

PAST MANAGEMENT HISTORY OF MANGROVE FORESTS OF SUNDARBANS

Prasanta Kumar Pandit

Conservator of Forests

Administration, Publicity and Marketing, WB

Aranya Bhaban, Block-LA-10A, Sector-III, Salt Lake City

Kolkata, West Bengal, India

E mail : pkpandit60@gmail.com

ABSTRACT ■ Sundarban has a long history of management and conservation starting from Mauryan period (321-226 BC). During Gupta dynasty (320-415 AD) it was well managed. In Munhall period (1575-1765 AD) Sundarban was mainly managed for revenue generation. First survey of Sundarban was carried out by Britishers in between period 1769-1773. Britishers allowed clearance of forest until 1855 before the enactment of Forest Act. First management plan Sundarban was written in the year 1871 in which regulation on harvesting of Sundari (*Heritiera fomes*) was prescribed. Some part of Sundarban was declared as reserve forest in the year 1878. Initially forest of Sundarban was thought to be an inexhaustible resource but gradually thought it was not to be so. So different management plan recommended restriction and regulation on use of forest based resources. After 1878 different management plan was written before and after Independence of India with various recommendations for better management and protection of unique biodiversity of Sundarbans. Out of total area (10,260 sq km) approximately 40% area falls under India rest of the part belongs to Bangladesh after independence of India. Owing to global importance of Indian Sundarban it was declared as World Heritage Site by UNESCO in the year 1985 and Biosphere Reserve in the year 1989. Due to the presence of considerable tiger population Sundarban Tiger Reserve was declared in the year 1973 with an area 2585 sq km. At present Indian Sundarban has a Tiger Reserve, National Park (1330.10 sq km) within Tiger Reserve area, three Wild Life Sanctuaries and rest of the area belongs to reserve forest.

INTRODUCTION

The Sundarban Mangrove forests is the largest single track of mangrove of the world covering an area approximately 10,260 sq km, situated in the delta of the river Ganga, Brahmaputra and Meghna are shared between countries Bangladesh (6000 sq km) and India (4,260 sq km). Indian part of Sundarbans situated in the Southern-most part of state West Bengal, in the District of South & North 24-Parganas, lies a little south to the Tropic

of Cancer between the latitude 21°31' & 22°31' North and longitude 88°10' & 89°51' East. A close network of rivers, channels and creeks intersect the whole Sundarbans, which has resulted in formation of total 102 islands. The main rivers, which flow in and around Sundarbans are Bidya, Matla, Gona, Gosaba, Harinbhanga, Kalindi, Raimangal, Kapura, Jhilla, Thakuran, Muriganga, Hatania and Doania. Among them Raimangal, Harinbhanga and Kalindi river separated India

and Bangladesh on the eastern side. Sundarban is bounded by Bangladesh in the East, fringe villages on the North and West and Bay of Bengal on the South. The present management of Indian Sundarban is under two administrative controls namely (i) Sundarban Tiger Reserve covering an area 2585 sq km on the eastern part and (ii) South 24 Pargana Forest Division comprising an area 1675 sq km covering the western part of Sundarbans. High tides and ebb-tides occur twice daily and the current changes its direction every six hours interval. The average elevation varies from 5.8 m to 6.1 m above mean sea level with several low line depressions. The maximum and minimum tides recorded at Sagar Island are 5.68 m and 0.96 m respectively. Biotic factor at Sundarbans plays a significant role and has developed a variety of habitat for wildlife, which includes estuaries, beaches, permanent and semi-permanent swamps, tidal flats and tidal creeks. The mangrove vegetation itself assists in the formation of new landmass and the inter-tidal vegetation plays a significant role in Sundarbans.

It is the only mangrove forests including Bangladesh which support significant tiger population. It constitutes over 60% of the total mangrove forest area in the entire country and has 90% of the total Indian mangrove species. Indian Sundarbans is very rich in biodiversity. There are 140 plant species under 59 families and 101 genera (Naskar, 2007) have been reported from the entire Biosphere region. There are recorded 31 species of mammal, 59 species of Reptilia, 7 species of Amphibia, 217 species of avifauna, more than 200 species of fishes found in Sundarbans. Moreover, among invertebrate species 143 mollusks, 201 insects, 240 crustacean, 78 annelids, 68 protozoa and 104 of nematodes are recorded

(Pandit, 2014). It is the home to a large number of endangered and globally threatened species like the tiger (*Panthera tigris tigris*), fishing cat (*Felis viverrina*), estuarine crocodile (*Crocodilus porosus*), Gangetic (*Platanista gangetica*) and Irrawady Dolphin (*Oracella brevirostris*), king cobra (*Ophiophagus hannah*), water monitor lizard (*Varanus salvator*) etc. It is the nesting ground for marine turtles like Olive Ridley (*Lepidochelys olivacea*), Green sea turtle (*Chelonia mydas*) and Hawksbill turtle (*Eretmochelys imbricata*). It is known as a kingfisher's paradise as out of the 12 species of kingfishers found in the country 8 species are found here. Two species of horse shoe crabs (which are considered as living fossils as they are thought to be more than 400 million years old) i.e. *Tachypleus gigas* and *Carcinoscorpius rotundicauda* are found here (Annon, 2012).

MANAGEMENT HISTORY

Sundarbans had a long history of conservation and Management. It was recorded that

During Muryan period, between 321-226 BC the Muryan Empire created a Department of Forest Products headed by an official called a "kupyadhyaksta". This department supervised the use of eight forest divisions called "gajavanas" or "elephant forests", classified with respect to their intended use: (1) religious, (2) supply of general forest produce, (3) grazing for royal elephants, (4) royal hunting ground and (5) public hunting ground. The Sundarbans was part of the Angireya-vana, which included forests from North and South Bengal.

During Gupta Dynasty (320-415 AD) new regulations were enacted, after which forest management declined and extensive tracts of land were cleared for agriculture. From 1204-1575, the Sundarbans was ruled by the Indo-

Turkish sultans. During this period, land reclamation was catalyzed by Islamic holy men called “*pirs*”, including Khan Jahan, Mubarra Ghazi, Zindah Gazi, Mehr Ali and Umar Shar. During the Mughal period (1575 to 1765 AD), newly reclaimed land was catalogued as administrative units called “*pargana*”, with the aim of producing revenue. The first *pargana* in the Sundarbans area (Ambarabad, 175 square miles) was established in 1734. From the 15th to 18th Centuries, the administration of the Sundarbans became increasingly complex, with plots of land “*ta'alluq*” owned by “*ta'allug-dar*”. The *ta'allug-dar* let out subplots for clearing, and supplied revenue to “*zamindars*”, who passed on a portion of their earnings to the Government. The Britishers conducted the first survey of the Sundarbans in between 1769 to 1773, took over rights to the area in 1828, and started leasing out land for further clearance in 1830. The rate of forest clearance then increased until the formulation of the Forest Act in 1855. At one stage, reclamation grants were suspended and the forest was leased to the Port Canning Company, but this decision was later revoked because the company treated the traditional forest users badly.

The first management plan for the Sundarbans, formulated in 1871, was designed to regulate harvesting of Sundari (*Heritiera fomes*). Some parts of the Sundarbans were declared as reserved forest in 1878 under the recommendation of Conservator of Forests in Burma and enactment of Forest Act of 1855. The boundary of the protected area has been subsequently re-plotted several times in response to an ever shrinking forest. The most comprehensive plan, in the early 1900s, delineated the Sundarbans into management units called compartments.

After gaining independence from the British rule in 1947, administration of the Sundarbans

was separated between India and East Pakistan. Bangladesh was subsequently created in 1971. A series of management plans subsequently evolved to update the harvesting strategies of an increasing number of forest products before and after Independence of India by Heining 1892; Lloyd 1904; Trafford 1911; Curtis 1933; Choudhury 1937; Roy Chaudhary 1948, Lahiri 1973 and the Field Directors subsequently.

The whole area in 24-Parganas District was declared first as protected forests following the efforts of Mr. A.L.Home, DCF, Dr. Schlich and Sir Richard Temple by a notification dated 7th December 1878 and the boundaries of the remaining protected forests were fixed by the notification No.4457-For dated 9th April 1926. The protected forests in the Basirhat Sub-Division of the District were constituted as Reserve Forests as per Govt. Notification No. 15340-For. dated 9th August, 1928. Due to fresh colonization in the Mahisani and Patibania islands a further exclusion was made from the above mentioned protected forests under notification Nos. 1024-For. dated the 20th August, 1935 and 5174-For. dated the 2nd May, 1939. The residual protected forests (Namkhana Range) were finally declared as Reserved Forests under notification No. 7737-For., dated the 29th May, 1943, with the result that the whole of the existing forests of the Division is now reserved. The Indian Forest Act 1927 prohibits or otherwise restricts the carrying of guns, cattle grazing, tree cutting, removal of forest produce, or land clearance. Within the reserved forest there are neither villages nor any agricultural land.

Owing to presence of considerable tiger population during the year 1973, eastern part of Sundarban having an area of 2585 sq km was declared as Sundarban Tiger Reserve (STR) by Government of India. This is the one out of nine Tiger Reserve first declared for

protection of Tiger. There is one sanctuary within the Tiger Reserve area viz., ‘Sajnekhali Wildlife Sanctuary’ covering an area of 362.335 sq km declared vide notification No.5396-For., dated 24.6.76. The ‘Sundarbans National Park’ within the tiger reserve covering an area of 1330.10 sq km was declared in 1984 vide Govt. Notification No. 2867-For, dated 4.5.1984. Considering the importance of this biogeographic region of this River Forests, the National Park area of STR had been included in the list of the World Heritage Sites in 1985 by UNESCO. The whole Sundarban region south of Dampier and Hodges Line including the protected area of Sundarban Tiger Reserve was declared as Biosphere Reserve on 29th March, 1989. Two Wildlife Sanctuaries namely Halliday Island (covering an area 5.95 sq km) and Lothian Island (comprising an area 38 sq km) was declared during the year 1976 and 1998 on the western part of Sundarbans (Pandit, 2014). The Working or Management Plans of the Sundarbans reflect the change in management objectives with the increase of population

dynamics in this area. Initially forests were thought to be an inexhaustible resource but gradually thought actually not to be so. With the gradual change in quality of the forest along with the steady decrease in area, led the conservationists to realize the conservation values of these mangrove forests and consecutive Working/Management Plans, Schemes put restriction and regulation on use of forest based resources.

The gradual changes in the observations, objectives and prescriptions of the previous Working/ Management Plans/ Schemes in respect of Sundarbans in brief are chronologically given in the following table (table-1).

After establishment of Sundarban Tiger Reserve (STR) in the year 1973, management of the tiger reserve area is done as per approved Management Plan or Annual Plan Operation of Field Director. Management of South 24 Pargana Division is done by as per approved Working Plan. Different Sanctuaries are managed by approved Management Plans.

Table-1: Different Working/ Management plan period with observations and recommendation

Sl. No.	Working/m anagement Plan Period	Working/ Management Plan written	Working/ Management Plan observations	Working/ Management Plan Prescriptions/ recommendation
1.	1863-1869	Dr. Brandis (Annon,1952)	i. Forests were considered as valuable resource for revenue generation.	i. The Port Canning Land Reclamation and Rehabilitation Private Company was given the lease to collected toll from 24 forest blocks from the forest produce.
2.	1871-1872	A. L. Home (Annon,1952)	i. Forests were found to be dense, impenetrable ii. Under growth primarily consists of <i>Cerriops</i> . iii. Each square mile of forest could produce 700 quintals of usable timber.	i. Government took over the lease of forest land in 1869 ii. Started collection of revenue from the forest produce.

Sl. No.	Working/management Plan Period	Working/Management Plan written	Working/ Management Plan observations	Working/ Management Plan Prescriptions/ recommendation
3.	1873-1874	Sir R. Temple & Dr. S. Schlich (Annon,1952)	<p>i. 40 different species of trees and herbs were found in the forest.</p> <p>ii. <i>Heritiera fomes</i> was the most economically valuable species which was confined to the North - Eastern corner and in the areas farthest from the sea.</p> <p>iii. Forests adjoining rivers got depleted</p> <p>iv. Due to unregulated felling no good quality forest was remained.</p>	<p>i. <i>Heritiera fomes</i> required protection</p> <p>ii. Forests were declared protected in 1878</p> <p>iii. A Forest Division was established for the protection & management of forest.</p>
4.	1893-1903	Heining (1893)	<p>i. Forests were depleted due to unregulated felling.</p> <p>ii. Most affected species was <i>Heritiera fomes</i></p> <p>iii. It was worst affected in the present Bangladesh areas due to relatively high population pressure.</p>	<p>i. The Annual Coupes were established in Bangladesh part of Sundarbans.</p> <p>ii. Felling girth limit of <i>Heritiera fomes</i> was restricted to > 90 cm for protection of younger one.</p>
5.	1903-1908	Lloyd's Working Scheme (Annon,1952)	<p>i. Forests were tremendously subjected under increased anthropogenic pressure</p> <p>ii. Stringent transportation rules and silviculture practices need to be implemented.</p>	<p>i. Rules were prescribed for felling of <i>Heritiera fomes</i>, <i>Sonneratia</i> spp. and <i>Xylocarpus mekongensis</i> in 24 Parganas District of present India.</p> <p>ii. Staff strength was increased for intensified patrolling & protection.</p>
6.	1906-1912	Farrington's Working Scheme (Annon,1952)	<p>i. Forests were found to be under increased anthropogenic pressure</p> <p>ii. Strong transportation rules and silvi-culture practices need to be implemented.</p>	<p>i. Felling girth for <i>Heritiera fomes</i> was raised to 105 cm</p> <p>ii. Impression of Government Hammer marks were prescribed prior to felling</p> <p>iii. Harvesting of <i>Amoora</i> sp, <i>Bruguiera</i> sp., <i>Heritiera fomes</i>, <i>Sonneratia</i> spp. and <i>Xylocarpus mekongensis</i> were strictly prohibited.</p> <p>iv. The rules to control the transport of forest produce was first introduced vide Notification No.- 2821-For, 8th November, 1906.</p>

Sl. No.	Working/m anagement Plan Period	Working/ Management Plan written	Working/ Management Plan observations	Working/ Management Plan Prescriptions/ recommendation
7.	1912-1932	Trafford's Working Plan (1912)	<p>i. It was felt that a single Management Practice cannot be applicable for the entire Sundarbans.</p> <p>ii. Based on salinity two circles as western with more salinity (Indian part) and eastern with less salinity having fresh water (Bangladesh part) inflow to be designated.</p>	<p>i. In the western circle (Indian part) the felling girth were restricted for <i>Amoora sp.</i> (60 cm), <i>Bruguiera sp.</i> (60 cm), <i>Heritiera fomes</i> (105 cm), <i>Sonneratia spp.</i> (120 cm) and <i>Xylocarpus mekongensis</i> (60 cm).</p> <p>ii. In both the circles five felling blocks were laid which to be worked on rotation for extraction of fuel wood.</p>
8.	1930-1959	Curtis, 1933	<p>i. The forest of Basirhat range was already declared as Reserve Forest by Government Notification for better scientific conservation.</p> <p>ii. The rest of Sundarbans located west of Matla river required stringent legal control against illegal felling.</p> <p>iii. The growth pattern of plant species was found to be zone specific.</p> <p>iv. The Forest Administration required decentralization and delegation of powers for better management over the area.</p>	<p>i. The forest in the west of Matla river was declared as Reserve Forest</p> <p>ii. 3 Working Circles were established.</p> <p>iii. The felling series were fixed based on species requirement, viz., 40 yrs for <i>Avicennia spp.</i> and 20 yrs for <i>Sonneratia spp.</i></p> <p>iv. The felling girth for different species were fixed based on the block in which they were situated</p> <p>v. To meet up the growing demand of fuel wood felling of <i>Ceriops tagal</i>, <i>C. decandra</i> and <i>Aegiceras majus</i> were allowed.</p>
9.	1937-1951	Chaudhuri, S. Working Scheme (Annon, 1952)	<p>i. Silviculture system of the forest had to be Block specific.</p>	<p>i. The forests were felled as per Selection cum Thinning Silviculture System.</p> <p>ii. The yield was fixed by area on a felling cycle of 20 years.</p> <p>iii. In Indian part only two felling series at Basirhat & Namkhana were created.</p> <p>iv. Collection of Fuel woods and leaves of <i>Nypa fruticans</i> were permitted.</p>

Sl. No.	Working/m anagement Plan Period	Working/ Management Plan written	Working/ Management Plan observations	Working/ Management Plan Prescriptions/ recommendation
10.	1949-1959	Roy Chowdhury Working Plan (The First Working Plan for 24 Parganas Forest Division, Southern Circle) (Annon,1952)	i. Forests were found to be poor stock & growth ii. Ongoing Silviculture system required to be change iii. Demand for quite a number of species had increased manifold. iv. Many blank areas were noticed in the natural forest areas.	i. The forests were worked under Selection cum Improvement Felling System. ii. Felling cycle was still 20 years iii. The area for felling was about 30,000 hectares, which was spread over five felling series. iv. The exploitable DBH were fixed at - <i>Avicennia spp.</i> (12.5 cm), <i>Bruguiera spp.</i> (15 cm), <i>Excoecaria agallocha</i> (10 cm), <i>Heritiera fomes</i> (7.5 cm), <i>Xylocarpus granatum</i> (12.5), <i>X. mekongensis</i> (15 cm) and <i>Sonneratia spp.</i> (23.5 - 45.5 cm). v. Artificial regeneration and stocking were recommended.
11.	1959-1973	Annual Working Schemes	i. Forests was under tremendous pressure leading to habitat degradation of tiger. ii. The problems accelerated due to Refugee Rehabilitation after partition of Sundarbans and two wars of 1965 and 1971.	i. The felling cycle continued to be of 20 years. ii. Natural regeneration was encouraged. iii. Revenue collection and transportation of timber was streamlined.
12.	1973-1979	1 st Management Plan Lahiri, R. K., (1973)	i. The loss of habitat of tigers was identified to be the most important leading to the destruction of the total ecosystem. ii. Holistic treatment approach towards the conservation of the ecosystem was identified as priority area.	i. Project Tiger was launched in 1973 in the eastern parts of Matla river in an area 2,585 sq km. ii. The principle objective was to preserve the habitat of the wildlife to achieve optimum level of population of tiger and its prey base along with other floral and faunal associations. iii. Digging of fresh water ponds started.

ACKNOWLEDGEMENT

I am thankful to N.C. Bahuguna, Principal Chief Conservator of Forests and Head of Forest Force, West Bengal and U.K. Bhattacharya,

Principal Chief Conservator of Forests, Wildlife and Chief Wildlife Warden, West Bengal for providing me facilities. Thanks are also due to P. Shukla, Additional Principal Chief

Conservator of Forests and Director Sundarban Biosphere Reserve and S. Dasgupta, Field Director, Sundarban Tiger Reserve for their constant encouragement.

REFERENCES

Annon, 1952. First Working Plan for the 24 Pargana Forest Division 1949-50 to 1958-59. Southern Annon, 1973. First Management Plan of Sundarban Tiger Reserve (1973-74 to 1978-79 by S.K. Lahiri). Annon, 2012. Annual Report of Sundarban Tiger Reserve, 2011-12.

Naskar, Kumudranjan (2007). *Medicinal Plants of Indian Sundarbans*. R.K.M. Ashrama, Narendrapur.

Pandit, P.K. (2013). Sundarbaner Badabaner Jibbaichitra in Bengali. In Bangiya Bhugol Mancha (eds) *Nadi Pahar O Amra*, pp- 96-104.

Pandit, P.K. 2014. *Biodiversity of Mangrove forests of Indian Sundarbans and its Management*. Accepted in a proceeding of on National Conference on Biodiversity NCG-2014 – Issues Concern and Future Strategies, 16-18 th January, Kolkata.

