distributions of many taxa, and some groups (such as birds, mammals, reptiles, plants, butterflies, and dragonflies) are reasonably well documented globally. Biogeographic principles (such as gradients

in species richness associated with latitude, temperature, salinity, and water depth) or the use of indicators can supplement available biotic inventories. Global and sub-global maps of species richness, several of which are provided in the MA reports Current State and Trends and Scenarios, provide valuable pictures of the distribution of biodiversity.

Most macroscopic organisms have small, often clustered geographical ranges, leading to centers of both high diversity and endemism, frequently concentrated in isolated or topographically variable regions (islands, mountains, peninsulas). A large proportion of the world's terrestrial biodiversity at the species level is concentrated in a small part of the world, mostly in the tropics. Even among the larger and more mobile species, such as terrestrial vertebrates, more than one third of all species have ranges of less than 1,000 square kilometers. In contrast, local and regional diversity of microorganisms tends to be more similar to large-scale and global diversity because of their large population size, greater dispersal, larger range sizes, and lower levels of regional species clustering.

Various threats to biodiversity

Biodiversity has been continually under threat since the dawn of man. As we expand we remove, change, and use land to serve our purposes. The changes we make often damage natural habitats and reduce their biodiversity. One of the primary threats to biodiversity is habitat loss. This can be through clear cutting forests, polluting oceans, or anything that alters the natural habitat. We

harvest large amounts of natural resources and when this is not done sustainably it has disastrous consequences.

One of the largest causes of habitat destruction is land development. As urbanization has increased over the last 100 years more and more land has been repurposed, destroying the natural habitat, increasing noise, and pollution. When habitats change animals flee the area or die, dramatically reducing the area's biodiversity. Climate change goes hand in hand with urbanization and habitat loss. As urbanization has increased, human development has increased, and this has increased consumption of many natural resources. Climate change alters regional climates, making many species specifically adapted to those regions struggle to survive. Additionally, as the climate changes species will move into new areas, altering the ecosystems already present there.

Finally, with these changes some climates will completely disappear. Glaciers will melt and islands will be covered with water. A final threat to biodiversity are invasive species. Invasive species are plants or animals that are not naturally found in a region and often come from very far away. These organisms are moved intentionally and unintentionally by us.

How we can protect biodiversity

Even though the biodiversity of many habitats has become threatened there are many things we can do to help reduce this danger. These are some of the steps you can take to conserve biodiversity.

1. Government legislation

Governments have the power to control what is done to the habitats within their country. Legislation that protects natural habitats by outlawing development, harvesting of natural resources, or other human exploitation has a huge impact on maintaining natural biodiversity. Additionally, laws protecting specific species like the USA's Endangered Species Act helps protect animals that have already been impacted. Protecting habitats before they have been altered is the best form on biodiversity conservation and is most successfully implemented by government regulations.

2. Nature preserves

Nature preserves are a form of government regulation and are often known as National Parks. They protect a region and the organisms that live there from certain forms of development and provide access for people to visit them. This is excellent because it protects the natural habitat and is a place where people can view the ecosystem.The goal is that over time this helps people have more respect for the natural world and increases pressure on government to further protect other areas.

3. Reducing amount of invasive species

Invasive species are sometimes introduced to an area on purpose, but also sometimes by accident. To limit the number of invasive species moved by accident planes, ships, and cargo must be thoroughly checked before it is offloaded in a new country.

Additionally, people should not bring new species of animals or plants to an area without consulting ecologists knowledgeable on the region.

4. Habitat restoration

After an area is damaged by human impacts we can try to return it to its natural state. This means bringing back the plants and animals that are naturally found there. This has been shown to be a promising way of returning biodiversity to a region.One example of this is the reintroduction of wolves into Yellowstone National Park. When wolves returned to the region they ate more elk and coyote, which increased the prey species of the coyote and let riparian (river bank) areas trampled by elk recover.These restoration projects can be undertaken by governments, local organizations, or NGOs.

5. Captive breeding and seed banks

Captive breeding is when animals in captivity (often at zoos) are bred. This is seen as somewhat controversial, as it requires the capture of animals that are often near extinction. On the positive side it provides the opportunity to increase the population of the species, so they can be reintroduced into the wild.

Seed banks are areas where huge varieties of plant seeds are stored. This provides a failsafe if a species goes extinct in nature. The plant can be grown from a saved seed and reintroduced back into its habitat.

This is a very real issue and seed banks have been collecting samples for many years, with some seed banks having over 2 billion seeds stored at a time.

6. Research

Understanding how species interact within their environment is crucial to protecting them. As humans further understand species interaction we find new and more direct ways to help protect organisms and maintain biodiversity.

One example is the use of wildlife corridors in urbanized areas. By researching many different species we have found that this dramatically increase their populations [9]. It reduces the number of animals that come into direct contact with humans and provides areas for migratory animals to move long distances.

7. Reduce climate change

As we know, climate change has disastrous consequences for all living things on earth. We use huge amounts of fossil fuels, which directly cause climate change. We need to move away from fossil fuels and towards alternative energy sources and natural or sustainable products. Reducing the effects of climate change requires a worldwide effort.

8. Purchase sustainable products

Many protects are now labeled with ecolabels that state if they are environmentally friendly. Some of the most prominent ecolabels are Energy Star, USDA Organic, and Rainforest Alliance Certified.

Additionally, when we consume these goods it increases demand for environmentally conscious products pushing more producers to make them.

9. Sustainable living

Sustainable living is something that we can each choose to do on a daily basis. Whether it be by taking shorter showers, riding a bike to work, or buying ecolabeled products it helps reduce the amount of resources we use.

This is arguably the most important way of protecting biodiversity because everyone can do it, often with only small lifestyle changes. If everyone chose to live sustainably, biodiversity in a variety habitats would improve.

10. Education

As with most environmental topics, education is one of the keys to success. Educating people about the importance of biodiversity conservation increases public awareness of the issue. As public awareness increases people become more involved and eventually influence their government representatives, pushing for more environmental protection. Government legislation protecting our natural environments is one of the most effective ways of protecting biodiversity.

The role of science and technology in conserving biodiversity

As our society develops we continually use more resources, which stains natural biodiversity, but development also leads to improved science and technology. Currently science and technology are two of the most important tools in conservation biology. We use science, and specifically ecology, to understand the web of interactions in our biomes. By understanding these interactions

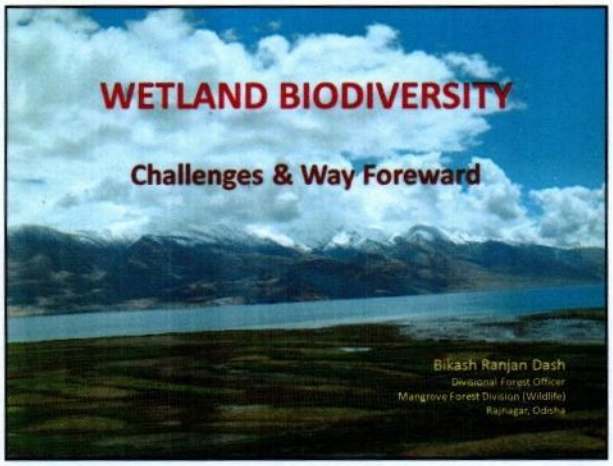
scientists are able to pinpoint the key species in ecosystems. This information is used to guide conservation efforts.

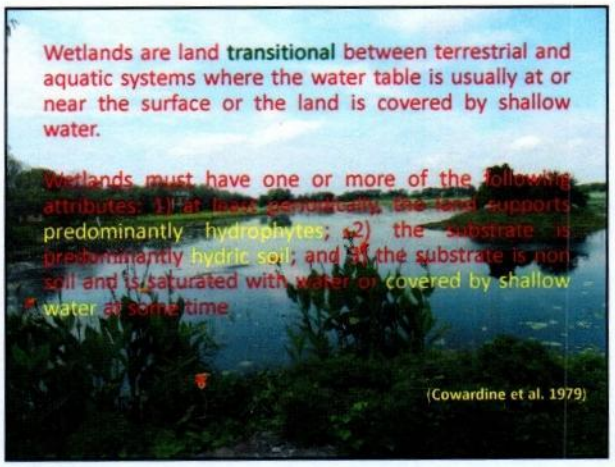
It is also used to understand pollution and its cascading effects within an ecosystem. Bio-magnification of toxins in a food chain can cause huge problems for top predators. This is an ever-adapting field of science and these two examples are just a few ways to implement the information it uncovers. Technology is becoming more and more important in conservation biology. Sustainable technologies, like renewable energies, biodegradable packaging, and recycling, help reduce our impact on the environment. Additionally, technologies like cloning give scientists the ability to bring back species that are already considered extinct. Biodiversity in natural ecosystems is of the outmost importance. It helps provide the resources and services that we rely on every day. The development and urbanization of humans poses a serious risk for natural biodiversity. If nothing is done to reduce these changes, there will be disastrous consequences. There are many things we can do in politics, science, and even in our daily lives to help fix these issues. As humans we need to understand the risks associated with our consuming lifestyles and work hard to fix what is already damaged and prevent future harm. The time has come for us to unite and save biodiversity.

WETLAND BIODIVERSITY

12/11/2020

Mr. B. R. Dash
D.F.O, Rajnagar

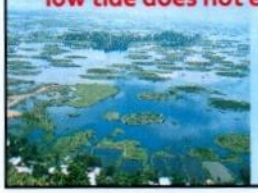




Wetland are:

Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed 6 m.

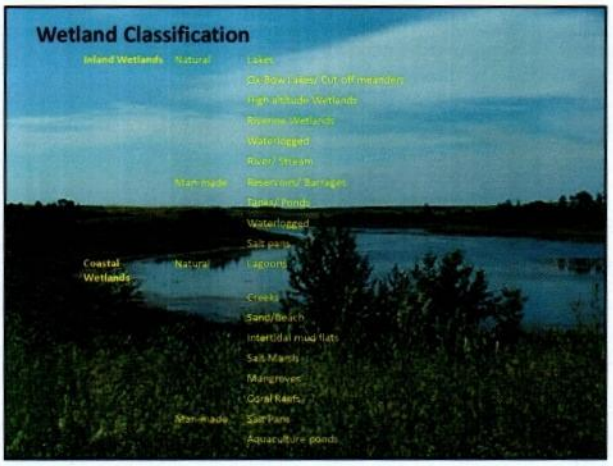
(IUCN 1971)



Wetlands Characteristics

Wetlands are land with soils that are periodically flooded or saturated with water

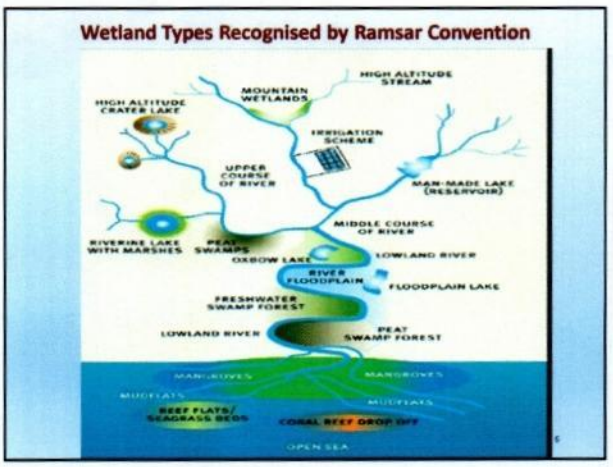
Whatever its source, water must be present for at least 7-15 successive days during the growing seasons.

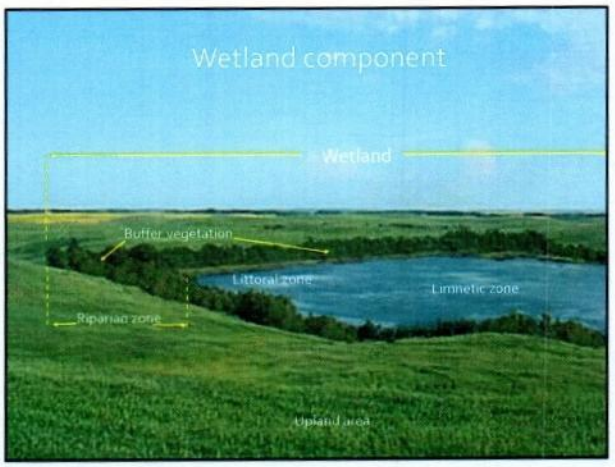


Predominant wetland types in India

1. Lakes and marshes of Trans-Himalayan and Himalayan regions
2. Oxbow lakes, swamps and seasonal marshes of Ganges and Brahamaputra flood plains
3. Mangroves, sand dunes, lagoons and coral reefs of east-coast deltaic regions
4. Mudflats, and seasonal marshes of Semi-arid Gujarat-Rajaputana and Kutchh
5. Tanks and bunds of Deccan Peninsula
6. Estuary and Backwaters of Malabar coast

7





Submerged *Hydrilla, Potamogeton, Ceratophyllum*

Free Floating: *Eichhornia, Salvinia, Pistia, Azolla*

Rooted Floating Leaved: *Trapa, Nymphaea*

Emergents: *Typha, Scirpus, Elaeocharis*

Ditch bank colonizers: *Polygonum, Paspalum*

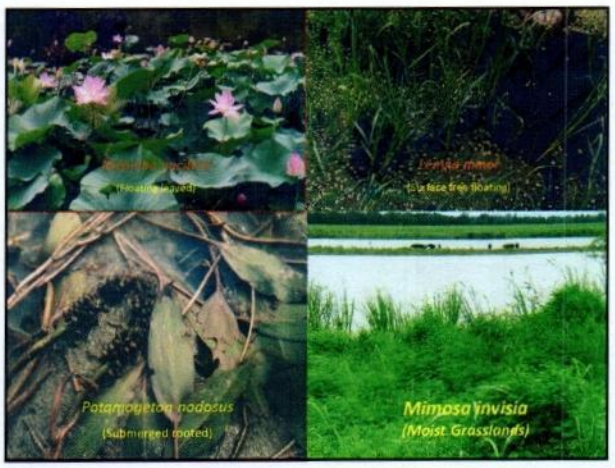
General Types of Aquatic Macrophytes

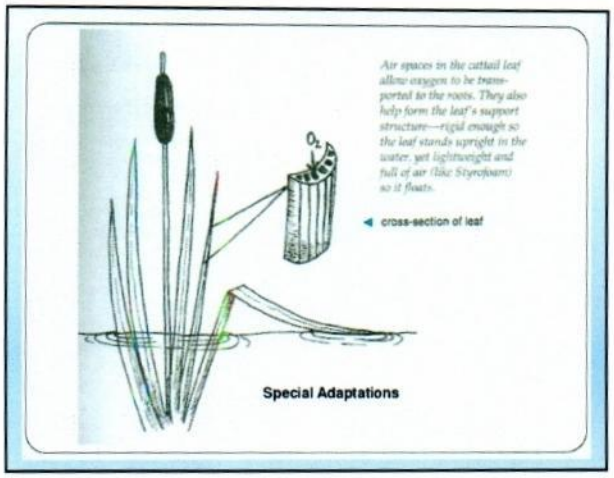
Submergent – Plants that grow entirely under water. Most are rooted at the bottom and some may have flowers that extend above the water surface.

Floating-leaved – Plants rooted to the bottom with leaves that float on the water surface. Flowers are normally above water.

Free Floating – Plants not rooted to the bottom and float on the surface.

Emergent – herbaceous or woody plants that have the majority of their vegetative parts above the surface of the water.



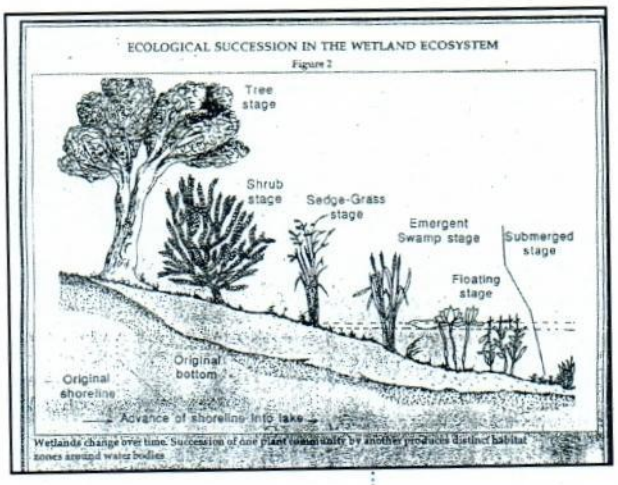


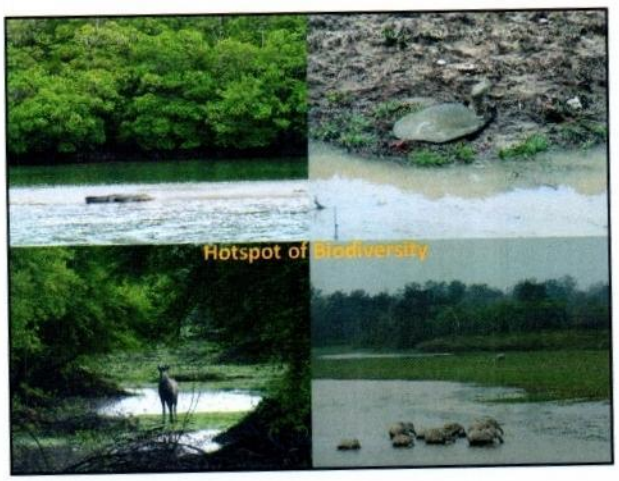
Understanding the Wildlife and Waterfowl the Wetland Supports

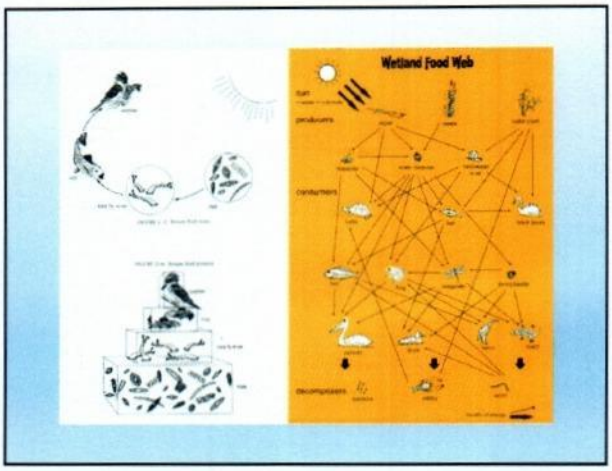
-25-30% of India's aquatic flora are in Wetlands.

-40-45% of our vertebrate fauna are dependent on wetlands at some stages of their life cycle for their survival.

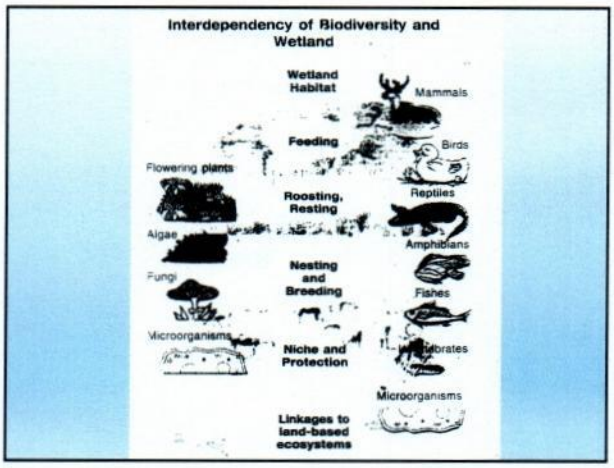
-Many of them are obligate to wetlands i.e. if wetlands are not available than one or more of their critical stages in their life cycle will not be completed. Eg. Larval stages of amphibians.

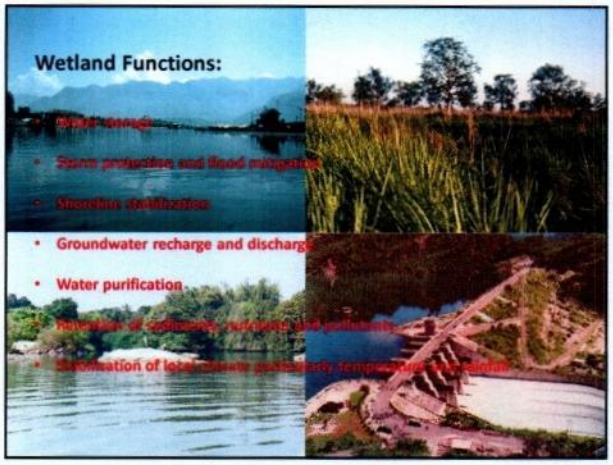


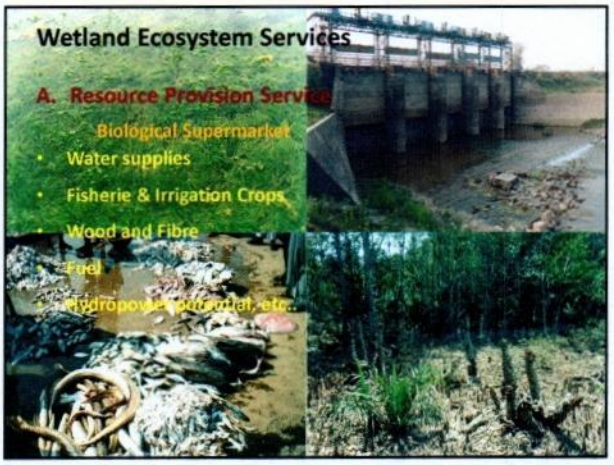


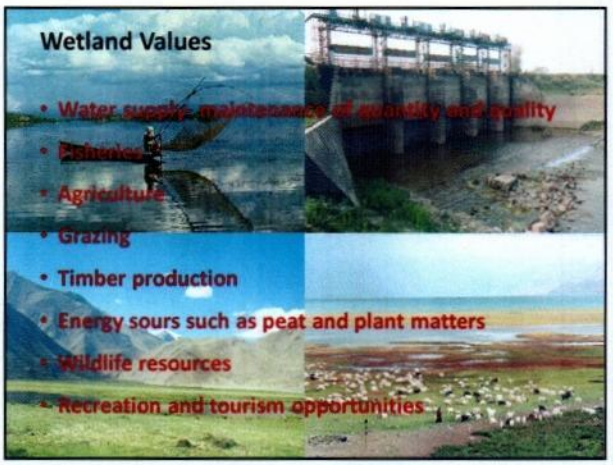


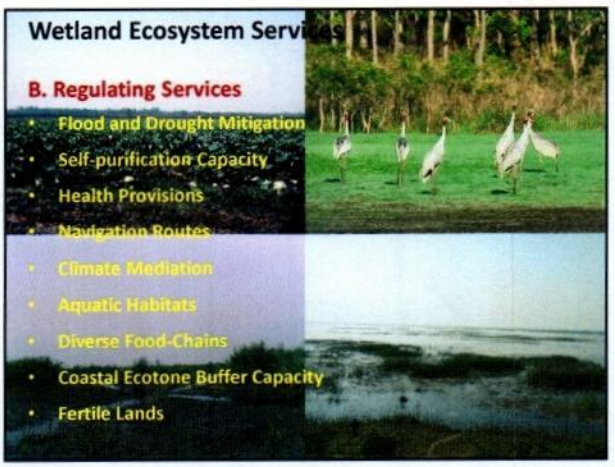
Wetland types	Major vegetation types	Obligate species
High altitude wetlands of Trans-Himalayan Region	*Carex, Equisetum*	Barheaded goose, Brahaminy duck, Black necked cranes, waders
High altitude wetlands of Sikkim and Arunachal Pradesh	*Carex, Equisetum*	Barheaded goose, Brahaminy duck, Black necked cranes and waders
Wetlands of southern Himalayan region (J & K)	*Phragmites, Typha, Saccharum*	16-20 species of ducks & geese, and waders
Swamps of Tarai	*Syzygium, Phragmites, Arundo donax, Typha*	Swamp deer, hog deer, hispid hare, Otter, Swamp Francolin
Swamps of Brahamaputra flood plains (beels)	*Syzygium, Phragmites, Arundo donax, Typha, Saccharum*	Swamp deer, hog deer, Rhino, Wild Buffalo, Otter, Wintering waterfowl
Lacustrine wetlands of Manipur	*Phragmites, Saccharum, Typha, Zizania*	Sangai, hog deer
Ganges river systems and seasonally flooded wetlands and oxbow lakes	*Phragmites, Typha, Paspalum, Nymphea, Nilumbo*	Gharial, Gangetic dolphins, 10-12 species of turtles. Wintering waterfowl habitats, Fishing cat
Lakes and Reservoirs of north, central and south India	*Phragmites, Saccharum, Typha*	Heronaries, waterfowls, waders, marsh crocodile, otter, fishing cat
Inter-tidal wetlands of Gujarat (Gulf of Kutchh)	*Mangrove scrub, Salvadora, Salix, Capris*	Waders, Flamingos, Common and Demoiselle Cranes, Wild ass
Sub-tidal wetlands of Gujarat (Gulf of Kutchh)	*Coral reefs, Sea grass beds, Mangroves*	Dugong, Sharaks in cluding whle sharks, Marine turtle
Inter-tidal wetlands of Tamil Nadu (Gulf of Mannar)	*Acacia, Prosopis, Salvadora*	Coral reefs, marine mammals, Dugongs, waders
Eastern coastal swamps	*Mangroves*	Marine turtles, Fishing cat, Otters, Salt water crocodiles, Water monitor,

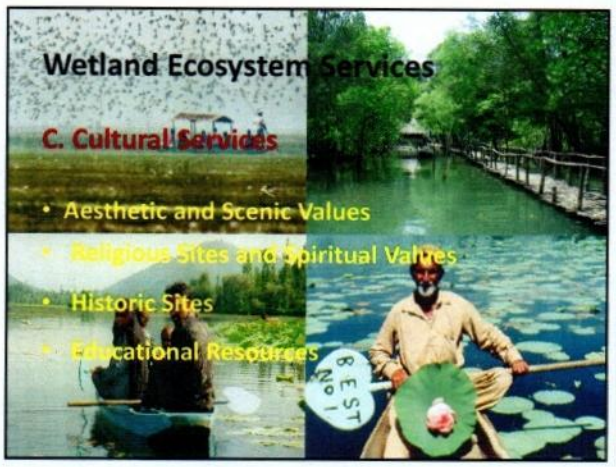


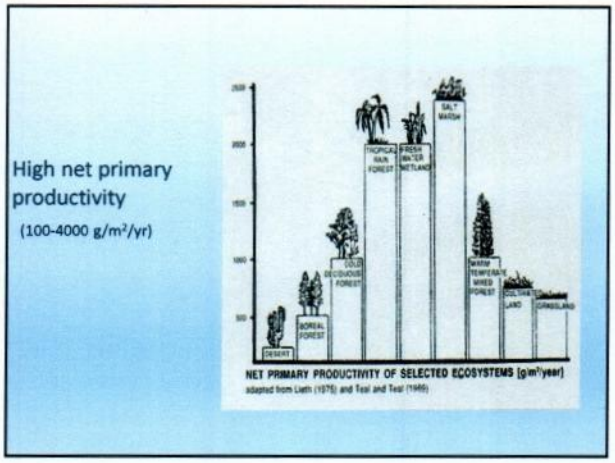

Wetland Functions:
• Groundwater recharge and discharge
• Water purification

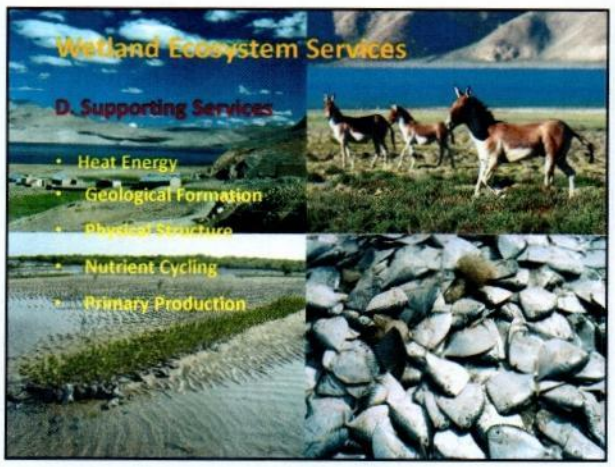

Wetland Ecosystem Services
A. Resource Provision Services
Biological Supermarket
• Water supplies
• Fisherie & Irrigation Crops
• Wood and Fibre
• Fuel

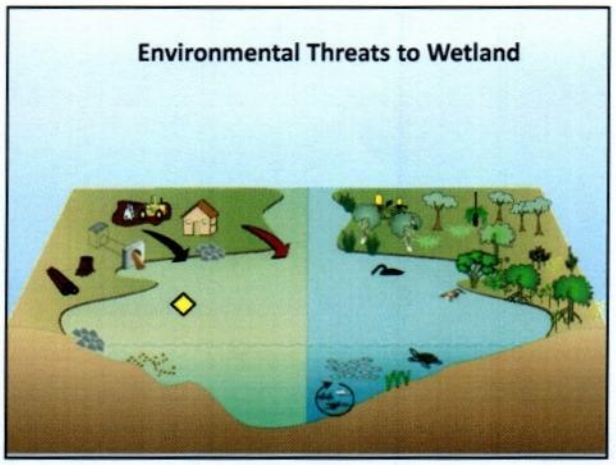

Wetland Values
• Agriculture
• Grazing
• Timber production
• Energy sours such as peat and plant matters
• Wildlife resources
• Recreation and tourism opportunities


B. Regulating Services
• Flood and Drought Mitigation
• Self-purification Capacity
• Health Provisions
• Climate Mediation
• Aquatic Habitats
• Diverse Food-Chains
• Coastal Ecotone Buffer Capacity
• Fertile Lands


Wetland Ecosystem Services
C. Cultural Services
• Aesthetic and Scenic Values
• Religious Sites and Spiritual Values
• Historic Sites
• Educational Resources


High net primary productivity
(100-4000 g/m²/yr)
NET PRIMARY PRODUCTIVITY OF SELECTED ECOSYSTEMS [g/m²/year]


Wetland Ecosystem Services
D. Supporting Services
• Heat Energy
• Geological Formation
• Nutrient Cycling
• Primary Production


Environmental Threats to Wetland

Encroachment – Treated as low value land or wasteland

Agriculture

Land reclamation

Urban Expansion

Pollution leading to eutrophication

From domestic sewerage

Fertilizer & pesticide runoff from agriculture land

Unsustainable and Unscientific Fishing Practice

Use of zero net

Fishing during ban period (breeding season)

Blockage of migratory routes

Aquaculture

Siltation

Natural process coupled with anthropogenic activities leading to alteration in biological composition

Weed Infestation

Eichornia/ Ipomea/ Phragmites

Decrease in biological diversity

Deterioration of water quality

Sedimentation and shrinkage in areas under wetlands

Decrease in migratory bird population

Decrease in fish productivity

Prolific growth of unwanted aquatic biota

Status of Major Groups of Wetland-dependent Species

Species Group	Status and trend
Waterbirds	41% are in decline. Of the 964 bird species that are wetland-dependent, 203 (21%) are globally threatened.
Mammals	Over one third (37%) of the freshwater-dependent mammal species are globally threatened.
Freshwater Fish	±20% of the world's 10,000 described freshwater fish species have been listed as threatened or endangered.
Amphibians	1,856 sps of amphibian species are threatened, of which 964 sps are freshwater. 43% sps are declining
Turtles	> 75% of freshwater turtle species in Asia are globally threatened, 18 sps are critically endangered.
Crocodiles	Of the 23 species of 4 are critically endangered, 3 endangered, and 3 vulnerable.

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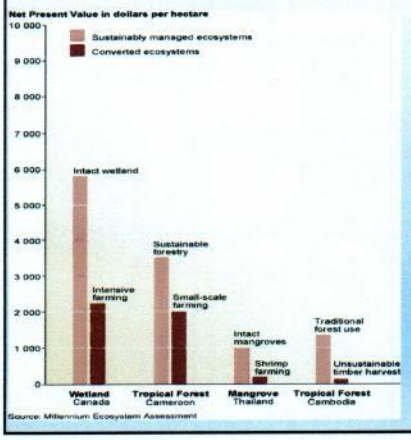
Type of change in ecological character

Type of change	Cause	Response of wetland
Physical changes	Change in water regime	Altered vegetation communities
	Increased siltation	Loss of wetland area
	Land reclamation	Loss of wetland area
Chemical changes	Increased nutrient load	Degradation of water quality
	Increased water pollution	Loss of aesthetic value, loss of consumptive benefits
Biological change	Weed infestation	Decreased waterfowl abundance
	Loss of nesting trees	Decreased in breeding birds
	Excessive biomass removal	Decline in predatory species
	Introduced species	Change in composition of native species

34



Total economic value associated with managing ecosystems more sustainably is often higher than the value associated with conversion

36

Emergence of responses at International levels

- Ramsar Convention on Wetlands (1971)
- Convention on Biological Diversity (1992)
- Other international instruments (CMS, CITES)

37

Responses at National level

- National Wetland Authority
- Integrated Coastal Zone Management Plan (ICZMP)
- National Plan for Conservation of Aquatic Ecosystems (NPCA)

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Ramsar Sites Status (Wetlands of International Importance)

Global: 2412 sites/ 254467869 Ha

India: 41/ 1071861 Ha

Odisha: 2/ 1815 Ha (Chilika & Bhitarkanika)

Legislations for Conservation of Environment and Wildlife

Legislations	Rules	Purpose
Forest (Conservation) Act, 1980		Prevention of loss of forests
Wildlife (Protection) Act, 1972		Conservation of species
	Coastal Regulation Zone rules Eco-sensitive Zone Rules EIA Rules Wetlands (Conservation & Management) Rules	
Environment (Protection) Act, 1986	Hazardous Substance Management Rules Prevention of Water Pollution Prevention of Air Pollution Prevention of Noise Pollution	Preservation of Environment
Water (Prevention and Control of pollution) Act, 1974		Control of water pollution
Air (Prevention and Control of Pollution) Act, 181		Control of Air Pollution

Responses at State level

- State Wetland Authorities
- Wetland Development Authorities (CDA, LDA, J&K –LWDA)

Major wetlands

Chilika (Ramsar site - 1981)

Bhitarkanika Mangrove (Ramsar site - 2002)

Anshupa Lake

Wetlands selected under NPCA

Chilika
Kanjia
Kuanria
Daha
Anshupa

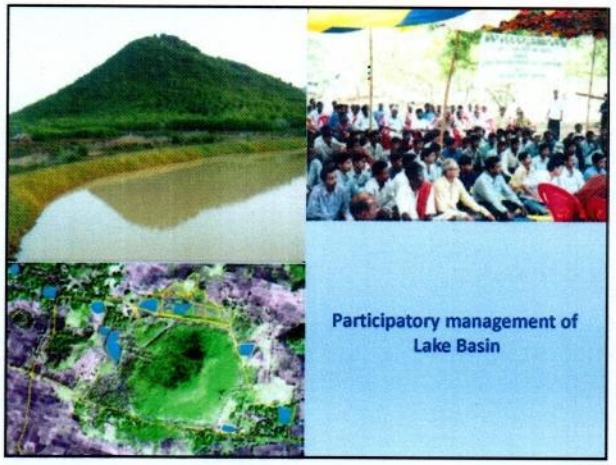
Odisha Wetland Status

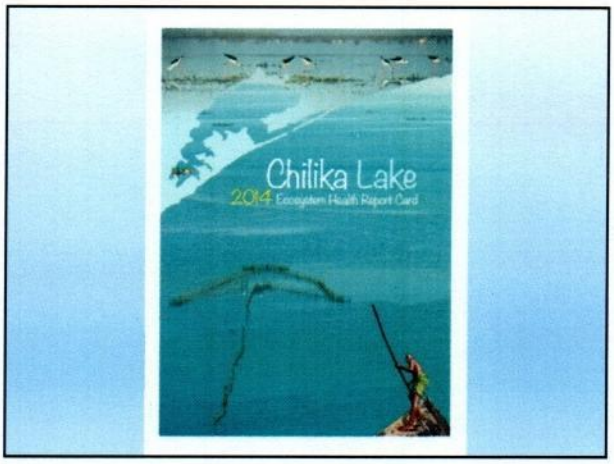
Category	Number	Total area in Sq. km	% of wetland area
Inland (Natural)	3111	2388	34.57
Inland (Man made)	7871	2202	31.87
Coastal (Natural)	560	1439	20.84
Coastal (Man made)	724	216	3.14
<2.25 Ha	66174	66174	9.58
Total	**78440**	**6909**	**100**

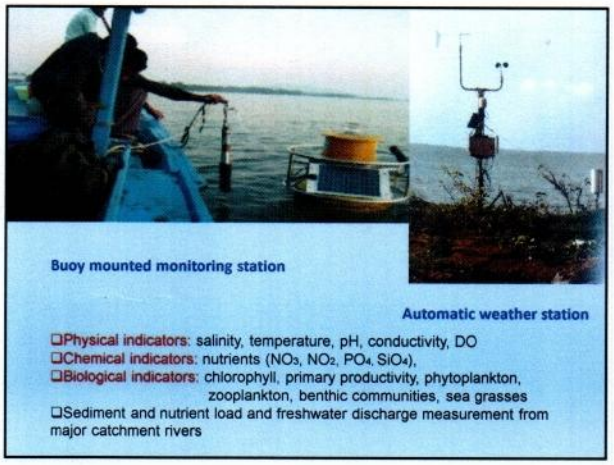
River/Streams: 2235 sq. km
Reservoirs/ Barrages: 1899 sq. km.
Tank/Pond: 239 sq. km
Lagoon: 890 sq. km
Intertidal mudflat: 255 sq. km
Mangroves: 233 sq. km

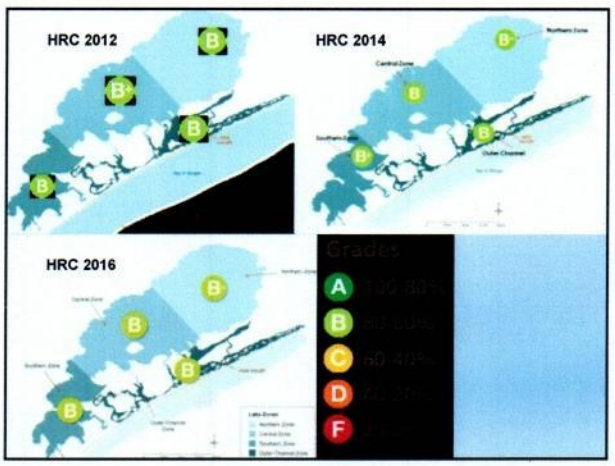
The Story of Chilika

- The first wetland of India declared as Ramsar Site (1981)
- Choking of sea mouth changed the salinity regime and anthropogenic activities changed bio-physical characteristics of the lake
- Included in Montreux Record in 1985 (as threatened wetland)
- Chilika Development Authority constituted in 1990 with Chief Minister heading the Governing Body
- Restoration of lake with dredging of sea mouth
- Removal of Chilika Lake from Montreaux Record
  - **Eviction of illegal shrimp culture**
  - **Supporting livelihood of fisherfolks**
  - **Supporting sustainable tourism**
  - **Restoration of catchment area with peoples participation**
  - **Monitoring lake health (water quality/biodiversity/habitat/water flow)**


Participatory management of
Lake Basin

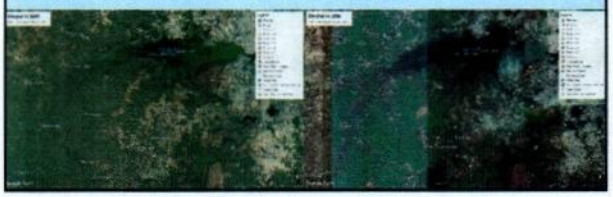

Chilika Lake
2014 Ecosystem Health Report Card


Buoy mounted monitoring station
Automatic weather station
Physical indicators: salinity, temperature, pH, conductivity, DO
Chemical indicators: nutrients (NO_3, NO_2, PO_4, SiO_4),
Biological indicators: chlorophyll, primary productivity, phytoplankton, zooplankton, benthic communities, sea grasses
Sediment and nutrient load and freshwater discharge measurement from major catchment rivers


HRC 2012
HRC 2014
HRC 2016
Grades
A
B
C
D
F

Restoration of Bhojtal, Madhya Pradesh

- Oldest man-made lake in India
- Faced eutrophication due to excessive anthropogenic activities and urban development around lower lake including commercial cloth washing by about 250 washermen families
- Restoration programme done in 1989-92 under JICA assistance
- Major challenge was livelihood of 250 washermen families depending on lower lake for their livelihood
- All the 250 families were shifted to another place with all facilities and alternate livelihood

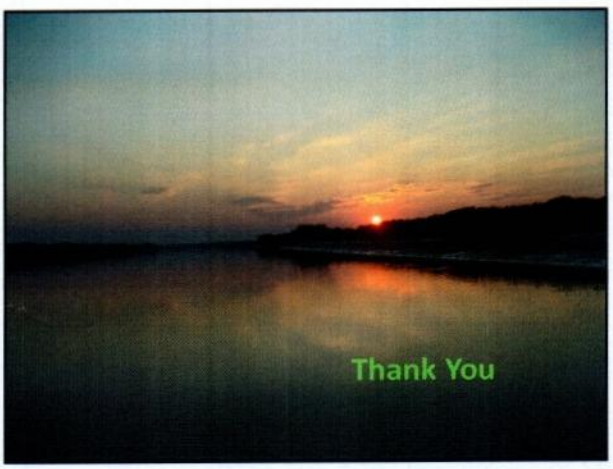


Lessons Learnt

- Strong political will
- Long term planning
- Inclusive management
- Capacity building
- Financial commitment

Womens' Soap Movement
Lake Biwa, Japan

- Emergence of Red Tide in 1977
- Caused due to golden algae (*Eruglena americana)*
- Attributed to phosphorus contamination from detergents
- Womens' movement to stop use of detergent containing phosphorus and use of powder soap with natural fat & oil
- Govt ordinance in 1980 to prevent eutrophication



CLIMATE CHANGE AND FORESTS: IMPACTS, MITIGATION AND ADAPTATION

Dr. Sudam Charan Sahu

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Sudamsahu.bdk@gmail.com

Climate change is a major global environmental issue of the 21st century that has threatened the world due to its adverse effects. The Intergovernmental Panel on Climate Change (IPCC 2007) concluded that the forest ecosystems would be affected by climate change. Forests are uniquely placed in the whole scenario of climate change as they are a sink as well as source of carbon dioxide. They store large quantities of carbon in vegetation and soil, exchange carbon with the atmosphere through photosynthesis and respiration, and act as sources of atmospheric carbon if they are disturbed by some human activities or natural causes. Forests contribute about 17.4% of the total GHG emissions (IPCC 2007). As a result, forests are at the Centre stage of global negotiations under United Nations Framework Convention on Climate Change (UNFCCC), and the Intergovernmental Panel on Climate Change (IPCC) has recognized the significant opportunity that forests provide as 'carbon sink'. In India, model based studies on assessment of climate impacts showed that about 45% of the forested grids are projected to undergo change. There is changing in the forest types and species composition. Some species may come under threatened category and some species may extinct from the earth for inability to adapt the rapid changes of the climate. Forests of Odisha state are likely to be among least vulnerable forests in

the country under A1 as well as B2 emission scenarios during the present century, and this is on account of high diversity, low fragmentation, high tree density and low rate of forest vegetation change. And also that, Odisha forests are likely to be benefited by increase in NPP from lower warming and increase in precipitation. Due to sea level rise, mangroves have been impacted adversely. Mitigation and adaptation should be followed at urgent basis. Green India Mission (GIM) and Carbon credit programme like REDD+ has to be implemented in India like developing country to conserve the forests and enhance carbon sequestration in forest sector.

Climate change refers to significant, long-term changes in the global climate.

The global climate is the connected system of sun, earth and oceans, wind, rain and snow, forests, deserts and savannas, and everything people do, too. The climate of a place, say New York, can be described as its rainfall, changing temperatures during the year and so on. But the global climate is more than the "average" of the climates of specific places. A description of the global climate includes how, for example, the rising temperature of the Pacific feeds typhoons which blow harder, drop more rain and cause more damage, but also shifts global ocean currents that melt Antarctica ice which slowly makes sea level rise until New York will be under water.

What is Global Warming?

Global warming is the slow increase in the average temperature of the earth's atmosphere because an increased amount of the energy (heat) striking the earth from the sun is being trapped in the atmosphere and not radiated out into space.

The earth's atmosphere has always acted like a greenhouse to capture the sun's heat, ensuring that the earth has enjoyed temperatures that permitted the emergence of life forms as we know them, including humans.

Without our atmospheric greenhouse the earth would be very cold. Global warming, however, is the equivalent of a greenhouse with high efficiency reflective glass installed the wrong way around. Ionically, the best evidence of this may come from a terrible cooling event that took place some 1,500 years ago. Two massive volcanic eruptions, one year after another placed so much black dust into the upper atmosphere that little sunlight could penetrate. Temperatures plummeted. Crops failed. People died of starvation and the Black Death started its march. As the dust slowly fell to earth, the sun was again able to warn the world and life returned to normal. Today, we have the opposite problem. Today, the problem is not that too little sun warmth is reaching the earth, but that too much is being trapped in our atmosphere. So much heat is being kept inside greenhouse earth that the temperature of the earth is going up faster than at any previous time in history. NASA provides an excellent course module on the science of global warming.

How does Global Warming drive Climate Change?

Heat is energy and when you add energy to any system changes occur because all systems in the global climate system are connected, adding heat energy causes the global climate as a whole to change. Much of the world is covered with ocean which heats up. When the ocean heats up, more water evaporates into clouds.

Where storms like hurricanes and typhoons are forming, the result is more energy-intensive storms. A warmer atmosphere makes glaciers and mountain snow packs, the Polar ice cap, and the great ice shield jutting off of Antarctica melt raising sea. Changes in temperature change the great patterns of wind that bring the monsoons in Asia and rain and snow around the world, making drought and unpredictable weather more common. This is why scientists have stopped focusing just on global warming and now focus on the larger topic of climate change.

What Causes Global Warming?

There are three positions on global warming: (1) that global warming is not occurring and so neither is climate change; (2) that global warming and climate change are occurring, but these are natural, cyclic events unrelated to human activity; and (3) that global warming is occurring as a result primarily of human activity and so climate change is also the result of human activity.

In general, climate scientists and environmentalists either (1) dispute the data based on, for example, new ice core data or (2) suggest that the timing issue – that is, the rapidity with which the globe has warmed and the climate changed simply do not fit the model of previous natural events. They note also that compared to other stars the sun is actually very stable, varying in energy output by just 0.1% and over a relatively short cycle of 11 to 50 years quite unrelated to global warming as a whole. The data strongly suggests that solar activity affects the global climate in many important ways, but is not a factor in the systemic change over time that we call global warming.

As for the final position that global warming and climate change result from human activity (are "anthropogenic"), scientists attribute current atmospheric warming to human activities that have increased the amount of carbon containing gases in the upper atmosphere and to increased amounts of tiny particles in the lower atmosphere.

Scientists call the tiny particles 'black carbon' (you call it soot or smoke) and attribute their warming effect to the fact that the resulting layer of black particles in the lower atmosphere absorbs heat like a black blanket. Scientists date the beginning of the current warming trend to the end of the 18th or beginning of the 19th century when coal first came into common use.

The most commonly discussed GHGs are:

CO2 or carbon dioxide is produced any time something is burned. It is the most common GHG, constituting by some measures almost 55% of total long-term GHGs. It is used as a marker by the United States Environmental Protection Agency, for example, because of its ubiquity. Carbon dioxide is assigned a GWP or Global Warming Potential of 1. Methane or CH4 is produced in many combustion processes and also by anaerobic decomposition, for example, in flooded rice paddies, pig and cow stomachs, and pig manure ponds. Methane breaks down in approximately 10 years, but is a precursor of ozone, itself an important GHG. CH4 has a GWP of 28-36.

Nitrous oxide in parean (laughing gas), NO/N2O or simply NOx is a byproduct of fertilizer production and use, other industrial processes and the combustion of certain materials. Nitrous oxide lasts a very long time in the atmosphere, but at the 100 year point of comparison to CO2, its GWP is 265-298.

Fluorinated gases were created as replacements for ozone depleting refrigerants, but have proved to be both extremely long lasting and extremely warming GHGs. They have no natural sources, but are entirely man-made. At the 100 year point of comparison, their GWPs range from 1,800 to 8,000 and some variants top 10,000.

What is black carbon and how does it cause global warming?

Black carbon (BC) is tiny particles of carbon released as a result of the incomplete combustion of fossil fuels, biofuels and biomass. These particles are extremely small, ranging from 10 μm (micrometers, PM10), the size of a single bacterium to less than 2.5 μm (PM2.5), one thirtieth the width of a human hair and small enough to pass through the walls of the human lung and into the bloodstream.

What are the most important sources of GHGs and black carbon?

Fossil fuel and related uses of coal and petroleum are the most important sources of GHGs and black carbon (power generation, industry, transportation, buildings). Agriculture is the second most important source (animals – cows and pigs), feed production, chemical intensive food production, and flooded paddy rice production, as well as deforestation driven by the desire to expand cultivated areas.

Natural sources of GHGs and black carbon include forest fires, savanna fires and volcanos. "Climate change is a global challenge and requires a global solution. Greenhouse gas emissions have the same impact on the atmosphere whether they originate in Washington, London or Beijing. Consequently, action by one country to reduce emissions will do little to slow global warming unless other

countries act as well. Ultimately, an effective strategy will require commitments and action by all the major emitting countries."

The global effort to manage climate change has been organized through what is called the United Nations Framework Convention on Climate Change (UNFCCC). The UNFCCC was launched at the 1992 Rio Earth Summit to achieve GHG concentrations. Managing climate change difficulties arise from two, related reasons: climate change management is viewed as expensive and it poses what we call a collective action problem.

What is climate change mitigation?

The term mitigation refers to efforts to cut or prevent the emission of greenhouse gases - limiting the magnitude of future warming. It may also encompass attempts to remove greenhouse gases from the atmosphere. It differs from climate change adaptation, which refers to the actions taken to manage the unavoidable impacts of climate change. Adaptation is dealt with in the IPCC's working group 2 report. Mitigation may require us to use new technologies, clean energy sources, change people's behavior, or make older technology more energy efficient.

What other options are there?

Geo-engineering is one controversial area that has gathered momentum in recent years. It requires the deliberate intervention in the climate system with the aim of curbing global warming.

One example is Solar Radiation Management (SRM), which involves reflecting more of the Sun's rays away from the planet back into space. This could be done by pumping Sulphur aerosols into the high reaches of the atmosphere, where

they would have similar reflective properties to the ash released naturally by volcanoes.

"Climate change has happened because of human behavior, therefore it's only natural it should be us, human beings, to address this issue. It may not be too late if we take decisive actions today."

DEPARTMENT OF BOTANY

PATTAMUNDAI COLLEGE

PATTAMUNDAI

Affiliated to Utkal University, Bhubaneswar,Odisha

Certificate of Participation

This is to certify that Mr./Ms./Mrs. DR. ANJALI KUMARI DASH of Pattmundai College has actively participated in the National Webinar on **'Biodiversity Conservation: Its Challenges and Opportunities'** organized by Department of BOTANY Pattamundai College, Pattamundai, Kendrapara, Odisha.

Date:19th September 2020, Certificate No-KOXAYK-CE000035

Dr. A.Dash	Dr. N. K.Dhal	Mr. B.R.Dash	Prof A.L.N Dash
Convenor	Resource Person	Resource Person	

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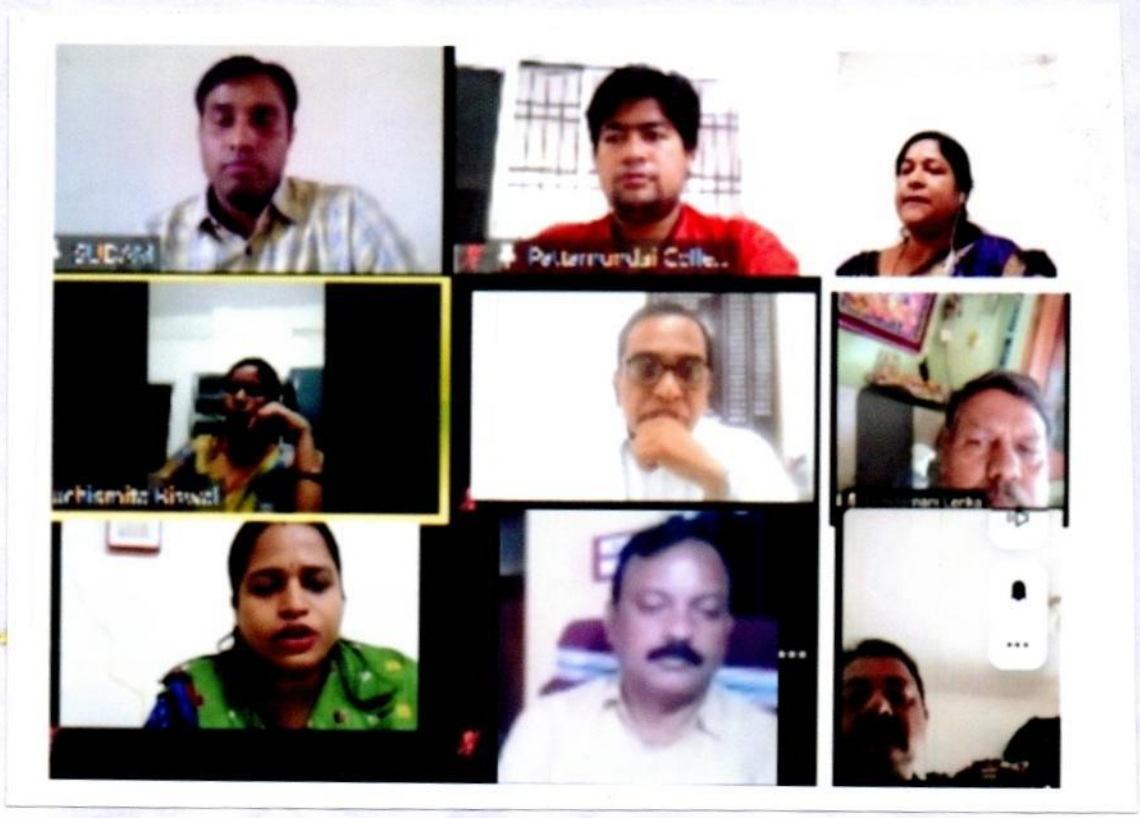
11/18/2020 21:28:33	Pdas95942@gmail.com	PRABIR DAS	Pattamundai degree colle	Student	Botany	Odisha	7681082790	
11/18/2020 21:46:24	padhirabindranath@gmai	Dr.Rabindra Nath Padhi	Nimapara Autonomous C	Asso. Professor	Botany	Odisha	9437185862	Thank you
11/18/2020 22:17:33	sinhasn62@gmail.com	Dr. Sankar Narayan sinh	University of kalyani	Professor	Botany	West Bengal	7003068065	
11/18/2020 22:27:11	manasnayak2009@gmail	DR MANAS KUMAR NAY	Pattamundai College	Asst. Professor	English	Odisha	8763776106	
11/19/2020 7:16:39	Subhasismishra5@gmail.	SUBHASIS MISHRA	Pattamundai College	Asst. Professor	Economics	Odisha	7978621173	
11/19/2020 7:27:15	smajumder959@gmail.co	SNIGDHA MAJUMDER	University of Kalyani	Research Scholar	Botany	West Bengal	7872748017	
11/19/2020 7:32:50	adyashapanda7606@gm	ADYASHA PANDA	Kendrapara autonomous	Student	Zoology department	Odisha	9016174093	
11/19/2020 7:51:46	prajnaparimita174@gmail	PRAJNA PARIMITA NAY	Pattamundai Degree Coll	Student	Botany	Odisha	9861330885	Best
11/19/2020 7:54:07	s.pattnaik1980@gmail.co	SANJAY KUMAR PATTN	NIIS COLLEGE	Asst. Professor	Botany	Odisha	9439862928	Thank you
11/19/2020 8:40:53	dr.spdewangan@gmail.c	DR. SHARAD KUMAR DI	Dr. B.S.P. Govt. College,	Asst. Professor	P.G. Department of Comr	Chhattisgarh	9770175133	Congratulation
11/19/2020 10:07:21	samalrinky1996@gmail.c	PRIYADARSHINI SAMAL	Centurion university	Student	Botany	Odisha	7606824126	Thank u
11/19/2020 10:37:36	biswal2020@gmail.com	Amaresh Naresh Samant	Ignou	Engineer and Environmer	Paradip Port Trust	Odisha	9437104692	Amaresh Naresh Samantha
11/19/2020 10:38:49	haldarsulagna@gmail.cor	SULAGNA HALDAR	University of Kalyani	Student	Botany	West Bengal	9635647671	Thanks a lot

Timestamp	Email Address	FULL NAME (IN CAPITA	College/ Institute/ Univers	Designation	Department	State	Mobile No.	WITH BEST WISHES FROM PATTAMUNDAI COLLEGE, PATTAMUNDAI.
11/13/2020 11:03:51	bikash17052011@gmail.c	Bikash jena	Pattamundai Degree Coll	Student	Boyany	Odisha	8287651722	
11/13/2020 11:05:00	swagatika18patra@gmail	SWAGATIKA PATRA	Pattamundai Degree Coll	Student	Botany	Odisha	9078327771	Thank you
11/13/2020 11:05:24	gjena196@gmail.com	GAYATRI JENA	Pattamundai CLG pattam	Student	Botany	Odisha	9178416553	
11/13/2020 11:23:19	jyotirmayeedash07@gma	JYOTIRMAYEE DASH	Maharishi College Of Nati	Asst. Professor	Botany	Odisha	9437464862	Thank you
11/13/2020 11:24:16	arabindapandab@gmail.c	ARABINDA PANDAB	PATTAMUNDAI COLLEG	LECTURER IN MATHEM	DEPARTMENT OF MATI	ODISHA	9937254024	
11/13/2020 11:37:09	paridamousumi215@gma	MOUSUMI PARIDA	Pattamundai college	Student	Botany	Odisha	9348683631	
11/13/2020 11:42:20	routrakesh2560@gmail.c	RAKESH ROUT	Pattamundai college	Student	Botany	Odisha	9078553355	
11/13/2020 11:57:37	excellentsaroja@gmail.co	SAROJAKANTA NAYAK	Pattamundai College	Asst. Professor	English	Odisha	9583371671	
11/13/2020 11:59:07	tapaswineedas06@gmail.	TAPASWINEE DAS	B. M. High School, Athara	Teacher TGT(PCM)	Physics	Odisha	8658997800	
11/13/2020 12:09:09	nilamani.lenka00@gmail.	DR.NILAMANI LENKA	Pattamundai College	Asso. Professor	Odia	Odisha	9438329950	
11/13/2020 12:32:51	sushreekarisma676@gm	SUSHREEKARISMA SA	Pattamundai college patt	Student	Botany	Odisha	8456069247	Yes
11/13/2020 12:36:02	sunilpradhan1968@gmail	DR SUNIL KUMAR PRAI	Pattamundai College	Asst. Professor	Chemistry	Odisha	9337335705	
11/13/2020 15:14:18	rkpandaodca2008@gmail	RABINDRA KUMAR PAN	Pattamundai College,Patt	Asst. Professor	History	Odisha	9238899769	
11/13/2020 15:38:56	maheshsatapathy103@gi	MAHESH CHANDRA SA	DELTA HIGHER SECON	Asst. Professor	BOTANY	ODISSA	9437926393	Thanks.
11/13/2020 22:09:44	baikunthroul1@gmail.con	BAIKUNTH CHARAN RO	Pattamundai College	Lecturer	Physics	Odisha	9337127295	
11/14/2020 11:46:32	nayakprasanna02@gmail	PRASANNA KUMAR NA	pattamundai college ,patt	Student	Botany	Odisha	8260146199	Thanks to,Pattamundai college, pattamundai
11/14/2020 11:49:35	beherapuja63@gmail.con	PUJA BEHERA	Pattamundai college patt	Student	Botany	Odisha	9668468631	Thanks to pattamundai college pattamundai
11/15/2020 19:39:30	rajashreebiswal90580@g	RAJASHREE BISWAL	Pattamundai degree Coll	Student	Botany	Odisha	9938751294	Thank u
11/15/2020 19:44:32	barshamahunta938@gm	MONALISA MAHUNTA	Pattamundai degree Coll	Student	Botany	Odhisha	7682987584	Thank you
11/16/2020 21:56:50	bikash634@rediffmail.cor	BIKASH RANJAN DASH	Mangrove Forest Division	Forest Officer	Forest and Environment I	Odisha	9437054953	
11/17/2020 10:08:13	SAROJINI MISHRA	sarojinimishra7191@@gr	Pattamundai College	Professor	Zoology	Odisha	9437920782	
11/17/2020 11:02:15	varsa018@gmail.com	PRAJNYA PARAMITA BE	Pattamundai college, Patt	Student	Botany	Odisha	9114566424	
11/17/2020 11:19:59	debatapikulu@gmail.com	SHUVASMITA DEBATA	Pattamundai collage, patt	Student	Botany	Odisha	9668999215	
11/17/2020 11:27:01	jnyanaranjanpal111@gm	Jnyanaranjan pal	North orissa University	Student	Botany	Odisha	9114312208	
11/17/2020 11:37:47	asimkumarmishra6@gma	Asim Kumar Mishra	North Orissa University	Student	BOTANY	ODISHA	7008763902	
11/17/2020 11:45:28	suchismitabiswal@yahoo.	SUCHISMITA BISWAL	Pattamundai College	Asst. Professor	Botany	Odisha	7978349618	Thanks
11/17/2020 11:49:52	anjalidash8@gmail.com	DR. ANJALI KUMARI DA	Pattamundai College	Asst. Professor	Botany	Odisha	9861476642	Thanks
11/17/2020 11:56:05	elizabethbhanja@yahoo.c	DR. ELIZABETH BHANJ	Paramananda College, Ba	Asso. Professor	Botany	Odisha	9777000632	Thanks
11/17/2020 12:04:07	dkkar1962@gmail.com	DR. DILIP KUMAR KAR	Pipli college, pipli, puri	Asso. Professor	Botany	Odisha	9438148358	Thank you
11/17/2020 12:11:09	pkdasrpc2016@gmail.co	Prabhat Kumar Das	Utkal University	Research Scholar	Botany	Orisa	09438015926	thank you
11/17/2020 12:14:04	samarendra.mallick1@gn	SAMARENDRA NARAYA	Regional Plant Resource	Research Scholar	Taxonomy and Conservat	Odisha	7978927141	Thank you
11/17/2020 12:15:04	subhadrasubhadarsini@y	SUBHADRA SUBHADAR	Marshaghai College Mars	Lecturer	Botany	Odisha	8908857456	Organize such type of webinar always
11/17/2020 12:17:20	sahoo_firoz@yahoo.com	FIROZ KUMAR SAHOO	Sri Sri Bayababa College	Asst. Professor	Economics	Odisha	7735182090	Thank you
11/17/2020 12:20:43	satyammohapatra98@gm	SATYAM MOHAPATRA	North Orissa University	Student	Botany	Odisha	8763343312	
11/17/2020 12:20:47	bichitrarout18@gmail.co	BICHITRA ROUT	Pattamundai college	Student	Botany	Odisha	7077627382	
11/17/2020 12:21:07	das.ankita412@gmail.cor	ANKITA DAS	North Orissa University	Student	Botany	Odisha	9437740550	
11/17/2020 12:33:23	shantiswarup@live.in	SHANTI SWARUP BISW	NIT ROURKELA	Research Scholar	Mining engineering	Odisha	9658747616	
11/17/2020 12:34:43	dashp496@gmail.com	Mr. Pradeep Kumar Dash	Pattamundai College, Ker	Student	Department of Physics	Odisha	+916370541023	I want to participate in all online Webinars please kindly inform me about upcoming events
11/17/2020 12:37:37	Prajnaguddu17@gmail.cc	PRAJNA BISWAL	North orissa university	Student	Botany	Odisha	7978441168	Thank you
11/17/2020 12:38:14	debashankar459@gmail.c	DEBA SHANKAR MARNI	U.N. COLLEGE, NALAGA	Asst. Professor	BOTANY	ODISHA	8270385765	THANK YOU
11/17/2020 12:43:19	sasantarout2@gmail.com	SUSANTA ROUT	PATTAMUNDAI DEGRE	Student	ZOOLOGY	ODISHA	7735679878	
11/17/2020 12:43:36	sudhams99@gmail.com	Bikram Pradhan	North Orissa University	Student	Botany	Orissa	07008138293	
11/17/2020 12:43:49	birendrapal8989@gmail.c	BIRENDRA PAL	North Orissa university	Student	Botany	Odisha	7684028030	Thanks
11/17/2020 12:47:37	sabitatudu43994@gmail.c	SABITA TUDU	North Orissa University, E	Student	BOTANY	Odisha	8114960988	
11/17/2020 12:49:51	sudamsahu.bdk@gmail.co	DR. SUDAM CHARAN SA	North Orissa University	Asst. Professor	Botany	Odisha	9437764563	Thanks
11/17/2020 12:51:23	[illegible]	NANDINI BEHERA	pattamundai college,patt	Student	Zoology	odisha	6372669671	yes
11/17/2020 12:51:59	monalibaral46@gmail.cor	MONALI BARAL	Pattamundai Degree Coll	Student	Zoology	ODISHA	9861482757	
11/17/2020 13:02:08	jitendramalik57@gmail.co	Mr Jitendra Malik	Pattamundai College, Pat	Asst. Professor	Commerce	Odisha	+917008598319	
11/17/2020 13:04:19	alisha.mohanta.97@gmai	KUMARI ALISHA MOHAI	North Orissa University	Student	Botany	Odisha	09937403688	
11/17/2020 13:05:40	yasaswinee.botanica@gn	Yasaswinee Rout	North Orissa University,	Research Scholar	Department of Botany	Odisha	9853648970	
11/17/2020 13:09:05	anujamishra1962@gmail.	ANUJA MISHRA	Ekamra College Bhubane	Asso. Professor	Botany	Odisha	9437644545	
11/17/2020 13:19:39	Aryabartini@gmail.com	ARYABARTINI JENA	Pattmundai college Pattm	Student	Math	Odisha	9668289747	Thank you
11/17/2020 13:38:38	suchitraswain70@gmail.c	SUCHITRA SWAIN	Kendrapara Autonomous	Student	Chemistry	Odisha	7381203539	Thank you
11/17/2020 13:58:00	sandeepkoni2@gmail.com	SANDEEP KUMAR SING	Government College of pl	Student	Botany	Odisha	7008764067	
11/17/2020 13:58:48	architapandalinu123@gm	ARCHITA PANDA	Pattamundai college	Student	Zoology department	Odisha	7853842716	Thank you
11/17/2020 14:05:45	suvamlenka1234@gmail.	SUVAM LENKA	Pattamundai College, pati	Student	Physics	Odisha	7325899029	Lot of thanks for organizing
11/17/2020 14:14:19	Barshamanisha905@gm	MANISHA RANI SAHU	North orissa university	Student	Botany	Orissa	8249234344	
11/17/2020 14:30:59	varshapradhan357@gma	BARSHARANI PRADHAI	SN clg	Student	Zoology	Odisha	6372979686	
11/17/2020 15:31:22	leenay06@gmail.com	SUDHANSUMALA ROUT	PN AUTONOMOUS COL	Reader in Botany	Botany	Odisha	9668076676	Thank you

11/17/2020 14:03:43	suvanilenka123@gmail.c	SUVANI LENKA	Pattamundai College, pat	Student	Physics	Odisha	7325899029	Lot of thanks for organizing
11/17/2020 14:14:19	Barshamanisha905@gma	MANISHA RANI SAHU	North orissa university	Student	Botany	Orissa	8249234344	
11/17/2020 14:30:59	varshapradhan357@gma	BARSHARANI PRADHAN	SN clg	Student	Zoology	Odisha	6372979686	
11/17/2020 15:31:22	keenay06@gmail.com	SUDHANSUMALA ROUT	PN AUTONOMOUS COL	Reader in Botany	Botany	Odisha	9668076676	Thank you
11/17/2020 15:38:27	sshyamala67@gmail.com	L.SHYAMALA	D.R.NAYAPALLI COLLEC	Research Scholar	BOTANY	ODISHA	9658124287	
11/17/2020 15:47:30	Lpmishra_2006@yahoo.c	DR. LADUKESH PRASA	Prananath College Auton	Reader	Botany	Odisha	9437138228	
11/17/2020 15:52:58	kalpanadasbjb438@gmai	KALPANA DAS	Nimapara Autonomous C	Asst. Professor	Botany	Odisha	7873194515	
11/17/2020 15:58:37	jayantamohanty59@gmai	JAYANTA KUMAR MOH	gop college	Asst. Professor	Botany	Odisha	9437303147	All the best
11/17/2020 15:59:07	manasi.sarangi@gmail.co	MANASI SARANGI	Sishuananta Mahavidyala	Asst. Professor	Botany	Odisha	9937469052	Thank you
11/17/2020 16:02:41	gitanjali27sept@gmail.co	DR. GITANJALI ROUT	PRANANATH AUTONOM	Asst. Professor	BOTANY	ODISHA	9437317987	
11/17/2020 16:11:55	sandhiyagopalakrishnan2	SANDHIYA GK	MAHENDRA INSTITUTE	Student	ECE	tamilnadu	9345262669	Thankyou for opportunity
11/17/2020 16:31:13	bhuyansasmita5@gmail.c	DR SASMITA BHUYAN	Choudwar College Utkal U	Asst. Professor	Botany	Odisha	9237078438	
11/17/2020 16:53:10	diptimayeesil177@gmail.	DIPTIMAYEE MALIK	Pattamundai college	Student	Botany	Orissa	9861485176	
11/17/2020 16:55:34	amitadas.personal@gmai	AMITA DAS.	N.S.M. City College, Raj	Reader in Botany.	Botany	Odisha	9439484576	All the best. Thank u all
11/17/2020 17:13:50	manasranjan.nirm@gmail	Manas Ranjan Mohanta	North Orissa University	Research Scholar	Botany	Odisha	7008524274	
11/17/2020 17:36:37	darshan.panda216@gma	DARSHAN PANDA	National Rice Research I	Research Scholar	Plant physiology and Bioc	Odisha	7008284458	
11/17/2020 17:46:01	chetnamohapatra4@gma	CHETNA MOHAPATRA	Stewart science College c	Student	Botany	Odisha	9861494913	I would like to join the webinar
11/17/2020 18:30:25	ankitashelly1997@gmail.c	ANKITA NAYAK	CBSH , OUAT , BHUBAN	Student	BOTANY	ODISHA	7978032458	Grt
11/17/2020 18:32:46	gupteswarswain2013@gr	GUPTESWAR SWAIN.	DAYAVIHAR DEGREE C	Asso. Professor	BOTANY	ODISHA .	9040321824	
11/17/2020 18:52:12	velpandi2012@gmail.com	Dr. T. VELPANDI	Tirunelveli Dakshina Mara	Asst. Professor	Commerce	Tamil Nadu	9488474757	Ok
11/17/2020 19:00:04	deeptimayee1966@gmail	DEEPTIMAYEE SAMAL	K.B.College, Barang	Asst. Professor	Botany	Odisha	9776363712	
11/17/2020 19:03:22	aranyadas12345@gmail.c	ARANYA DAS	North Odisha University, I	Student	Botany	Odisha	7894515572	
11/17/2020 19:11:39	ajittaipubam@gmail.com	DR. L. AJITKUMAR SHAI	Ideal Girls' College, Akam	Asst. Professor	Chemistry	Manipur	+919436022978	
11/17/2020 20:09:56	thejeshtn3@gmail.com	THEJESH T N	HMS institute of technolo	Asst. Professor	Civil engineering	Karnataka	8892640061	
11/17/2020 20:12:48	ranadipdutta45@gmail.co	Ranadip Dutta	Rabindra Bharati Universi	Student	msw	West bengal	08981159580	
11/17/2020 20:46:25	taj23april@gmail.com	TAJINDER SINGH	GMS HARDOSARAN	Hindi Master	Education Department	Punjab	9855422216	
11/17/2020 21:23:43	samantarajashree01@gm	RAJASHREE SAMANTA	SSJ Mahavidyalaya Rajna	Lecturer	Botany	Odisha	9937281624	Thank you
11/17/2020 21:37:32	prasantbslugaon@gmail.c	DR PRASANT KUMAR P	Godavaris Mahavidyalay,	Asst. Professor	Botany	Odisha	9439000290	Thanks
11/17/2020 21:56:07	rajalaxmisahoo1802@gm	RAJALAXMI SAHOO	D.R.Nayapalli College	Professor	Botany	Odisha	9937700651	
11/17/2020 22:01:20	mithiladas.rjk@gmail.com	DR. MITHILA DAS	S.N.College, Rajkanika	Asst. Professor	Zoology	Odisha	9439051850	
11/17/2020 22:39:20	gouraprasad67@gmail.co	Dr Goura Prasad Sarangi	Kendrapara Autonomous	Asso. Professor	Zoology	Odisha	9937491261	
11/18/2020 0:04:10	gsjp.sgc@gmail.com	Dr.Gauri Sankar Juga Pra	S.G College,Kanikapada,	Asst. Professor	Botany	Odisha	9937819525	Thank u
11/18/2020 0:10:41	ashirbadm@yahoo.com	DR. ASHIRBAD MOHAPA	Sri Jayadev College of Ed	Asso. Professor	Botany	Odisha	9861145218	
11/18/2020 2:47:36	heerakrath@yahoo.in	ANWESA RATH	SBR Govt.Women's Colle	Student	Science	Odisha	9437127755	Thanks
11/18/2020 7:18:50	dasdibyanshu06@gmail.c	DIBYANSHU DAS	Pattamundai college, patt	Student	Botany	Odisha	9178418624	
11/18/2020 8:29:14	riderbijay163@gmail.com	Bijay Kumar malik	College	Student	Mechanical	ODISHA	9337429559	
11/18/2020 9:10:44	nayak37059@gmail.com	SRUSTIDEEPA NAYAK	PATTAMUNDAI DEGREE	Student	Botany	Odisha	7853906694	Welcome
11/18/2020 9:56:23	407rajrampatel@gmail.c	RAJARAM PATEL	Central University of hary	Student	Education	Odisha	7751910458	Thank you
11/18/2020 9:56:40	babitapradhan1993@gm	BABITA PRADHAN	Rairakhol Women's High	Lect.in Botany	Botany	Odisha	8093401777	
11/18/2020 9:58:21	binayakmohapatra97@gr	Binayak Mohapatra	Utkal university	Student	Botany	Orissa	09337494344	
11/18/2020 9:59:43	nitishpadhan2911@gmail	NITISH PADHAN	Rajendra Autonomous Co	Student	Botany	Odisha	7504528588	
11/18/2020 10:03:14	smrutibarik405@gmail.c	SMRUTIMAYEE BARIK	Sambalpur University	Student	Lifescience	Odisha	7008280831	
11/18/2020 10:03:28	sadhanapriyadarshini199	SADHANA PRIYADARSH	Rama Devi Women's Uni	Student	Life science	Odisha	9040738940	
11/18/2020 10:06:31	Pragati06199906@gmail.	Sushree Pragati Priyadar	North Orissa University	Student	Botany	Odisha	8144740662	
11/18/2020 10:07:00	bank.sangita08@gmail.co	SUSHREE SANGITA BAI	Khallikote University	Research Scholar	PG. Department of Botan	Odisha	8895542977	Thanks a lot for this initiative
11/18/2020 10:12:09	Pabitrabehera168@gma	PABITRAMOHAN BEHEI	GOVT. WOMENS COLLE	Asst. Professor	Botany	Odisha	9438024023	Welcome
11/18/2020 10:12:28	rojalinmb@gmail.com	M B ROJALIN	Ramadevi University	Student	Lifescience	Odisha	9658617779	All d best
11/18/2020 10:14:57	naikbhanupriya49@gmail	BHANUPRIYA NAIK	NORTH ORISSA UNIVE	Student	BOTANY	ODISHA	9861610173	Thank you for this oppurtunity .
11/18/2020 10:50:00	suchitra16101@gmail.c	SUSHREE SUCHITRA D.	Pattamundai college, patt	Student	Botany	Odisha	8114364022	
11/18/2020 10:58:35	rinsaiman@gmail.com	RIN SAIMAN SAMAL	Saraswata Mahavidyalaya	Lecturer in botany	Dept.of Botany	Odisha	9938267877	
11/18/2020 11:06:50	lal_harishankar@yahoo.c	Hari Shankar Lal	Vinoba Bhave University	Research Scholar	P.G.Department of Botan	JHARKHAND	9431530563	Yes
11/18/2020 11:31:09	Priyadarshanisahooma	PRIYADARSHANI SAHO	S.N college Rajkanika Ke	Student	Department of zoology	Odisha	6372042342	
11/18/2020 11:31:40	soubhagyabatibehera5@g	SOUBHAGYABATI BEHE	S.N college	Student	Zoology	Odisha	8114939756	
11/18/2020 11:33:10	roulJayashree63@gmail.c	JAYASHREE ROUL	S.N College, Rajkanika	Student	Zoology	Odisha	9668777997	
11/18/2020 11:36:44	pandasupriya742@gmail.	SUPRIYA PANDA	SN Degree college Rajka	Student	Zoology	Odisha	9937269862	Thank you
11/18/2020 11:53:24	biswaranjan22042@gmai	BISWA RANJAN ROUL	College	Student	Zoology	Odisha	9078443830	
11/18/2020 12:01:51	dillipkumardebata26@gm	DILLIP KUMAR DEBATA	Chhatrapala college	Lecturer	Botany	Odisha	9861208998	
11/18/2020 12:04:03	swainabhisek613@gmail.	ABHISEK SWAIN	Kendrapara Autonomous	Student	Department of Zoology	Odisha	9078794845	Yes
11/18/2020 12:04:25	routpriyanka2002@gmail.	PRIYANKA PRIYADARSI	Kendrapara Autonomous	Student	Zoology	Odisha	8917348378	

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Arjali Dash

ପଟାମୁଣ୍ଡାଇ କଲେଜ ଉଦ୍ଭିଦ ବିଜ୍ଞାନ ଜାତୀୟ ୱେବିନାର

ପଟାମୁଣ୍ଡାଇ, ୨୭।୧୧ (ନି.ପ୍ର): ପଟାମୁଣ୍ଡାଇ କଲେଜ ଉଦ୍ଭିଦ ବିଜ୍ଞାନ ବିଭାଗ ପକ୍ଷରୁ ଜୈବ ବିବିଧତାର ସଂରକ୍ଷଣ ଓ ଏହାର ସୁଯୋଗ ଆହ୍ୱାନ ଶୀର୍ଷକ ଜାତୀୟ ୱେବିନାର କଲେଜ ଅଧ୍ୟକ୍ଷ ପ୍ରଫେସର ଅଧିକାରୀ ଲକ୍ଷ୍ମୀନାରାୟଣ ଦାଶଙ୍କ ପୌରୋହିତ୍ୟରେ ଅନୁଷ୍ଠିତ ହୋଇଯାଇଛି । ଏଥିରେ ଭୁବନେଶ୍ୱର ଆଇଏମଏମଟି ମୁଖ୍ୟ ବୈଜ୍ଞାନିକ ଡଃ. ନବୀନକୁମାର ଧଳ, ରାଜନଗର ବନଖଣ୍ଡ ଅଧିକାରୀ ବିକାଶରଞ୍ଜନ ଦାସ, ଉତ୍ତର ଓଡିଶା ବିଶ୍ୱବିଦ୍ୟାଳୟ ସହକାରୀ ପ୍ରଫେସର ଡଃ. ସୁଦାମଚରଣ ସାହୁ ପ୍ରମୁଖ ବୈଷୟିକଭିତ୍ତିକ ଆଲୋଚନା କରିଥିଲେ। ଅଧ୍ୟାପକ ଡଃ. ମାନସ ନାୟକଙ୍କ ସଂଯୋଜନାରେ ଆୟୋଜିତ କାର୍ଯ୍ୟକ୍ରମରେ ପଟାମୁଣ୍ଡାଇ କଲେଜ ଉଦ୍ଭିଦ ବିଜ୍ଞାନ ମୁଖ୍ୟ ଡଃ. ଅଞ୍ଜଳି ଦାଶ ସ୍ୱାଗତ ଭାଷଣ ଓ ଅତିଥିପରିଚୟ ପ୍ରଦାନ କରିଥିଲେ । ଅଧ୍ୟାପିକା ସୁଚିସ୍ମିତା ବିଶ୍ୱାଳ ଧନ୍ୟବାଦ ଦେଇଥିଲେ ।

ପ୍ରମାଣ ସା ୨୮.୧୧.୨୦୨୦

ଜାତୀୟସ୍ତରୀୟ ୱେବିନାର

ପଙ୍କାମୁଣ୍ଡାଇ,୨୫/୧୧(ଇମିସ): ପଙ୍କାମୁଣ୍ଡାଇ କଲେଜ ଉଦ୍ଭିଦ ବିଜ୍ଞାନ ପକ୍ଷରୁ ଏକ ଜାତୀୟ ୱେବିନାର ଅନୁଷ୍ଠିତ ହୋଇଛି। କଲେଜ ଅଧ୍ୟକ୍ଷ ପ୍ରଫେସର ଅଧିକାରୀ ଲକ୍ଷ୍ମୀନାରାୟଣ ଦାଶ ଏହି ୱେବିନାରେ ସଭାପତିତ୍ୱ କରିଥିଲେ। 'ଜୈବ ବିବିଧତାର ସଂରକ୍ଷଣ ଓ ଏହାର ସୁଯୋଗ ଓ ଆହ୍ୱାନ' ଶୀର୍ଷକ ଜାତୀୟ ୱେବିନାରେ କାର୍ଯ୍ୟକ୍ରମରେ ଜାତୀୟସ୍ତରୀୟ ବକ୍ତାମାନେ ଯୋଗଦେଇଥିଲେ। ମୁଖ୍ୟ ଆଲୋଚକ ଭାବେ ଆଇଏମଏମଟି ଭୁବନେଶ୍ୱରର ମୁଖ୍ୟ ବୈଜ୍ଞାନିକ ଡକ୍ଟର ନବୀନ କୁମାର ଧଳ, ରାଜନଗର ବନଖଣ୍ଡ ଅଧିକାରୀ ବିକାଶ ରଂଜନ ଦାଶ, ଉତ୍ତର ଓଡିଶା ବିଶ୍ୱ ବିଦ୍ୟାଳୟର ସହକାରୀ ପ୍ରାଧ୍ୟାପକ ସୁଧାମ ଚରଣ ସାହୁ ପ୍ରମୁଖ ବିଷୟଭିତ୍ତିକ ଆଲୋଚନା କରିଥିଲେ। ପଙ୍କାମୁଣ୍ଡାଇ କଲେଜ ଉଦ୍ଭିଦ ବିଜ୍ଞାନ ବିଭାଗର ମୁଖ୍ୟ ଡକ୍ଟର ଅଂଜଳି ଦାଶ ସ୍ୱାଗତ ଭାଷଣ ଓ ଅତିଥି ପରିଚୟ ପ୍ରଦାନ କରିଥିଲେ। ଅଧ୍ୟାପିକା ସୁଚିସ୍ମିତା ବିଶ୍ୱାଳ ଧନ୍ୟବାଦ ଅର୍ପଣ କରିଥିଲେ। ଅଧ୍ୟାପିକା ନିରୁପମା ସ୍ୱାଇଁ ଓ ଅଧ୍ୟାପକ ମାନସ ନାୟକ ଏହାକୁ ପରିଚାଳନା କରିଥିଲେ।

ସମ୍ବାଦ ତା ୨୨.୧୧.୨୦୨୦