

**INDIGENOUS KNOWLEDGE SYSTEM OF THE FISHERMEN OF  
SUNDARBANS IN WEST BENGAL AND THEIR APPROACHES TO  
HEALTH, SANITATION AND CLIMATE\***

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The project was undertaken with the basic fact that vitality of a scientific community springs from many sources. In Indian Science there is much to be concerned about biodiversity, ecosystems, indigenous flora and fauna which are available in unique geological and geographical contexts of which there is still a greater scope for research. In this context that the role of the indigenous knowledge or 'folk science' is considered vital and important and managing the integration of such knowledge into more formal scientific systems. The aim of the project is to document the indigenous knowledge system and practices of combating and containing tropical diseases of the people of Sunderban.

The Project was carried out under the following chapters:

- I. Historical Geography of Sunderbans
- II. Forest Ecosystem and Socio-economic History
- III. Livelihood pattern and the Folk religion and culture of Sunderbans
- IV. Plant resources, Medicine and Medical facilities available to the People
- V. Climatic disasters and Natural hazards
- VI. Conclusion

The Sunderbans is a varied and comprehensive unit with mangroves, swamps and elevated fertile lands. Working on the people's knowledge of Science becomes more important, in an area, which is very fragile ecologically and yet economically and scientifically very valuable. It lies in the marginal,

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last tip, of the delta in the South 24 Parganas district. During all new constructions in Jadavpur University, the archaic remains of the Sundari tree comes out after every digging. The life of the city of Kolkata, in fact, largely depends upon the life of the mangrove forests of the Sundarbans.

The Project Investigator started collecting data from field surveys in the area itself and also from the primary and secondary references. While working on the theme, it was found that many scholars have researched on some of the aspects of this world heritage site. Before referring to them, one would add that no comprehensive account is available from the context of linking people's history of the area with the history of scientific development. There is no proper approach to link, what the investigator call, the biocentric scientific knowledge with an anthropocentric one. An effort is made here to link and narrate this big history, which is biological, or, more to say, geological in nature, where the picture of man's appropriation with nature, has been increasingly dominated by the destruction of man by disasters of nature. The investigator have analysed to consolidate a picture of history of science, where social history is often underplayed in the terrain of a giant environment.

Moreover, many of the existing historiography deals with a history from above. An effort have been made to write a history of the people, in a collective sense, to emphasise the need for linking this historical knowledge with the scientific status of the area. Men had reclaimed forests, settled in the area from centuries beyond. Man had used the plant and animal resources for various purposes, and had been responsible for geographical changes, but that was only part of a long story. Behind this smaller stage, lies the bigger canopy of silent environmental changes, where man works like a super intelligent mammal, who is unable to control and dictate his environ. Scientists deal with the effects of cyclones, climate disasters like global warming and also with the problems of health and hygiene and most of the problems are not solved as yet. The Sundarbans, provide an arena, which is sometimes beyond the control of the reductionist scientific knowledge of scholars.

#### **Literature Survey**

W.W. Hunter's Statistical Account (1903-1904) and O'Malley's Gazetteers (1908) are important documents on the history of the Sundarbans.

Paul Greenough has criticised the colonialists reports as “intuitively assembled version” in his works on the downland and science in the Victorian Sundarbans. The works of A.K. Danda, Rathindranath De, etc. are worth mentioning. The Sundarban Mangals (ed.) by D.N. Guha Bakshi, Pranabes Sanyal, K.R. Naskar is a very good compilation. Anuradha Banerjee’s ‘Environment, Population and Human Settlements of the Sundarbans Delta’, Aparna Mandal’s, ‘Sundarbans – an Ecological History’, Annu Jalai’s ‘Forest of Tigers : People, Politics and Environment in the Sundarbans are important appendages of research. Sutapa Chatterjee Sarkar has done very good research on the Punthi Literature and the folk deities.

There are numerous books in Bengali like Debi Prasad Jana’s *Srikhanda Sundarban*, Sibsankar Mitra’s *Sundarban Samagra*, Abdul Jalil’s work, which give information on several aspects which have been cited in references and bibliography. One cannot end the literature survey without a mention of Amitav Ghosh’s novel *The Hungry Tide*, where we get a picturesque account of man-animal-nature relationship in the Sundarbans. The investigator have been immensely benefitted from the aforesaid books. It is very difficult to write about the people in general, the main reason being lack of information. Matters get worse, if one thinks about writing the history of the people of an area, which is mostly covered by the uninhabitable thicket of mangrove swamps, separating the expanding Indian population from the Bay of Bengal. However, since 1980s’, an eminent anthropologist like Bernard S. Cohn tried to locate history through anthropology. Scholars like Ranajit Guha, Partha Chatterjee, Dipesh Chakraborty, Dhruv Raina, Gayatri Chakrabarty and other are giving the idea of ‘a history from below’, with notions of deconstruction or re-reading of the existing sources.

The present effort is a humble following of that alternative way of history writing. The first chapter on historical geography of the Sundarbans gives some idea of the land, the flora and fauna, where the knowledge system was gradually developing. The second chapter is on the forest eco-systems and very brief socio-economic history. An example of a small field survey is also cited. The third chapter deals with the livelihood patterns and the folk religion and culture of the Sundarbans and analyses the extent to which the knowledge systems of the people are culture-specific. The fourth chapter is written directly on the plant resources, medicine, and medical

facilities available to the people. The fifth chapter deals with climatic disasters and natural hazards. The final chapter is a record of the environmental history, with reference to all the aforesaid issues. The conclusions suggest a conflict resolution.

### **Discussion & Findings**

Apart from its high biodiversity value, the Sundarbans contain several hundred different kinds of plant species, several species of fishes; it is a major habitat of shrimps, and a major pathway from induction cycling and pollution reduction. This region is the largest mangrove reserve on the globe and contains more than 60% of India's total mangrove reserves. The mangroves exhibit a great diversity of rare and highly endangered flora and fauna, and act as a nursery for a number of fishes which form the base food chain for the entire coastal fishing zone of eastern India. The mangroves also protect the metropolis of Calcutta and the Suburbs from the frequent gales originating from the Bay of Bengal. Geologically, the tract of the Sundarbans is not very old. It is of recent origin, raised by the deposition of sediments formed due to soil erosion in the Himalayas. The process has been accelerated by tides from the sea face. The Substratum consists mainly of Quaternary Era sediments, sand and silt mixed with marine salt deposits and clay. Geologists have detected a southeastern slope and tilting of the Bengal basin during the tertiary era. Due to the neo-tectonic movements in the 10<sup>th</sup> –12<sup>th</sup> centuries AD, the Bengal Basin tilted eastward. Evidence from borehole studies indicate that while the western side of the Sundarbans is relatively stable, the south eastern corner is an active sedimentary area and is subsiding. The eco-geography of this area is totally dependent on the tidal effects. There are two flow tides (inflow) and two ebb tides (outflow) within 24 hours and tidal range varies from 3 m to 5 m rising upto 8 m in normal spring tide. The tidal action of the sea inundates the whole of Sundarbans in varying depths. Due to the tidal action, the silts carried down to the sea are pushed back to the channels and get deposited there. The bed of the channel thus gets steadily raised, thereby blocking the flow of water and gradually evolving a small island. This is the basic geographical history about the origin of innumerable islands of the region. Soils of the Sundarbans region are subjected to the effects of salinity and waterlogging, which naturally affect the vegetation. In places, soils are semi-solid and poorly consolidated.

The PH ranges vary widely from 5.3 to 8.0. Although the Sundarbans soil is in general, medium textured, sandy loam, silk loam or clay loam, the grain size distribution is highly variable. Silt loam is the dominant textural class. Sodium and calcium contents of the soil vary from 5.7 to 29.8 meq/100 g. dry soil and are generally low in the eastern region and higher towards the west. The available potassium content of the soil is low, 0.3 – 1.3 meq/100 g. dry soil. Organic matter content varies between 4% and 10% in dry soil. Soil salinity increases from east to west but the salinity is not uniform from north to south throughout the forest. The salinity of this swampy and marshy soil, also known as ‘mangrove soil’, changes throughout the year and is governed mainly by the quantity of the fresh water flow and the monsoon rainfall. In the report it has been shown how the people have acclimatized themselves with the climate and soil which determine their livelihood patterns including medication sanitation and perception of public health in general.

Many researches have been undertaken on the vegetation of the Sunderbans. Eminent botanists have written in detail on the mangrove forests of the area. About the plant biodiversity of the Sundarbans, it can be said that the area encompasses a variety of plants including trees, shrubs, grasses, epiphytes, and lianas. They are mostly evergreen, and possess more or less similar physiological and structural adaptations. Most trees have pneumatophores for aerial respiration. Out of the fifty mangrove species of the world, around thirty-five are found in the Sundarbans in addition to 117 other halophytic mangrove associates. The prominent species are Sundari (*Heritiera fomes*), Gewa (*Excoecaria agallocha*), Goran (*Ceriops decandra*), Keora (*Sonneratia apetala*), Passur (*Xylocarpus mekonongensis*), Dhundul (*X-granatum*). Bain (*Avicennia alba*, *A. marina*, *A. Officinales*), Hental (*Phoenix Pelludosa*) etc. The ‘Golpata’ or Nipa Palm (*Nipa fruticans*) are available by the side of almost all the canals. The Sundarbans show some distinct phyto-successions, where the newly formed lands are occupied by some pioneer species called *dhāni ghās* or wild rice (*Leersia hexandra*, or potresia species) followed by *Avicennia*, *Sonneratia* and *Aegiceras*. The secondary succession occurs due to *Ceriops*, *Exoecaria Bruguiera*, *Heritiera*, *Xylocarpus* and *Rhizophora*, Tiger fern (*Achrostichum aureum*) covers the ground floor and tigers use these bushes to camouflage themselves. Apart from the aforesaid plant species available in the mangrove forest areas, the settlement areas, around the forests are dominated by salt-loving plants like

numerous algal flora, bushes of *Phragmites Vallatoria*, *Aegiceras majus*, *Typha elephantina* etc. The vegetation of swamps and dry habitated lands are mostly dominated by oligohaline and mesohaline shrubby species and several halophytic trees, along with bushes and filamentous algae like *Enteromorpha intestinalis*, *E-Prolifera* etc. In course of time, many saline water bodies have been changed to sewage-fed fisheries and this has resulted in the changing of the aquatic vegetation. Some portions area of this settlement area also utilized for paddy cultivation and garbage farming. Cultivable lands are protected by embankments, and are also mapped in the government records as Orchards and paddy fields. No account of the Sundarbans is complete without a record of the innumerable faunal diversity of the area. In 1938, Radhakamal Mukherjee, the eminent geographer has noted – “From the fifteenth century, man has carried out the work of reclamation here fighting with the jungle, the tiger, the wild buffalo, the pig and the crocodile. Until at the present day, nearly half of what was formerly an impenetrable forest has been converted into gardens of graceful palm and fields of waving rice.” The most important animal of the region is obviously the Royal Bengal Tiger. It is at the apex of the hierarchy of terrestrial as well as aquatic animals and its prey includes pig, deer, monkey, water monitor, bird, crab, and fish. Francois Bernier, who traveled in the Sundarbans in 1665-66, wrote in details about the tigers – “Among these islands, it is in many places dangerous to land and great care must be had that the boat, which during the night is fastened to a tree, be kept at same distance from the shore, for it constantly happens that some person or another falls prey to tigers. These ferocious animals are very apt, it is said, to enter into the boat itself while the people are asleep, and to carry away some victim, who, if we are to believe the boatmen of the country, generally happens to be the stoutest and fattest of the party.” The aforesaid remarks prove that the Sundarbans has been famous for many centuries for its wildlife, especially the man-eating tiger. This amphibian, Bengal tiger (*Panthera Tigris*) received the name ‘Royal’ from the incident, when a tiger was shot by the Duke of Windsor when he was the Prince of Wales. O’Malley, the well-known British Gazetteer has also narrated the story of tigers thus – “In their markings these animals vary greatly. The young tigers are handsomer than the old ones; their colouring is more vivid and the stripes darker and closer together.” It may be mentioned here that for several reasons, most of the Sundarban tigers are supposed to be maneaters.

About climate, it can be said that the region has a typical tropical monsoon climate with excess of humidity. Since the forest is located on the south of the tropic of Cancer and bounded by the northern limits of the Bay of Bengal, it is classified as tropical moist forest. The average annual maximum and minimum temperatures vary between 30<sup>o</sup> and 21<sup>o</sup> Celsius. High temperatures occur from mid-March to mid-June and low in December and January. Annual average rainfall is around 1800 mm. but the area is known for violent thunderstorms and accompanying hailstorms, with high waves and tides near the sea, in the pre-monsoon and post-monsoon years. As far as the people of the Sundarbans are concerned, the people are used to many kinds of medical treatments. The present author tries to expose their proximity with those kinds of herbalists, who are available in the surroundings, with a kind of folk medicine, made out of the plant resources. The concepts of diagnosis, prognosis, etiology, materia medica and therapies have regional colloquial terminology in the context of regional variations. Diagnosis of any disease begins with thorough interrogation of patients by medical men, who were often known as *pirs* or *ojhas*. Pulse (*nāḍī*) examination is usually taught and learnt through oral tradition. For healing in a snake bite, a healer often takes a sharp pin, and goes on pricking the affected limb. He gives the patient neem leaves to chew. He diagnoses the extent to which the venom has spread in the body, where the pin prick or the taste of neem are not felt by the patient. He also observes the bite mark, colour of blood, victim's general conditions like respiration and responses. Imposition of strict diet and regimen is a common phenomenon. Mostly, the tradition flows in families for generations. The secrecy of the healing art is guarded safely, which is considered to be God's Gift. Herbalists, who serve the poor maintain a kind of professional ethics. The services are either free or with nominal or token fees. Cuts, burns, insect bites are treated instantly through first-aid measures. Promotion of positive health is sought through tonic herbs. Cosmetic care is also rendered through herbal remedies.

A few examples of such remedies are cited here. Honey, which is collected from the Sundarbans, is extensively used as a panacea for many diseases. 1. Honey to increase memory and vigour. 2. For cough and cold etc. 3. Thorn Prick – application of old tamarind fruit pulp or water of keora fruit. 4. High fever—*Bantulsi* leaves with warm water. 5. Fracture- *Harguza* leaves, *haldi* and lime. These are only few examples. The detailed information have been cited in full report.

The unlettered massers show an unconditional respect for these wise people who had a practical knowledge of the place, the climate, the disease and medicine. All of these priests cannot be ignored to be mere frauds. Unfortunately the science of herpetology or toxicology has not taken this indigenous knowledge system, into proper consideration. The people of the Sundarbans, in general have a deeper knowledge of the plants and animals of their country. The priests know as much of the tigers and snakes, as ancient hunters knew about antelopes. But neither were zoologists, and their knowledge could not be described as science. It has to be organised and arranged into a system. For, Science is systematized knowledge.

The Sundarbans were originally measured (about 200 years ago) to be of about 16,700 sq.km. Today, the area has been reduced and comprises approximately, 10,000 sq.km. of mangrove forests in 102 islands, with about 400 interconnected tidal rivers, creeks and canals. After the Partition of India, Bangladesh received about 2/3<sup>rd</sup> of the forest; the rest is on Indian side. The Bangla word '*ban*' means forest, and the name Sundarban was coined either from the forests of *Sundari* tree, i.e. *Sundari ban*, or from the forests of the *samudra* (sea) i.e. *Sumudraban*, or from its association with the primitive tribe '*Chandra*', which was corrupted into the term Sundarban.<sup>2</sup> The generally accepted explanation however is its derivation from the Sundari tree, the most common tree in these forests. Whatever in the name, the Sundarbans were declared an International Biosphere Reserve in the year 2001 by UNESCO. It is the only remaining tiger land of the globe where the Royal Bengal Tiger occupies the pinnacle of both aquatic and terrestrial food webs. The Sundarban Tiger Reserve in Indian Sundarbans is one of the pioneer Tiger Reserves in India under Project Tiger, launched in the year 1973. It has the distinction of being a 'World Heritage Site' (Sundarban National Park).

It is the world's largest delta and is known for its mangrove wealth, its Royal Bengal Tiger, and it is a home of great biodiversity. This historic basin forms the southernmost part of the Gangetic delta, extending along the surface of the Bay of Bengal from the river Hooghly on the west to the river Meghna on the east, covering the districts of the 24 Parganas, in West Bengal and Khulna and Bakarganj, in present Bangladesh. It is indeed difficult to write a history of the people of the Sundarbans. Right from the early days

of the civilization, this area was an unrecorded terrain, only occasionally mentioned in contemporary records. The locale can be perceived in a geocentric or biometric way, and much lesser in an anthropocentric level. Yet there were people's habitats, there were indigenous traditions, and valuable knowledge systems necessary for the survival of men.

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