CHAPTER 1

Introduction
1. INTRODUCTION

1.1. SUNDARBANS OF WEST BENGAL

Mangroves are very specialized forest ecosystem found at the land-sea interface of the tropical and sub-tropical regions of the world bordering the sheltered sea coasts and estuaries. These forest systems are dominated by the salt-tolerant halophytic plants restricted to the intertidal belts and are exposed to the high and low tides twice in 24 hours. This mangrove ecosystem supports numerous terrestrial, benthic and aquatic organisms forming a complex association of species, exchanging materials and energy within and between the systems and the adjoining coastal waters. This very specialized vegetation not only dominates the habitat and characterize the ecosystem, but also define an economic resource which has been variously used by the coastal people since centuries. At the land-sea interface, these intertidal wetlands are a basic life sustaining ecosystem, but “very fragile being marginal”. Hence, any development modification on management of this ecosystem should only be an ecological sound one to avoid degradation and loss, and to ensure a sustained, stable and productive ecosystem.

The Sundarbans Biosphere Reserve supports the world’s most luxuriant mangrove vegetation - a well known ecosystem of the tropics. The Sundarbans is the third largest Biosphere Reserve in India and is situated at the Hooghly-Matla estuarine complex. The Sundarbans has been declared as a Biosphere Reserve in the year 1989. This Biosphere Reserve supports 4266.66 sq. km (66%) area out of a total 6419 sq. km. mangrove cover area in India (Naskar, 2004). Considering the importance and uniqueness, the Sundarbans has been accepted in the Global Network of Biosphere Reserves by UNESCO in 2001. The mangrove forest of Sundarbans was also declared as a ‘World Heritage Site’ and ‘Ramsar Wetland Site’ for proper preservation of its flora and fauna.
Three centuries back, the total forests and river area in undivided Sundarbans, of present day’s India and Bangladesh, was more than 20,000 sq. km. and restricted within 21° N to 22°31’ N latitude and 88°10’ E to 92°15’ E longitude. During partition of Bengal (1947), more than 66% of the total mangrove forest of Sundarbans had fallen within the jurisdiction of Bangladesh and only 34% remained within India, between 21°31’ N to 22°30’ N latitude and 88°10’ E to 89°51’ E longitude. Indian Sundarbans covering a total area of 9,630 sq. km. was declared as a biosphere reserve in the year 1989. The present mangrove forest area of Sundarban biosphere reserve is about 4,266.66 sq. km. including rivers, creek and canals. The Sundarbans Biosphere Reserve falls under the jurisdiction of two districts- North and South 24-Parganas of West Bengal.

The entire biosphere reserve can be spatially divided into 3 zones-

i. Core zone (1,692 sq. km.)
ii. Buffer zone (2,233 sq. km.)
iii. Transition zone (5,705 sq. km.)

The transition area of 5,705 sq. km. along the northern boundary of the reserve is mainly mangrove reclaimed area where agriculture and coastal aquaculture are extensively practiced by about 4.1 million local people.

The Sundarbans Biosphere Reserve includes one National Park- the Sundarban National Park (1,330 sq. km.) and 3 Wildlife Sanctuaries – Sajinakhali (362.40 sq. km.), Lothian Island (38 sq. km.) and Haliday Island (5.95 sq. km.).

The term ‘Sundarbans’ has coined either from the name of a mangrove plant ‘Sundri’ (*Heritiera fomes* Buch.-Ham.) or from the forests of ‘Beautiful Plants’ or from the forests of ‘Samudra’ (ocean) (Naskar & Guha Bakshi, 1982).
‘Sundarbans’ is the only mangrove reserve inhabited by the tigers. The mangrove forest of Sundarbans is the ideal habitat for the world famous ‘Royal Bengal Tiger’ (Panthera tigris tigris). An area of 2,585.10 sq. km. inside the Sunderbans Biosphere Reserve has been marked as ‘Sundarbans Tiger Reserve’, which is under strict management practices and kept free from all types of human interference. An area of 124 sq. km. within this Tiger Reserve is preserved as primitive zone to act as ‘gene pool’. The Sundarbans Tiger Reserve is bounded in the East by the international boundary with Bangladesh, formed by the rivers Harinbhanga, Raimangal and Kalindi and on the South by the Bay of Bengal. The Western border is along the river Matla. Sajinakhali, one of the 3 Wildlife Sanctuaries is within the Sundarban Tiger Reserve.

The Sundarbans Tiger Reserve can be distinctly divided into 3 ecological units-

i. The eastern patch is lying east of river Harinbhanga with sufficient fresh water coming from Bangladesh side

ii. The western patch is lying west of river Thakuran with much less fresh water supply from river Hooghly

iii. The central patch which is practically completely cut off from upstream flow and is fed only by back waters of the Bay of Bengal.
1.2. CRITERIA FOR DESIGNATION AS BIOSPHERE RESERVE:

The Sundarbans Biosphere Reserve falls under the Indo-Malayan Realm, Province No. 4.3.1. (Bengalian Rain Forest) and Tropical Humid Forests Biome of Udvardy’s Classification of biogeographical provinces of the world. Sundarbans, in the coastal area of West Bengal is well known for having its interesting and extensive bio-diversity of mangrove habitat flora and fauna. Adaptations of these mangrove plants and mangrove dwelling fauna in islands on estuarine mouths of the river Hooghly are unique and important. The natural higher groups of plants in the Sundarbans mangals have about 81 species, including trees, shrubs and herbs (Naskar, 1999). Most of these plants are endemic in the intertidal high saline deltaic areas, for having their special adaptation in these physiologically dry soils. Total 964 mangroves and mangrove associate plant species under 145 families were reported from the entire biosphere reserve (Debnath et. al., 2013). The whole ecosystem complex with a mosaic of vegetational entities, natural habitats and land cover types harbour a rich diversified fauna. The mangrove dwelling fauna or mangrove habitat animal species in the Indian Sundarbans are also important for their large species diversity, along with several important threatened, rare, endangered and endemic species. The vast groups of animal species are directly dependant on these dense mangrove habitats either for their food or safe shelter. On the other hand, these faunal species indirectly or directly protect these threatened mangrove forests from rapid destruction by human beings.
1.3. SIGNIFICANCE FOR CONSERVATION:

The biogeography of Sundarbans is unique and the region harbours a rich diversity in terms of species content, ecosystem and habitat types. This deltaic ecosystem, which is the single largest continuous area in the world for threatened Bengal Tiger and largest contiguous mangrove patch on globe (along with Bangladesh), is very productive and well known for its greater degree of specialization.

1,100 flowering plants including 81 mangrove species of which 24 species of medicinal plants and 150 species of algae are recorded from this area (Naskar, 2001). Globally important rare mangrove plant species like *Acanthus volubilis, Aglaia cucullata, Bruguiera parviflora, Heritiera fomes, Kandelia candel, Nypa fruticans, Rhizophora apiculata, Scyphiphora hydrophyllacea* and *Sonneratia caseolaris* are available in the Sundarbans (Anonymous, 2002). More than 163 species of birds, 40 species of mammals, 56 species of reptiles, 165 species of fish, 15 species of prawns, 67 species of crabs and 23 species of mollusca have so far been reported from Indian Sundarbans (Anonymous, 2002). This only mangrove tiger-land of the planet harbours many rare and endangered mammals like *Panthera tigris tigris, Prionalius bengalensis*, *P. viverrina, Platanista gangetica, Neomeris phocaenoides*, *Manis pentadactyla*. The rare birds are Goliath Heron, White bellied Sea eagle, Bramhiny Kite, The reptiles *Batagus bhaska, Crocodylus porosus, Chelonia mydas, Varanus salvator* are endangered Anonymous (l.c.).

Fish, fisheries and fishing in the Sundarbans tidal estuaries, rivers, creeks and vast estuarine wetlands are very important in terms of rural economic set up and supply of cheaper protein food of the neighbourers of Sundarbans. Fish, prawns and crabs of Sundarbans are transported to local as well as the outside markets. The shrimp from Sundarbans is also exported to the international markets. Large numbers of rural people are engaged in fishing activities and fisheries, which are the substantial source of earning.
1.4. LAND USE HISTORY:

The forests of Sunderbans were considered initially common and were subjected to unrestricted use as per historical records. Shah Sujah, a local king in 1658 for the first time used the Sunderbans as a source of revenue by imposing a levy on the export of wood from the forests.

In 1773, Claud Russel, collector of East India company gave away some portions of the dense forests to local authorities called Zamindars to make it suitable for agriculture. In 1825, Government declared that the whole of Sunderbans is a sole property of the Government and no part of it had ever been assigned to any Zamindars. After some years the Zamindars were again given some rights over the forest lands with a 99 years lease agreement.

Dr. Brandis in 1863 after inspecting the forests, leased out 14 Blocks in 1866 for the collection of tolls on forest products. A.L. Home, the Deputy Conservator of forests, in 1871-72, had visited the forest areas and calculated that each square mile (2.59 sq. km.) of forest could produce 700 quintals of timber.

In 1905, Sunderbans Act was passed and the Government of Bengal sent a proposal to the Government of India for Rayatwari settlement for reclamation in the Sunderbans of South 24-Parganas. In 1911, the whole forest was declared as Reserve Forest and no land lease was allowed to clear the forest. In 1963 and 1977-78 refugees from East Pakistan (now Bangladesh) have been allowed for settlement in regions like Jharkhali, Marichjhampi and Herobhanga.
1.5. CULTURAL SIGNIFICANCE:

The society under the force of circumstances to be founded upon Hindu-Muslim unity and a blend of Hindu and Muslim culture. Out of common fear from nature and ferocious animals, the Hindus and Muslims of Sundarbans have been used to worship Banbibi, Dakshin Rai, Baba Thakur, Gorachand Pir, Bara Khan Gazi, Panchanan Pir, Kalu Rai, Sha Junguli, Manasa, Sitala, Olabibi etc irrespective of their religious belief. These gods and goddesses are worshipped by lower class people generally under the trees or by the riverside in open place. There is no reference to them in the Shastras or Puranas. Such local idols were perhaps created by the people by their own imagination to help them out of troubles.

There are references to the Sundarbans in the Ramayana, Mahabharata and in the Puranas mentioning the episodes connected with Maharshi Kapil of Sagar Island. Kalidas, the court poet of the Gupta sovereign, Chandragupta II (5th Century A.D.) refers to lower Bengal in his Raghuvansam (Canto 36, Sloka no. 26). Ptolemy’s map (2nd Century A.D.), Huien Tsiang’s account (7th Century A.D.), Samudragupta’s inscription (4th Century A.D.) and Gauda Vaha (731 A.D.) – all seem to justify the existence of Sundarbans, identifiable with lower Vanga, in the historic age. The evidences supplied by poet Bipradas Chakravarti (1495), Kabikankan Mukundaram Chakravarti (16th & 17th Century) and in Ain-i-Akbari (16th Century) also establish the existence of Sundarbans long before the period of reclamation. Chandikan or Sagar Island was in Pratapaditya’s days (16th Century), an important seat of maritime power in Bengal. He was finally overpowered and defeated by the then Governor of Bengal, Man Singh (1589-1609).