



## Sunderban: The Call of the Forest

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Sunderban mangrove, the world's largest single block of halophytic mangrove ecosystem in Northern Bay of Bengal with approximately 10,000 km<sup>2</sup> area. The Sunderban (21°32' to 22°40'N and 88°05' to 89°51'E) are situated on the delta in the Bay of Bengal created by the Ganges, Brahmaputra and Meghna rivers. 62% of the total area falls within Bangladesh and 38% in India (Spalding, M. *et al.*, 2010). Name Sunderban resembles the large mangrove trees Sundari (*Heritiera littoralis*). The region is networked by a complex of tidal waterways, mudflats and series of small islands of halophytic mangrove forests. Highly diverse and productive mangrove functions as a system of buffer against the cyclones.

### Mangroves and the biodiversity:

About 24 taxa of true mangroves belongs to 9 different families are recorded in Indian Sunderban (Barik, J. and Chowdhury, S. 2014). Species such as *Aegialitis rotundifolia*, *Heritiera fomes*, *Sonneratia apetala* or *S. griffithii*. *H. fomes* is now facing threat in the Indian Sunderban and Myanmar. The region is rich with diversified and high in numbers of mangroves and also possesses 200 other plant sp, > 400 sp of fish, >300 sp of birds, 35 sp of reptiles, 42 sp of mammals, as well as countless benthic invertebrates, bacteria, fungi, etc. (Gopal, B. and Chauhan; 2006 & IUCN; 2001). Jhingran (1977) recorded 172 species of fishes, 20 species of prawn and 44 species of crabs including two edible crabs from Sunderban. In the Indian part of Sunderban, the significant rise in opportunistic trash fish and reduction in commercial fisheries is reported due to quantitative and qualitative degradation in the ecosystem. Important fisheries composed of: *Lates calcarifer* (Bloch), *Tenualosa ilisha* (Hamilton-Buchanan), *Liza parsia* (Hamilton), *Liza tade* (Forsskal), *Harpadon nehereus* (Hamilton-Buchanan), *Plotosus canius* (Hamilton-Buchanan), *Pampus argenteus* (Euphrasen), *Rhinobatos annandalei* Norman, *Pangasius pangasius* (Hamilton-Buchanan), *Polydactylus indicus* (Shaw), *Chanos chanos* (Forsskal), *Eleutheronema tetradactylum*, *Polynemous indicus*, *Polynemous paradiseus* (Linn.) and *Pama pama* (Hamilton), *Panaeus monodon* (Fabricius), *Panaeus penicillatus* (Milne-Edw) and *Metapenaeus monoceros* (Fabricius), *Scylla serrata* (Forsskal) and *Neptunus pelagiens*.

### Discussion:

This ecosystem is increasingly being degraded for a variety of purposes such as human interference as agriculture, fishing, farming and settlement and the steady effects of climate change. Coastal forests like Mangroves generally possess a high resilience to natural disturbances. These Mangroves provide some dynamic functions in the ecosystem by protecting the sea-shore areas against many natural hazards viz. tropical storms and tsunamis, they act as a catalyst in nutrient recycle, assist in the growth of reefs, seagrasses and fisheries as well. Mangrove forms habitat for different aquatic and terrestrial organisms. For example it is suitable for rare and protected Royal Bengal tiger (*Panthera tigris* ssp. *tigris*) and Gangatic river dolphin (*Platanista gangetica*). These ecosystems are also crucial for carbon sinks; enabling store into peat soils or as dissolved organic carbon in ocean beds (Kristensen, E. *et al.*, 2008). In both the country the populous surrounding of



Sunderban depend heavily on the goods and services that the forests provide. These mangroves are used for varied purposes as apiculture, timber, fuel, charcoal, bee keeping, tannin production and medicinal uses. Interestingly, cultivation of honey by Maulis (honey collectors) addressed in Bengali, frequently risk their lives in the peak season to collect honey, without much safety accessories but with a traditional prayer to Bon Bibi (the Goddess of Forest Collected honey has a very unique, distinctive woody and mangrove taste to it. Humid weather in the forest impacts positively to the texture and composition of the honey. The absorbance of momentum of Cyclone Aila in 2009 and tsunami in 2004 resembles the unique buffering capacity of such forests (Saenger, P., 2011). According to various researchers the mangrove vegetation in the central Indian Sundarbans is under stress due to hyper-saline condition. To address core conservation challenges to the Sunderban, the world's largest unbroken mangrove system, IUCN-World Heritage Centre always show concern and takes prompt action. Increase in erosion rates than aggradation in Sunderban is arrested due to wastewater pollution from industries & artificial sediment traps upstream by dams and barrages in particular areas (e.g. the Farakka Barrage) and higher discharge through water diversion in other parts of the drainage basin (Giri, C. *et al.*, 2007; Raha, A. *et al.* 2012). Irregular runoff from the Himalayas declines soil salinity, and, owing to higher erosion, high siltation. Thus it causes lower transparency and lowers photosynthetic activity. A proper series of research on contamination indices are needed in coming days. The rise in sea level, global warming eventually affects the dynamic mangrove forest and vulnerable coastal communities. Sunderban is ultimately facing long term changes in response to habitat modification and fragmentation. This region is highly impacted by cyclonic storms and severe tides frequently. Major cyclones in last two decades like Akash (2007), Sidr (2007), Rashmi (2008), Bijli (2009), Viyaru (2013), Komen (2015), Roanu (2016), Mora (2017), Fani (2019), Bulbul (2019), Amphan (2020) etc. effected the economy and livelihood of the whole region. The wide spectrum havoc created by natural disasters are major challenges for the agriculture and long term management plans. Cyclone Amphan on 20 May 2020 made landfall across the West Bengal-Bangladesh coast, including both World Heritage properties: "Sunderban National Park" (India) and "The Sunderban" (Bangladesh), inscribed on the World Heritage List (UNESCO) in 1987 and 1997 respectively. Sunderban was declared as a core area of Sunderban Tiger Reserve in the year 1973, a National Park on 4th May, 1989.

In the region, Fishing is a major path of livelihood, alongside wage labour, agriculture, and crab and prawn seed collection. Naukas are the major craft used in the Sundarban region, and popular fishing gear are dragnets, shore seines, gillnets and fixed bagnets. Fishing villages are quite vulnerable to potable water, basic transportation facilities, electricity, education and schools and health facilities. Decline of tiger prawn population at alarming stage and excessive seed collection during post spawning period is harming the health of the fisheries communities.

Many novels have been written by authors in the setting of Sundarbans that are based on the rigors of the lives of villages and fishermen eg. Emilio Salgari's *The Mystery of the Black Jungle*, Sundarbane Arjan Sardar by Shib Sankar Mitra and Padma Nadir Majhi, by Manik Bandyopadhyay. Also, the Booker Prize winning novel, Salman Rushdie's *Midnight's Children* and *The Hungry Tide* by Amitav Ghosh are set in the Sunderban. Many have written articles about widow village; it is said that, In the Sunderban, a village is named after widow Village, where most of the family members have died due to the attack by Tiger.

The future of Sunderban would be a collaborative result of co-working of government, NGO's, research stations and creation of infrastructural facilities. Nowadays, as an alternative to traditional approaches environmental monitoring and surveillance by means of Internet of Things (IoT) and Artificial Intelligence is being developed. These technologies can play a sound role in ushering the agriculture and allied sectors in heritage spots like Sunderban. In different countries, with inclusion of IOT in such ecosystems villagers and agencies are today outfitted with clever



gadgets with real-time observations and associated water observing abilities thus reducing the cost of possible issues and disaster management & its conditions at the same time.

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