Chapter Six

WATER RESOURCES IN THE SUNDARBANS: MANAGEMENT AND UTILIZATION IN THE COLONIAL PERIOD

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6 WATER RESOURCES IN THE
SUNDARBANS: MANAGEMENT AND
UTILIZATION IN THE COLONIAL PERIOD

“From end to end it is a very network of waterways, innumerable tributaries linking the main stream, broad khals that in a land where nature is in less expansive mood would themselves be dignified with the name of rivers, or tiny narrow creeks, overhung with trees, from which at low tide the water completely disappears”.

The Sunderbans
Calcutta Review, July 1917
F.B Bradley-Birt

6.1 Introduction: Early references to the rivers of Sundarbans

The Bengal Delta represents a perfect example of a dynamic fresh-water eco-system. This is characterized by lentic or standing water (such as lakes and ponds), lotic or running water (such as rivers and streams) and wetlands (that include marshes and swamp forests).1 Old records refer to lower Bengal as a land of hundreds of rivers and rivulets. Innumerable silt-laden rivers,
rivulets and creeks cover the entire area and have various grades of currents flowing through their waters.² As W.W Hunter wrote, “The Sundarbans may therefore be described as a tangled region of estuaries, rivers, and watercourses enclosing a vast number of islands of various shapes and sizes” and “the whole country is one network of rivers and watercourses”.³ Indeed, from end to end it is a very network of waterways and innumerable tributaries linking the main streams and broad khals.⁴

Pargiter writing in 1879 noted that the Sundarbans stretch from the Hoogly on the west to the Meghna, the estuary of the Ganges and Brahmaputra on the east, and comprise the southern portions of the present districts of the 24-Parganas, Khulna and Bakargang.⁵ Rennel’s map, prepared in 1779, still forms the basis for studies on the river systems of this area. Most of the rivers, which generally flow from the north to south, are influenced by tides from the Bay of Bengal. The channels connecting these rivers generally flow east or west.⁶ The estuaries or rivers are old beds of the Ganges, which has gradually tended eastwards, forming new channels and
these old beds would long since have silted up but for tidal action. In his writings, the Greek traveller Ptolemy (150 AD) refers to five separate estuaries of the river Ganges. His observation corresponds very closely to the geological features evident today. The main estuaries from west to east are the Hugli, the Saptamukhi, the Thakuran, the Matla, the Bidya, the Ajmalmati, the Bidyadhari, the Gosabsa, the Kalindi and the Raimangal. These rivers, apart from the Hugli, have no connection with head water channel of the upland river system. Apart from the main estuaries there are innumerable side-channels known as khals, some of which (barani khal) lead from estuary to estuary and others (mara khals) gradually branch into smaller channels until they disappear in the forest. Many of the smaller khals have their origin in depressions of varying size known as bhils, which as a rule are not well stocked tree growth. The khals are kept open by the action of the spring tides which at high water cover the whole country to a depth of a foot or more and in receding scour out the channels to silt up. During the dry season the influence of the tides is felt far up the channels, but in rainy season tidal action is nullified by constant stream of fresh water.
seawards. The natural drainage of the Sundarbans is by means of the little creeks which intersect the land and by which the water finds its way into the surrounding rivers during ebb tide.

Pargiter in his writings have noted that the water throughout the Sundarbans “is necessarily very dirty, being full of the mud and impurities brought down from up-country”. In the middle and eastern portions, where the rivers ensure a constant out-flow to the sea, the waters are comparatively wholesome, but in the west where there is no strong current and the tide alone flows in and out, “objectionable matter is washed up and down for sometime before it finds its way into the sea”. He further states that within the blocks of land, wholesome fresh water can scarcely be had anywhere, and even when ordinary fresh water is not obtainable, the people use water that is slightly brackish without apparently any “deleterious consequences”. He presumes that the wild animals “must, of course, drink water more or less salt for it is seldom they can get access to a tank of fresh water”.¹⁹
Regarding the natural drainage pattern of Sundarbans:

Pargiter writing in Calcutta Review in 1889 wrote,

“Between these large estuaries and rivers are innumerable streams and water courses, called khals, forming a perfect network of channels, and ending ultimately in little channels that serve to draw off the water from each block of land. For each block is formed like a saucer, with high ground along the bank of the khals surrounding it, and with one or more depressions in the middle according to the size of the block. The water collects in the depressions, and is drained off by the little khal into the larger khals, and ultimately into the rivers; conversely when water swells in the rivers, it floods the country through the same courses. Many of the khals connect two larger ones, and consequently the tide flows into them through both ends; such khals are called do-aniya khals in the 24 Parganas and Khulna, and bharanis in Bakarganj. They are very useful as affording communication between the larger khals, but have one serious defect, that they are liable to silt up at the point where the two tides meet, for the water is always still there.”
6.2 Ecology impacting History: Eastward shift of the river Ganges

Deltaic environments are so dynamic that natural processes of growth, ecological succession and decline can be observed within an historical time frame. Progradation and aggradation in one area are accompanied by recession and subsidence in others. Changes in surface drainage, salinity gradients and landforms trigger continuous eco-systemic adjustments, which feed back in turn upon physical processes. Infact, stream channel patterns, coastal land forms and vegetation complexes are all continuously changing.\(^{12}\) Infact a study of maps and charts makes it evident that the rivers have been constantly changing their courses in this region. A comparison of Rennell’s Atlas of 1779 with Morrieson’s map of 1811 makes this clear.

In the middle of the 19\(^{th}\) c, the Bengal Delta consisted of approximately 28,080 sq miles of superficial area, or double the area of the Delta of Nile. Measuring from West to East, or from the right bank of the Hooghly River to the plain
lands of Chittagong, it was about 326 miles from the sea by its longest channel and spread inland with an average breadth of 220 miles. It consisted of 3 delta heads formed by 3 major rivers of the Himalayan ranges - the Ganges, the Meghna and the Brahmaputra. These rivers, as they lose their precipitous speed after entering the plain of Bengal, begin to deposit silt brought down from upcountry until they finally carry it to the sea. At the same time, the ocean currents also found themselves impeded by the heavy outflow from the rivers, and in their turn dropped down the burden of sand. Thus a double-process of land making went on due to the confrontation of silt-laden rivers and sand carrying sea water. Maps of the region drawn in 1548 AD by Gastaldi, 1615 AD by de Barros, 1660 AD by Van den Broecke and 1779 AD by James Rennel, including those drawn throughout the colonial period, testify to this continuous process of land formation.13
Beginning in the 16th or 17th c there was a gradual eastward movement of the Ganges from the Hooghly-Bhairathi channels to follow the bed of a smaller river, the Padma. Contemporary European maps show this shift when the great Ganges river system, abandoning its former channels in western and southern Bengal, linked up with the Padma, enabling its main course to flow directly into the heart of the east. With the main waters of the Ganges now pouring through the channel
of the Padma river, the combined Ganges-Padma system linked eastern Bengal with north India at the very moment of Bengal’s political integration with the Mughal Empire.\textsuperscript{14} The main body of Ganges silt, now carried directly into the east, was deposited an ever greater area of the eastern delta during annual flooding. This permitted an intensification of cultivation along the larger rivers where rice culture had already been established, and an extension of cultivation into those parts of the interior not yet brought under the plough. As a result East Bengal attained agricultural and demographic growth at levels no longer possible in the western delta.. Hence the regions in the west which received diminishing levels of fresh water and silt, gradually became moribund and stagnant.\textsuperscript{15}

There are many theories behind this shift and we may consider two most important ones.

- Many think that due to the gradual rise of the northwestern part of the Delta and subsidence of Bengal basin, there was a gradual eastward tilting of its overlying crust. This separated the ancient branches of the river Ganges from the area which
today comprises the Indian Sundarbans.\(^{16}\)

- According to another theory, put forward by Prestage Franklin in 1861, the Brahmaputra and other large rivers to the east rose and fell about a month sooner than the Ganges proper and the result was that when the floods in the Ganges proper were at their highest, the water in the Brahmaputra began to fall. This gave a natural vent for the Ganges to the south-east, while all overflows to the south west were gorged. This eastward shift of the Ganges ended when it met the river Brahmaputra near Dhaka in the early 19\(^{th}\) c.

This shift of the Ganges meant a severe blow to the once very flourishing region of the North-Western Delta through which the river had flowed earlier.\(^{17}\) The Delta as a whole experienced a gradual eastward movement of civilization as pioneers in the more ecologically active regions cut virgin forests, thereby throwing open a widening zone for field agriculture.\(^{18}\) The rivers of the western Sundarbans, in comparison to those of the eastern portion, carry much less fresh water and silt and consequently draw in more sea water. The rivers in this area are
like ingressions from the sea, rather than fresh water rivers. Here salinity is high and has strong influence on the forest complex and fauna in this area.\textsuperscript{19} This 16\textsuperscript{th} c phenomena represents a classic example of how certain ecological event can have an impact on the history and development of the affected region.
6.3 Colonial Water Resource Management and Utilization

“the Europeans were the first to develop the resources of Soonderbuns, and to shew the way in which they were to be developed. To them, the natives are indebted for the extensive system of embankments, the introduction of sluices, and the plan of drainage at present in use.”

*The Soonderbuns- Their Commercial Importance*

*Calcutta Review, 1858*

Fresh water inflows provide domestic, agricultural and industrial water supplies to districts surrounding the Sundarbans. They also convey sediments and nutrients which create a foundation for vegetation growth and estuarine species. Tidal processes contribute to the navigability of coastal channels and to forest and fisheries production. They also maintain the dynamic ecological processes of estuarine sedimentation, nutrient mixing, flooding, salinity gradient and mangrove forest growth. Thus, in a very real sense, rivers and tides created the lands on which revenue systems and government policies have been based.

Building on the foundation of medieval land revenue
administration, the British undertook elaborate experiments in land and water development. Of particular concern here is how land laws affected water management.20

One must understand that flooding, drainage, erosion and access were primarily addressed through colonial land law, in which water was an incident of land ownership and control. The British adapted regional land use systems to suit their own purposes, but they also introduced English common law (including the riparian doctrine) to handle some of the land and water problems that arose. Infact common law ownership of riparian lands and water is particularly relevant to the Sundarbans and its surroundings.21

The colonial government did not recognize common property as such, but it did allow for several types of land and water ownership that verge on “common situations”. The first were “government estates”, which were owned by government and often leased out. Also there were special (diara) settlement rules and temporary leasing provisions for river flats,
islands and government alluvial lands. One must understand that during colonial period water was considered an adjunct of the land and riparian rights to river flows were not an issue during the colonial period. Hence under the common law, riparian land owners were entitled to flows undiminished in quantity or quality, subject to unlimited domestic use in upstream reaches.  

Ascoli writing his “A Revenue History of the Sundarbans from 1870-1920” pointed out “…..it is merely the fact that revenue is more concerned with land than with water that has tended in this book to hide the importance of rivers.”  

Ascoli’s 1921 revenue history offers an explanation for the neglect of water resources in the colonial administration of mangrove forests in the Sundarban area of the Bengal delta. Because revenues were based on “land”, i.e., spatially delimited areas of economic access and control, water was regarded as just one of many resources attached to the land. Revenues were actually derived from commodities that labourers produced, like timber, food, fish, and fiber. But revenue collection was organized
through systems of entitlement to land. From the 18th century onwards, the Sundarbans have been regarded as a certain type of land—wasteland or forest land managed by government. Although there have been gaps between government policy and actual practice, government has been officially responsible for developing, disposing of and protecting Sundarban resources.

Hunter’s account of the Sundarbans, regarded as one of the most reliable sources on Sundarbans, provides ample information on river traffic, riverside trading villages and fisheries.

- Regarding **river traffic** he writes that nearly all the traffic from the eastern districts to Calcutta is carried on by boat routes through the Sundarbans. Two routes are commonly followed, one known as the inner passage and the other as the outer passage. There is also a steamer route through the Sundarban rivers, which is followed by the river steamers to and from Calcutta and Dacca and the Assam tea districts. Infact, the waterways were the only means of communication with outside places.
• As to the markets, Hunter tells us that there are no river-side towns in the Sundarbans, but several river-side trading villages are situated on the border between the settled Districts to the north and the Sundarban on the south. Periodical markets are regularly held at these villages to which the cultivators bring their rice for sale, and where they purchase in return their little home stores and necessaries. These river-side trading villages were Basra and Basantpur on the northern boundary of the 24 Parganas and Chandkhali, Morrelganj and Khulna near the Jessore Sundarbans.28

• The right to fish, according to W.W. Hunter, in the navigable channels of the Sundarbans was public, and no revenue for it was collected on behalf of the Government.29 Besides, the rivers and khals abound with fish of all kinds and support a large fishing population. There was once a fishery and fish drying business near the mouth of the Meghna, but it was given up many years ago.30 The varieties of fish most commonly found in the Sundarbans include bhetki, bain, kai,
bhola, saul, banspata, magur, kain magur, parisa, tengra, pangas selanda, bhagan, chingri or prawn, mocha or cray-fish, chuna, ilsa or hilsa, chitra, gangtora, paira chanda, med, gagra, singi and puti.\textsuperscript{31} In the year 1860 the Sundarban rivers and khals were divided into blocks and farmed out by public auction; and government derived a considerable revenue from the farms till the question of the public right of fishery was raised.\textsuperscript{32} Indeed in 1866, Hunter notes, government put up to auction the rights of the fisheries in all the Sundarban rivers, but liable at anytime to resumption after six months previous notice. The Port Canning Company purchased the fishing rights, but they were withdrawn in October 1868 in consequence of the claims of the Company being disputed by fishermen and others who had prescriptive rights. It was then finally decided that the government had not the right to farm out the fisheries in tidal waters to private persons.\textsuperscript{33} Thus, after some discussion the government gave up the fisheries in 1867. Sundarban grantees, however, farmed out the fisheries within their estates. The Commissioner of the Sundarbans instances the case of one grant of about 2335 acres, of which 770
acres were leased out as fisheries; and also mentions another case in which a grantee realized 90 pounds a year from the fisheries on his estate. Hunter even quoted from Westland’s District Account of Jessore- “the trade is plied in all the northern rivers of the Sundarbans, and also in some of the more remote ones within the forest tract. On muddy banks of tidal rivers, little branching twigs are placed to attract prawns, which cluster about the twigs in great numbers and are easily caught.” Thus he describes in details the mode of fishing. Hunter also complains that the Commissioner had stated that “he has no means of ascertaining what proportion of the Sundarban population live by fishing, boating or other industries.” However, all the poorer classes employ themselves in fishing and as boatmen or woodcutters, as a subsidiary means of livelihood in addition to the tilling of the fields, and have no other occupation than agriculture. Hence, the right to fish in the watercourses of the Sundarbans was in the realm of the common pool and no revenue for it was collected on behalf of the Government.
Traditionally fish were harvested from estuaries, rivers, khals (creeks), and bils (marshlands) at no cost except the traditional home spun nets and boats of fishers. Some seventy species of fish were commonly available and fishing was an important home industry. Traditional fishers were aware of the spawning seasons of different species of fish and the catching of these types of fish during such months was prohibited. The traditional fishers of Sundarbans delta knew from childhood when the different species were not to be caught. If such fish entered the nets, the practice was to release them. The use of otters to catch fish for instance represents one of these non-intrusive methods of fish catch, which was practiced by specialized fisher folk. (Hunter noted in his gazetteer “Sometimes otters are tied by a rope to the boat, and trained to plunge about on the sides of the net, so as to frighten fish into it”, pg 19). The indigenous techniques of fishing also were perhaps the least technologically intrusive economic activity in the Sundarbans. 37
6.4 Embankments

Embankments are crucial for the existence of human settlements on the deltaic islands. Infact embankment of water inlets is another vital feature in the reclamation and cultivation of Sundarban lands. Hunter in his Statistical Account has explained in details the utility of these structures for a land dominated by saline water.

“ It is a characteristic of deltaic formations, that the banks of the rivers are higher than the lands farther removed from them; and the whole of Sundarbans may be looked on as an aggregation of basins, where the higher level of the sides prevents the water coming in to overflow the interior. Many of these basins are so formed, that, left to themselves, they would remain under flood, as they communicate with the surrounding channels by means of khals, or small water courses, which penetrate the banks; and great part of reclamation work consists in keeping out the water, and thus bringing under cultivation the marsh land inside…..In employing this method, all the inlets from the channels surrounding are embanked, and smaller channels called poyans
are opened round their ends. The inlets themselves are too big to be kept under control, but these poyans can easily be so kept. This embanking is usually done in November, after the rivers have gone down. When the tide is low, the channels are opened, and the water from the inside drains off; when it is high, the channels are closed. Much land can be rendered culturable by this means, which would otherwise be marsh.”

Statistical Account of Sundarbans

W.W.Hunter; pg 54

Breaches in embankments force change in livelihood pattern from land based to water based, which has significant bearing on the health of the eco-system. 38 These embankments were the chief means of communication during colonial times. 39 The British hastened the process of reclamation in the Sundarbans; land was being claimed from the tides and forests before normal delta building process could proceed. In this natural process, sometimes a silting up of the interlocking creeks, form islands. Eventually, the islands are connected by filling up of
the intervening channel, and raised permanently above the high-water level. During the 19th c and thereafter land was reclaimed at the limit of the low water level by building embankments. The silt that would have been deposited on the islands, thus raising their levels, was now deposited in the creeks, raising their levels instead. Overtime, the creek beds rose higher than the low lying reclaimed areas, turning those areas into vast stretches of permanent marshes. To prevent reclaimed land from turning into marshes embankments were erected. During reclamation a line was cut through the forest along the banks of the streams surrounding the lot, and the embankment thrown up along the line; and that strong dams were constructed across the mouths of the smaller streams which run into the blocks in order to keep the salt water out.

The presence of embankments seals off the possibility of these tracts ever naturally maturing into lands habitable by humans. This is the basic contradiction in the Sundarbans, an inherent incompatibility between the normal geomorphic process and human settlements in the delta. This
incompatibility is characterized as “death-struggle” between freshwater and salt water.\textsuperscript{42} O’ Malley writing in 1914 pointed out that for making human habitation possible on the islands, first, land had to be embanked along streams in order to keep salt water out.\textsuperscript{43} The embankments built during the colonial period were very weak due to unscientific building methods (with out adequate width, compaction and free board) and unsuitability of soil characteristics for construction and maintenance of such structures required regular maintenance. Alignment of the embankments were also defective.\textsuperscript{44} Here again the information provided by Hunter is crucial.

“\textit{a single year’ s neglect may take away at one stroke all that has been gained by many years labour. The effects of the rains and the freshes of each year is to partially destroy all the embankments that were used the previous year, and to flood the lands. The rice that has been sown has , however, attained sufficient hardihood to remain uninjured……But unless the embankments are again renewed in November, the floods will not
have ceased to cover the low lands by sowing time, the land will remain unsown, and jungle and marshy reed will take the place of the paddy”.

Statistical Account of Sundarbans
W.W. Hunter, pg55

These embankments has the effect of confining the rising tides within the river channels, and preventing it expending itself in lateral overflow. Prior to 1765, the embankments were the responsibility of zamindars. Government began to make repairs in 1785 and then assigned responsibility for them to the Salt Agents. Finally, in 1803, an Embankment Commission was established to co-ordinate private and collective actions. But the primary responsibility in maintaining these structures remained with the zamindars and were often neglected.
6.5 Port Canning

The decision to establish an alternative port located in the adjacent banks of the mangrove swamps was part of a long-term concern of the imperial administration. The plan was to develop a subsidiary port to complement the one in Calcutta. As early as 1853, the Bengal Chamber of Commerce drew the attention of the government to the difficulty and dangerous state of navigation on the Hooghly river rendering access to the port impracticable for vessels of even the smallest tonnage. Immediately after the 1857 revolt, the British authorities turned their attention to develop a new port to the east of the city in the 24 Parganas part of the Sundarbans.\(^46\)

As discussions were going on for the new project, it was soon decided that the railway project would have an advantage over a canal route.\(^47\)

- A section of British officials felt that bulky articles like rice, oilseed etc. for which freight proved expensive, would be cheaper if shipped from the Matla than from Calcutta.\(^48\)
• Besides, the river was sufficiently deep close to the banks; as a result the vessels would be able to receive and discharge cargo along the wharves, which would reduce shipping and landing charges. Therefore, Matla appeared to be a fine open river port, much suited to the growing commerce of the city. 49

• It was thought that with railway and better road communication, the trade in Calcutta would flourish. With moderate port charges there was nothing to prevent the Matla from becoming an important seat of rice trade. 50

• Also, salt would find a market in this region. This would stimulate the trade in the new port.

Soon a team was sent with Lieutenant Ward to survey the river in 1853. Messrs A.R. Young, H. Yule and Robertson wrote to the Secretary of Bengal that Lot No. 50, situated at the junction of the rivers Bidyadhari and Matla, was a suitable site for developing into a port town. 51 Soon the government passed orders to have Lot 54 cleared and conduct all operations there. 52 The expenditure for the clearance of the Matla lots during 1860-63 was made from a fund called the
‘Mutla Town Improvement Fund’. For Rs 11000 about 8260 acres were bought for the purpose of constructing a ship canal and railway to connect that river with the Hooghly. At that time the lot was only partially cleared along the river frontage; and this portion was surveyed for 6 miles, and marked out into roads and “lots” for the construction of the new town and port in 1855 and a site was also chosen for the railway station. Measures were also taken at once to clear the remainder of the lot and people it with raiyats. This was a tedious and expensive undertaking, and seems to have occupied about 7 years. The establishment of the port was begun about 1858 and it was named Port Canning, in honour of the then Viceroy.

In 1863 the government’s proprietary right on the land was made over to the municipality in trust for the town of Canning, subject to the control of the government as to the manner in which the lands were to be disposed of for the benefit of the said town and port. The balance of the Matla funds on 1 January 1863 was made over to the Commissioners,
and the work in progress under the Public Works Department, in connection with the city, was also transferred to them. In connection with the Port Canning scheme, a company was started called the Port Canning Land Investment, Reclamation and Dock Company Limited, for the purpose of purchasing and reclaiming the wastelands bordering on the river Matla.\textsuperscript{56} The company also floated shares for raising funds which rose in value at an unprecedented rate. It was soon found, however, that the genuine expectations of projectors and speculators were not likely to be realized and the shares fell as rapidly as they had risen. Following dissensions between the directors and the shareholders, the management of the company was transferred to other hands.\textsuperscript{56} A dispute also took place between the company and the municipality. In 1870, the Secretary of the company addressed the government urging it to redeem the debentures the municipality had failed to meet. The government of India, in reply, declined to shoulder any obligation, and refused to provide the Municipal Commissioner with funds to repay their debt. The receipts and disbursements of the municipality from 1864-71 clearly revealed that the expenditure incurred did not produce any
result capable of yielding profit. Most of the money has been spent in piers and protective works, or in constructing metalled roads.

Between 1865-68 there was a remarkable increase in shipping, after which there was a decline in shipping activities leading to a collapse in 1860. In March 1869, the company applied to the government, asking for suspension of port dues and charges. The request was granted, and a government notification was issued declaring Canning to be a free port. But this notification had no effect because since February 1870 no ocean-going ship arrived at the port. "Enough seems to have been done to make the port a success if success were attainable". But the scheme of a subsidiary port seems to have been unsuited to the commercial interests of Calcutta, and it failed. The Municipality fell into hopeless pecuniary difficulties, which at length brought it into costly litigation with the Port Canning Company and with Government. Besides, the port establishment had been a heavy and unprofitable expense to the government. The exact expense incurred in the scheme is
impossible to state. The Government spent at least 6 lakhs; what income it received is obscure. But one can surely say that the amount the government earned “can scarcely have been comparable with the expenditure”. How private persons were affected is still less within conjecture, but their losses were commonly reported to have been very heavy. Considering the position and prospects of the company and the hopelessness of the establishment of trade which would justify the retention of a port on the Matla, in June 1871 recommendations were made that the earliest opportunity should be taken to officially close the port. The recommendations further sought to withdraw the establishment. These recommendations were adopted and the port officially declared closed. Pargiter writing in 1889 noted, “Port Canning now wears an appearance of stagnation. No shipping visits the port.”
6.6 Navigation in the rivers of Sundarbans

At the same period that Port Canning scheme was set on foot, other measures were taken by the colonial government to improve the navigation and trade in the Sundarbans. During the earlier part of the 19th c “navigation must have been in a very unsatisfactory state”. Indeed there was no continuous towing path from Calcutta to Khulna; boats sank in the channels and were a constant cause of obstruction and danger; and the channels silted up, especially at the points where the tide flowing from opposite directions met. A careful inquiry was made in 1853 and these defects were remedied and other improvements were introduced. “The towing path is an indispensable requisite; boats can be rowed as long as the flood or ebb-tide will carry them in the direction they wish to go, but if there is no wind to help them on, it is wasted labour for the boatmen to attempt to row any except the smallest boats against stream; it is then they can tow and the towing path is absolutely necessary to prevent the boats being detained till the tide becomes favorable again.” For a few years an officer with
magisterial powers was stationed half-way between Calcutta and Khulna to superintend the navigation.” At present all these matters are ..... cared for by the Public Works Department.”  

But these routes were too small, except in a few places, for the large steamer that plied between Calcutta and Eastern Bengal took “a route much further to the south, which passes for the most part through dense forest.” There was a suggestion that a mart should be established on the river Baleswar or Bishkhali, as a port for the trade of East Bengal, independent of Calcutta. Both rivers were surveyed, but only Baleswar was found favorable for small vessels. The scheme was talked about for some years, but ultimately came to nothing. Indeed, the failure of the Port Canning scheme indicates how mistaken many projects started at that time were.
6.7 Conclusion

The Sundarbans is indeed a geomorphologic and hydrological fascination. Water plays mud into different shapes, sculpting it into new islands and reforming the old. These drowned lands and everything that live in them have adjusted to the tides that rise twice daily. While describing the rivers of Sundarban one colonial writer noted that it is “unharnessed and untamed”, “quick moving, full of life, either smooth flowing at the ebb or forced impetuously backward by the tide or again tossed to a sea by wind and storm”.63 If one thinks of Sundarbans as a hydrologic region, or as one hydrologic region within a hierarchy of larger hydrologic regions, our understanding of the area and its problems is substantially altered.64 During the colonial period water was not a primary revenue variable in the Sundarbans. Waterways link the Sundarban with regional, national and international arenas of resource development - arenas that institutionally encompass and physically impact the coastal ecosystem.
Thus we can think of the Sundarbans as part of an elaborate network of hydrologic institutional, cultural and bureaucratic systems. It is this “hydraulic” perspective that constantly reminds us that Sundarbans resources cannot be managed or conserved independently of larger realms of water resource management.65 Thus if one endeavours to understand the problems of a land predominated by saline water and lack of sweet drinking water, one has to first take a ‘hydraulic’ perspective. It is then that water resources of this eco-habitat can be better managed and its related problems can be solved sooner.
6.8 References


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39. Ibid- Danda; pg52-53

40. Ibid- Pargiter ;pg 286


42. L.S.S.O’ Malley- Bengal District Gazetteer- 24 Parganas; pg 5

43. Ibid- Danda ;pg 54

44. Ibid- Danda; pg 55

45. Nilmoni Mukherjee- The Port of Calcutta: A Short History, Calcutta ; pg 9

46. 30 November 1855, letter from john Borradaile and Co. to R.M. Stephenson Managing Director and Agent of the E.I. Railway

47. Papers relating to the formation of Port Canning, on the Matla River, extending from 27 May 1853 to 11 March 1865, Calcutta, 1865.

48. Ibid

49. W.B.S.A, B.O.R, Lower Provinces, 18 March 1856, Letter from E.D.Kilburn to Lieutenant Governor of Bengal
50. 26 March 1856, Letter from A.R. Young, H. Yule, and D Robertson to Secretary to Government


52. Ibid- Pargiter; pg 284


55. Hunter, Vol. 1., op.cit., p.95

56. Ibid., pg 96.

57. Ibid- Pargiter; pg 285-286

58. Ibid- Pargiter; pg 286

59. L.S.S. O’ Malley- Bengal District Gazetteer, Twenty Four Parganas, Calcutta, 1914, pp223-5, papers relating to the formation of Port Canning on the Matla River, op.cit., p 52

60. Ibid- Pargiter; pg 290
61. Ibid- Pargiter; pg291

62. Ibid- Pargiter; pg291-92

63. Ibid- Bradley-Birt; pg 214-227

64. Ibid- Westcoat

65. Ibid- Westcoat