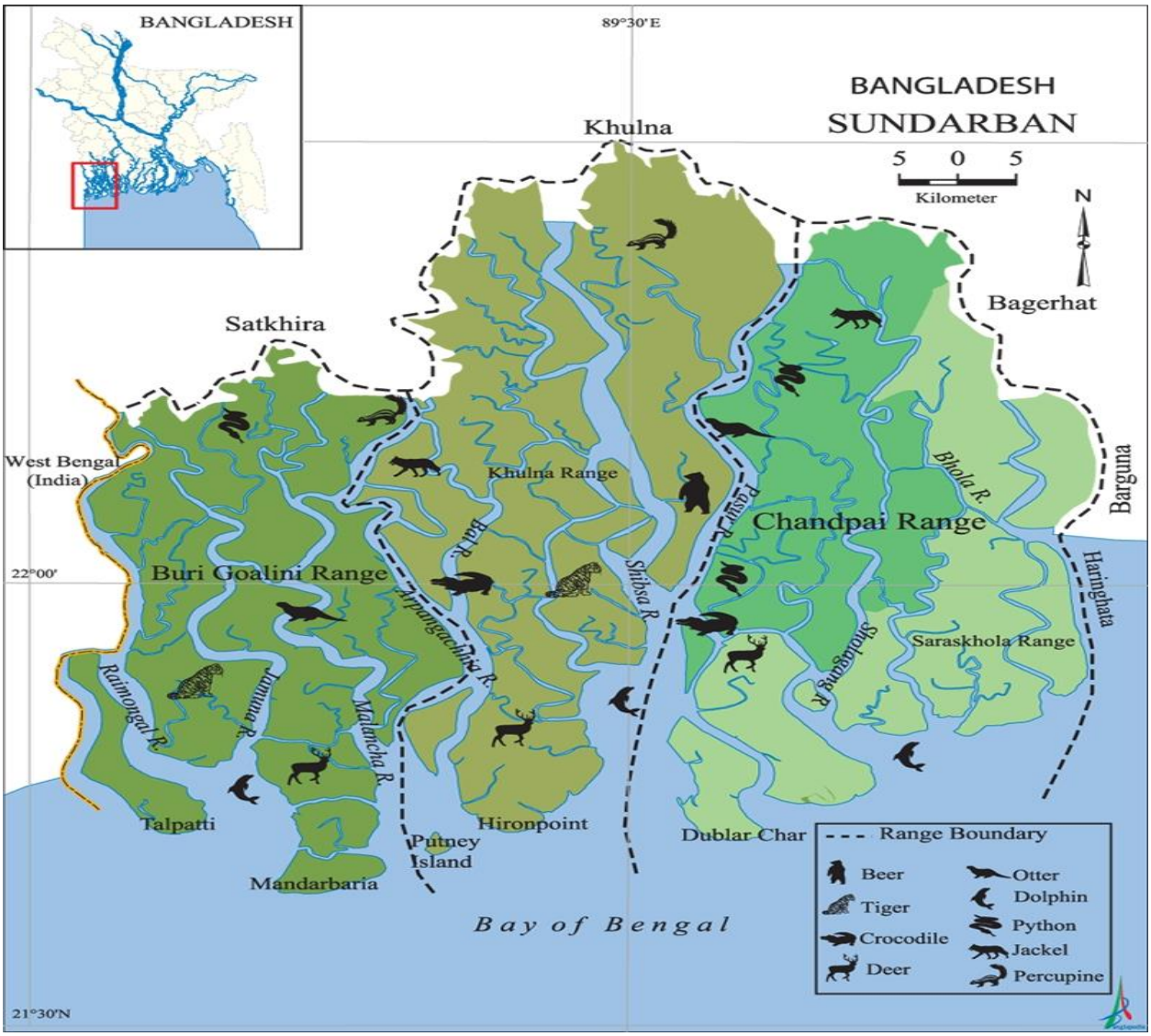
The **Sundarbans** is a mangrove area in the delta formed by the confluence of the Ganges, Brahmaputra and Meghna Rivers in the Bay of Bengal. It spans from the Hooghly River in India's state of West Bengal to the Baleswar River in Bangladesh. It comprises closed and open mangrove forests, agriculturally used land, mudflats and barren land, and is intersected by multiple tidal streams and channels. Four protected areas in the Sundarbans are enlisted as UNESCO World Heritage Sites, viz. Sundarbans National Park, Sundarbans West, Sundarbans South and Sundarbans East Wildlife Sanctuaries.[3] Despite these protections, the Indian Sundarbans were considered endangered in a 2020 assessment under the IUCN Red List of Ecosystems framework.

The Sundarbans mangrove forest covers an area of about 10,000 km^2 (3,900 sq mi), of which forests in Bangladesh's Khulna Division extend over 6,017 km^2 (2,323 sq mi) and in West Bengal, they extend over 4,260 km^2 (1,640 sq mi) across the South 24 Parganas and North 24 Parganas districts. The most abundant tree species are sundri (*Heritiera fomes*) and gewa (*Excoecaria agallocha*). The forests provide habitat to 453 faunal wildlife, including 290 bird, 120 fish, 42 mammal, 35 reptile and eight amphibian species.

Despite a total ban on all killing or capture of wildlife other than fish and some invertebrates, it appears that there is a consistent pattern of depleted biodiversity or loss of species in the 20th century, and that the ecological quality of the forest is declining.[7] The Directorate of Forest is responsible for the administration and management of Sundarban National Park in West Bengal. In Bangladesh, a Forest Circle was created in 1993 to preserve the forest, and Chief Conservators of Forests have been posted since. Despite preservation commitments from both Governments, the Sunderbans are under threat from both natural and human-made causes. In 2007, the landfall of Cyclone Sidr damaged around 40% of the Sundarbans. The forest is also suffering from increased salinity due to rising sea levels and reduced freshwater supply. Again in May 2009 Cyclone Aila devastated Sundarban with massive casualties. At least 100,000 people were affected by this cyclone. The proposed coal-fired Rampal power station situated 14 km (8.7 mi) north of the Sundarbans at Rampal Upazila of Bagerhat District in Khulna, Bangladesh, is anticipated to further damage this unique mangrove forest according to a 2016 report by UNESCO.



Geography:

The Sundarban forest lies in the vast delta on the Bay of Bengal formed by the super confluence of
the Ganges, Hooghly, Padma, Brahmaputra and Meghna rivers across southern Bangladesh. The seasonally flooded Sundarbans freshwater swamp forests lie inland from the mangrove forests on the coastal fringe. The forest covers 10,000 km^2 (3,900 sq mi) of which about 6,000 km^2 (2,300 sq mi) are in Bangladesh. The Indian part of Sundarbans is estimated to be about 4,110 km^2 (1,590 sq mi), of which about 1,700 km^2 (660 sq mi) is occupied by water bodies in the forms of

river, canals and creeks of width varying from a few metres to several kilometres.

The Sundarbans is intersected by a complex network of tidal waterways, mudflats and small islands of salt-tolerant mangrove forests. The interconnected network of waterways makes almost every corner of the forest accessible by boat. The area is known for the Bengal tiger (*Panthera tigris tigris*), as well as numerous fauna including species of birds, spotted deer, crocodiles and snakes. The fertile soils of the delta have been subject to intensive human use for centuries, and the ecoregion has been mostly converted to intensive agriculture, with few enclaves of forest remaining. The remaining forests, taken together with the Sundarbans mangroves, are important habitat for the endangered tiger. Additionally, the Sundarbans serves a crucial function as a protective barrier for the millions of inhabitants in and around Khulna and Mongla against the floods that result from the cyclones.

Sundarbans freshwater swamp forests

The Sundarbans freshwater swamp forests are a tropical moist broadleaf forest ecoregion of Bangladesh. It represents the brackish swamp forests that lie behind the *Sundarbans Mangroves*, where the salinity is more pronounced. The freshwater ecoregion is an area where the water is only slightly brackish and becomes quite fresh during the rainy season, when the freshwater plumes from the Ganges and the Brahmaputra rivers push the intruding salt water out and bring a deposit of silt. It covers 14,600 square kilometres (5,600 sq mi) of the vast Ganges-Brahmaputra Delta, extending from the northern part of Khulna District and finishing at the mouth of the Bay of Bengal with scattered portions extending into India's West Bengal state. The Sundarbans freshwater swamp forests lie between the upland Lower Gangetic plains moist deciduous forests and the brackish-water Sundarbans mangroves bordering the Bay of Bengal.

A victim of large-scale clearing and settlement to support one of the densest human populations in Asia, this ecoregion is under a great threat of extinction. Hundreds of years of habitation and exploitation have exacted a heavy toll on this ecoregion's habitat and biodiversity. There are two protected areas – Narendrapur (110 km^2) and Ata Danga Baor (20 km^2) that cover a mere 130 km^2 of the ecoregion. Habitat loss in this ecoregion is so extensive, and the remaining habitat is so fragmented, that it is difficult to ascertain the composition of the original vegetation of this ecoregion. According to Champion and Seth (1968), the freshwater swamp forests are characterised by *Heritiera minor*, *Xylocarpus molluccensis*, *Bruguiera conjugata*, *Sonneratia apetala*, *Avicennia officinalis*, and *Sonneratia caseolaris*, with *Pandanus tectorius*, *Hibiscus tiliaceus*, and *Nipa fruticans* along the fringing banks.

Flora:


A total 245 genera and 334 plant species were recorded by David Prain in 1903.[29] While most of the mangroves in other parts of the world are characterised by members of the Rhizophoraceae, Avicenneaceae or Combretaceae, the mangroves of Bangladesh are dominated by the Malvaceae and Euphorbiaceae.[17]

The Sundarbans flora is characterised by the abundance of sundari (*Heritiera fomes*), gewa (*Excoecaria agallocha*), goran (*Ceriops decandra*) and keora (*Sonneratia apetala*) all of which occur prominently throughout the area. The characteristic tree of the forest is the *sundari* (*Heritiera littoralis*), from which the name of the forest had probably been derived. It yields a hard wood, used for building houses and making boats, furniture and other things. New forest accretions is often conspicuously dominated by keora (*Sonneratia apetala*) and tidal forests. It is an indicator species for newly accreted mudbanks and is an important species for wildlife, especially spotted deer (*Axis axis*). There is abundance of dhundul or passur (*Xylocarpus granatum*) and kankra (*Bruguiera gymnorhiza*) though distribution is discontinuous. Among palms, *Poresia coaractata*, *Myriostachya wightiana* and golpata (*Nypa fruticans*), and among grasses spear grass (*Imperata cylindrica*) and khagra (*Phragmites karka*) are well distributed.

Mammals:



The Sundarbans are an important habitat for the Bengal tiger (*Panthera tigris tigris*). The forest also provides habitat for small wild cats such as the jungle cat (*Felis chaus*), fishing cat (*Prionailurus viverrinus*), and leopard cat (*P. bengalensis*).

Several predators dwell in the labyrinth of channels, branches and roots that poke up into the air. This is the only mangrove ecoregion that harbours the Indo-Pacific region's largest terrestrial predator, the Bengal tiger. Unlike in other habitats, tigers live here and swim among the mangrove islands, where they hunt scarce prey such as the chital deer (*Axis axis*), Indian muntjacs (*Muntiacus muntjak*), wild boar (*Sus scrofa*), and Rhesus macaque (*Macaca mulatta*). It is estimated that there are now 180 Bengal tigers and about 30,000 spotted deer in the area. The tigers regularly attack and kill humans who venture into the forest, human deaths ranging from 30–100 per year.

Avifauna and Aquafauna



The forest is also rich in bird life, with 286 species including the endemic brown-winged kingfishers (*Pelargopsis amauroptera*) and the

globally threatened lesser adjutants (*Leptoptilos javanicus*) and masked finfoots (*Heliopais personata*) and birds of prey such as the ospreys (*Pandion haliaetus*), white-bellied sea eagles (*Haliaeetus leucogaster*) and grey-headed fish eagles (*Ichthyophaga ichthyaetus*). Some more popular birds found in this region are open billed storks, black-headed ibis, water hens, coots, pheasant-tailed jacanas, pariah kites, brahminy kites, marsh harriers, swamp partridges, red junglefowls, spotted doves, common mynahs, jungle crows, jungle babblers, cotton teals, herring gulls, Caspian terns, gray herons, brahminy ducks, spot-billed pelicans, great egrets, night herons, common snipes, wood sandpipers, green pigeons, rose-ringed parakeets, paradise flycatchers, cormorants, white-bellied sea eagles, seagulls, common kingfishers, peregrine falcons, woodpeckers, Eurasian whimbrels, black-tailed godwits, little stints, eastern knots, curlews, golden plovers, pintails, white-eyed pochards and lesser whistling ducks

The Sundarbans National Park is home to olive ridley turtle, hawksbill turtle, green turtle, sea snake, dog-faced water snake, estuarine crocodile, chameleon, king cobra, Russell's viper, house gecko, monitor lizard, pythons, common krait, green vine snake, checkered keelback and rat snake. The river terrapin, Indian flap-shelled turtle (*Lissemys punctata*), peacock soft-shelled turtle (*Trionyx hurum*), *yellow monitor*, Asian water monitor, and Indian python. Fish and amphibians found in the Sundarbans include sawfish, butter fish, electric ray, common carp, silver carp, barb, river eels, starfish, king crab, fiddler crab, hermit crab, prawn, shrimps, Gangetic dolphins, skipper frogs, common toads and tree frogs. One particularly interesting fish is the mudskipper, a gobioid that climbs out of the water into mudflats and even climbs trees.

Economy:

The Sundarbans plays an important role in the economy of the southwestern region of Bangladesh as well as in the national economy. It is the single largest source of forest produce in the country. The forest provides raw materials for wood-based industries. In addition to traditional forest produce like timber, fuelwood, pulpwood etc., large-scale harvest of non-wood forest products such as thatching materials, honey, beeswax, fish, crustacean and mollusc resources of the forest takes place regularly. The vegetated tidal lands of the Sundarbans function as an essential habitat, produces nutrients and purifies water. The forest also traps nutrient and sediment, acts as a storm barrier, shore stabiliser and energy storage unit. Last but not the least, the Sunderbans provides an aesthetic attraction for local and foreign tourists.

The forest has immense protective and productive functions. Constituting 51% of the total reserved forest estate of Bangladesh, it contributes about 41% of total forest revenue and accounts for about 45% of all timber and fuel wood output of the country.[69] A number of industries (e.g., newsprint mill, match factory, hardboard, boat building, furniture making) are based on raw materials obtained from the Sundarbans ecosystem. Non-timber forest products and plantations help generate considerable employment and income opportunities for at least half a million poor coastal people. It provides natural protection to life and properties of the coastal population in cyclone-prone Bangladesh.