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## SUNDARBAN: A BIOLOGICAL HOTSPOT

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**Abstract** – The Sundarbans is located in the south of West Bengal. The main features of the ecosystem here are the saline soils in the coastal river valleys and delta areas. Where there are different types of forests, it is called mangrove forest. After the partition of India in 1947, an area of about 6017 square kilometers was included in India. This mangrove forest is rich in a species of plant called Sundari which is named after the Sundarbans. The largest mangrove forest in the world is West Bengal and the Sundarbans in the south of Bangladesh. Its range is between 21 degrees 30 minutes north to 22 degrees 30 minutes north latitude and 88 degrees 40 minutes east to 90 degrees east longitude. Its area is about 9630 square kilometers. Due to its ecological importance, it has been included in the World Heritage List. This region is very important in terms of biodiversity. There are different species of Flora, Fauna, mammals, avifauna, aquafuna, marine mammals etc. Notable species include Royal Bengal Tiger, Gangetic Dolphins, Sundari Tree, Olive Ridley Turtle, Kingfisher etc. There are about 40 species of mammals, 150 species of fish, 270 species of birds, 35 species of reptiles. However, the current Sundarbans region has some environmental problems that, if left unresolved, could lead to the destruction of the world's largest mangrove forest in the future.

**Keywords**- Largest delta, Mangrove, Royal Bengal Tiger, Sundari Tree, Environment Issues

**Introduction**- Millions of years have passed since the origin of the earth and now life has originated on the earth. Different kinds of animals, birds, plants, mountains, plateaus, plains, etc. have developed in different parts of the world.

This area located on the east coast of India, the Sundarbans is known as the largest mangrove forest in the world. This wetland is located in West Bengal, India. Which is mainly located near the Bay of Bengal. About 40 % of it is located in India and 60 % in Bangladesh.

In 1997, UNESCO named three sanctuaries in the Sundarbans as World Heritage site. the Sundarban is the richest area for a number of faunal organisms in the lower Bengal basin.

It is known as one of the largest delta islands in the world due to the sediment deposition of the Ganges-Brahmaputra and Meghna rivers.

As a Mangrove Habitat, the Sundarban is home to a broad range of flora and fauna ,offering a variety of ecosystem services for this area.

The Sundarban is named after the SUNDARI tree here. The region extends from 21 degrees 30 minutes north to 22 degree 30 minutes north latitude and 88degree 40 minutes east to 90 degrees east longitude. Its area is about 9630 sq km.

This ecosystem is so important that it has been included in the World Heritage List. 60% of the Sundarbans region is land and 40 % is water. It is a vast alluvial plain. Geographically, the Sundarbans is a little higher than the sea level.

Mangrove wetlands serve as just a cyclone shield, deter coastal flooding and also provide nursery fields for a variety of fish, crabs that are commercially valuable.

Four primary forms of subsistence practices are currently practiced ;agriculture ,fishery, Timber processing and honey collection the key crops grown here include paddy, potato ,Green Chili and pumpkins. Timber ,firewood, Honey, neepa palm tree, animals and Marine fauna include other tools of the Sundarban biodiversity.

**The main objectives** – The main purpose of writing this article is to inform everyone about the largest mangrove forest in the world. Discuss the various biodiversity obtained here such as plant and animal diversity. The main purpose of this is to bring the importance of this region in front of everyone.

### **Physiography**

The Sundarbans are around half the size of the mangrove region that occurred 200years ago, the other half of which has been cleared and turned into farm property. tidal activity molds the land, consisting in an identifiable geomorphology.

Rivers appear to be long and smooth, a result of heavy tidal powers and erosion -resistant layers of clay and silt .At the river mouth, quickly eroded Sands accumulates and form channels and chars, which are driven into dunes by the powerful Southwest monsoon above the high water level ,through the Bay of Bengal, finer silts are washed out.

The ecosystem of the Sundarbans in the Ganges Delta is a complex ecosystem. which a large part belongs to Bangladesh 60% and a small part to India 40 %.

### **Climate**

The Sundarbans, because of their exposure to the Bay of Bengal, are a very humid region.Summer in the Sundarbans starts from March to May. The temperature here is about 42 degrees C. On the other hand the winter is very cold. Here the temperature drops to 9 degree C in winter.

## Soil

The soils of the Sundarbans are different from other soils in the landmass and are submerged for most of the year.

The soil here is not solid in nature but slightly soft. The pH of the soil here is usually between 5.3 -8.0. The soil particles are medium in size..

The main textural class is silt loam. The soil content of sodium and calcium ranges from 5.7 to 29.8 meq/100g of dry soil, however, and is usually poor in the eastern zone and greater in the west. The usable soil potassium content is poor, 0.3-

1.3 meq/100g dried soil. The rate of organic content in dry soil ranges between 4% and 10%. The salt content of

the soil rises from 5ppt in the east to 30ppt in the west (highly saline), even though salinity in the forest is not consistent from north to south.

## Flora

There are different species of flora and fauna in the Sundarbans. There are about 334 species found here. The Sundarbans is named after the predominance of Sundari trees in the region. The prevalent tree species is Sundari.

This tree is made of relatively hard wood to make various types of boat, house, furniture etc.

In addition to these plants, there are different types of palm, *Poreia coarctata*, *Myriostachya wightiana* and *Golpata* in this region.

There are various kinds of mangrove forest, coastal forest, marsh forest, mixed forest for salt water, mixed forest for brackish water.

Each saltwater plant has some morphological features and anatomical features as follows: The roots of saltwater plants are usually shallow. This is due to the lack of aeration at the roots of the saltwater plant. So the root of this plant rises above the ground and this is called the prop root. These are of a pointed shape.

The stems of most saltwater plants are juicy in nature. The leaves of this plant are thick, juicy and small in shape. Submerged halophyte leaf are thin and the vascular bundles of the leaves are not well formed. Their leaves can absorb water and food directly.

The fruits of these plants are usually light, so they have air cavities on the outside so they can easily float from one place to another. In the case of saltwater plants, the seeds usually germinate while in the mother plant, which is called viviparous germination.

Their stems are attached to the entire cuticle and the outer skin is thick, multilayered and the vascular tissue is well formed.

The leaves are attached to the cuticle and the epidermal cells are very thick in nature. The petioles are deep and are visible only at the base.

## Fauna

The Sundarbans mangrove forest is home to a wide variety of biodiversity. Mangrove forests are a mixture of fresh water and salt-water, so the biodiversity is abundant here. There are also about 150 species of fish, 40 species of mammals, 270 species of birds, 35 species of reptiles and 8 species of amphibians. There are also some species that are endangered.

There are different species of cats in the Sundarbans. fishing cat, jungle cat, leopard cat are notable. There are also chital deer, wild boar, Indian muntjacs.

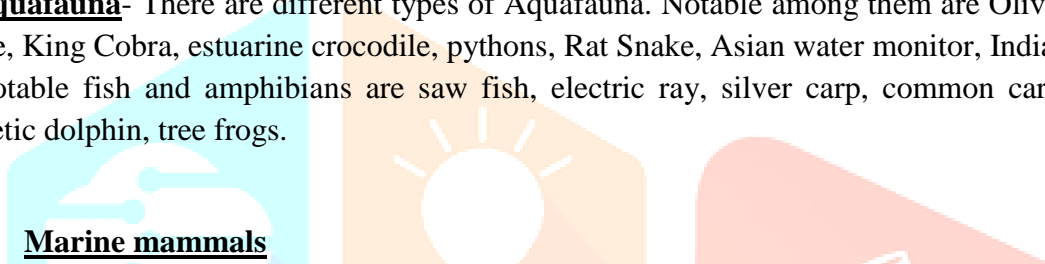
**Royal Bengal tiger-** The Royal Bengal Tiger is one of the most important animals in the Sundarbans. According to the 2011 census, there are about 180 tigers in the Sundarbans, including 106 in Bangladesh and 74 in India. The Royal Bengal Tigers live in the core of the Sundarbans. They hunt a variety of animals here, but sometimes they kill people. Every year about 30 to 100 people die in tiger attacks.

The tiger is a carnivorous animal. sambar ,chital, barasingha, water buffalo ,nilgai and takin are favoured to hunt.

**Avifauna-** There are often 286 species of birds, notably the lesser adjutants, brown winged Kingfisher, white-bellied Eagles, cotton teals, coots, great egrets, common kingfishers, spotted doves, pintails, etc.

**Aquafauna-** There are different types of Aquafauna. Notable among them are Olive ridley Turtle, green Turtle, King Cobra, estuarine crocodile, pythons, Rat Snake, Asian water monitor, Indian python.

Notable fish and amphibians are saw fish, electric ray, silver carp, common carp, king crab, prawn, gangetic dolphin, tree frogs.



### **Marine mammals**

The planned Marine animal richness protective area of Sundarbans protect to coastal areas around Sundarbans which contain important ecosystems for vulnerable cetaceans.

Irrawaddy dolphins, Ganges river dolphins and white Chinese dolphins are resident species. also present in this region are finless porpoises, spinner dolphins, and pantropical spotted dolphins, Indo Pacific bottlenose dolphins, false killer whales and rough-toothed dolphins are scarcer.

### **Environmental issues in Sundarbans**

#### **1. Sea Level Increase-**

The rise of sea level has had the worst effects on human settlement in the surrounding blocks in the central areas of the Sundarbans. the increase in sea level has deprived citizens of their primary livelihood sources - that is cultivation and fishing .a ton of fertile land beneath the sea is being flooded.

The cumulative impact of the already elevated intensity of sea-level rise in the Bay of Bengal and ground subsidence in the Sundarbans has been a successful sea level rise of almost three times the Global average (~ 8 mm/year) in the Sundarban.

higher sea levels have disastrous consequences on low lying coastal ecosystems and one of the most heavily inhabited and biodiverse areas in the world is the Sundarbans.

The special report published in October 2018 by the Intergovernmental Panel on Climate Change (IPCC) warns that sea levels may increase to 77 cm by 2100, even though global temperatures have risen 'only' to 1.5 C in the next 80 years. The truth that we are experiencing at present is much worse. Currently, we are on target to raise the temperature from 3 to 4 C by 2100.

## 2. Salinity-

The salinity rate of the river water rises steadily with time and the salinity in the Sundarbans has influenced more rivers.

The mangroves of the Sundarbans distributed across the Ganges Delta. The elevated salinity of the fresh water of the Ganges is attributed to the lack of fresh water. The decline in the Ganges River flow rate has resulted in high saline water levels in the upstream regions. In the South-Western corner of the Sundarbans, the high salinity region is located.

## 3. Climate change-

Precipitation is also showing a growing pattern in the Sundarban area together with the weather. In recent years, the instability in climatic parameters has increased. An rise in the speed of the cyclone and the amount of rainfall will be attributed to the warm atmosphere

## 4. Cyclones-

Despite the Sundarbans being a cycloneprone area, there is a shortage of shelters for disasters. Cyclonic storms affecting the Sundarbans have risen in recent years. The waves crossed the heights of the dam and reached the plains during Cyclone Aila in 2009. Because of the lack of water supplies and the loss of crops, several persons were impacted. The land and crops were severely affected because of the cyclones.



## 5. Pollution -

The Ganges River does not bring fresh water to the Sundarbans because of the severe dumping of solid waste from the surrounding towns. The tributary flows hold a large volume of domestic and agricultural pollution. Pollution is often induced by tonnes of mud from the harbors. The emergence of the Haldia Port Complex in East India is a big oil disembarkment.



## 6. Oil spill-

Oil spills are one of the major manmade hazards that impact both the inhabitants and the ecosystem of the Sundarbans. The 2014 oil spill created by the Southern Star VII, a Bangladeshi ship, caused a lot of harm, particularly to aquatic life. Orthodox farming practices were practiced earlier. But nowadays, the usage of pesticides and contaminants that harm the flora and fauna of the area is being embraced by citizens. There is still a danger to the ecosystem from the drainage of numerous industrial and residential wastes into river systems. There are questions about the development near the Sundarbans of a 1320-megawatt coal fired power station.

## 7. Fishing-

The phenomenon of overfishing has put considerable strain on the ecosystem. Because of the combination of overexploitation and climatic shifts, the supply of fish is declining. The density of fish in shallow waters has declined significantly. The local people dropped conventional fishing activities because of the unsustainable demand for prawn items and embraced the culture of prawn seeds.

## 8. Wood cutting -

There is an unlawful rise in the cutting of trees and vegetation in the Sundarbans. Individuals residing near the woods

in the South 24Paraganas are actively interested in the timber trade. In certain areas of the Sundarbans, deforestation is growing, which would eventually contribute to the depletion of biodiversity.

**Conclusion-** The Sundarbans is a very diverse region of the world in terms of biodiversity. There is a deep connection between rivers, seas and mangrove forests. Humans have a close connection with every plant and animal species that lives here. Protects us from various natural disasters so we must protect about this.

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