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Problem of east Kolkata wetland

Mondira Show[1]
[1] Department of Geography and Disaster Management, Tripura University, Suryamaninagar, Tripura, India

Abstract
Calcutta is sustained by unique and friendly water regime. To its West flows the river Hooghly, along the levee of which the city has grown. About 30 km eastwards flows the river Kulti-Bidyadhari that carries the drainage to the Bay of Bengal. Finally and central to this regime is vast wetland area beyond the Easter edge of the city that has been transformed to use city waste water in fisheries, vegetable gardens and paddy fields in the successive tracts of land. In the year 2002 East Kolkata wetlands has been recognized a wetlands of international significance to understand the concept of 'wise use'. In the past it was a rich abode of wildness and was well known for its rich floral and faunal diversity. The paper mainly discuss about understanding the state of wetland habitat using water bird as the biological indicator. Living organisms are sensitive to the changes in the state of their environment. The changes in their abundance are used to analyze the state of the environment in the study area. Monitoring the presence, abundance as well as nature of birds species in the study area not only tells as about the current state of an environment but repeated monitoring should a drastic change in this wetland ecosystem.

Keywords: east Kolkata wetland biodiversity, evaluation of east Kolkata wetland, relation between rainfall and temperature with migratory birds, land cover and land use of wetland, conclusion

Introduction
A low-lying area of land that is saturated with moisture, especially when regarded as the natural habitat of wildlife Marshes, swamps and bogs are examples of Wetlands. There are many different types of wetlands. These include areas of marsh, fen peat land and shallow water bodies. Most are natural but some are human made, and they can be permanent or seasonal. The water in wetlands can be flowing or static and can be fresh, brackish or saline. Marine water that does not exceed 6 meters depth at low tide is also classed as a wetland, and many river estuaries are globally significant wetlands. Notified from the Ramsar convention on wetland there is different interpretation of what constitutes a wetland around the world. Measurement and mapping techniques are also very between countries and regions. This makes it difficult to accurately measure the number and extent of wetlands globally.

Why are wetlands important
For Centuries, people in Europe saw Wetland as unproductive land: difficult to access, difficult to farm, and the source of disease and flooding. But attitudes have changed; wetlands are now widely recognized as valuable to poor people.

Fig 1: location of study area

Location of study area

The East Kolkata Wetlands (EKW), located on the eastern fringes of Kolkata city bordering the Salt Lake Township on the one hand and the new township at Rajarhat on the other, forms one of the largest assemblages of sewage fed fish ponds. Situated between 22°27'00"N and 88°27'00"E the wetlands spread over an area of 12,500 hectare (Ha). It is comprised of nearly 254 sewage fed fisheries distributed across the districts of South and North 24 Parganas covering a total of 37 Mouzas (30 full and 7 part). Besides, there are small agricultural plots and solid waste farms and some built up areas also.

The EKW (East Kolkata Wetland) nurtures the world's largest wastewater fed aqua culture system. Sewerage that is sent to the wetlands are subjected to solar purification followed by natural oxidation by which the water become conducive for algal and plankton growth which are the primary feed of fishes. The goods and services provided by the EKW (East Kolkata Wetland) include, in addition to fisheries, a very cheap, efficient and eco-friendly system of solid waste and sewer treatment system for the city of Kolkata, habitat for waterfowl and home for a large number of flora and fauna. On 19th August, 2002 the EKW (East Kolktata Wetland) was included in the Ramsar list of 'Wetlands of International Importance'. However, because of increasing pressure of urbanization, change in the quality and quantity of the solid waste and sewer, as also human neglect, this site is under threat from various directions.

Wetland biodiversity in urban areas is an issue of primary concern, especially in developing nations where major portion of people obtain their livelihoods from such type of wetlands. This paper highlighted the significance of East Kolkata wetland-based biodiversity. One of the most important factors which heavily contributed to degradation of East Kolkata wetlands is the lack of understanding of their economic, ecological and socio-cultural values among all the stakeholders. The study attempted to achieve the objective of valuing wetland biodiversity conservation by eliciting respondent's willingness to Pay (WTP) using Contingent Valuation Method (CVM).

Problem of Study area

a. Physical Impact of Wetlands by Promoter because every day population are increase and also settlement increase.
b. Decreasing rate of Migratory Birds when Migratory birds are coming at in seasonally because for their relief but in India also temperature is high so Migratory birds also decrease.
c. Increasing rate of Settlement around the wetland time to time because slum area is increase.

Objectives

a. To make out the change in the physical set up of the study area.
b. Impact of Wetland on fisherman.
c. Find out Economical and social changes on East Kolkata.
d. Environmental changes due to Wetlands.
e. Important of wetland. We all know that wetland is our only one water supplier in ground water and fish supplier in urban area.

Materials

a. Satellite data like TM and SRTM of 1989 and 2009 are used to locate the changes in the environment due to Wetland.
b. Land use map of study area.
c. Google Earth image of 2005-2015 is used to show the land use changes and also various changes.
d. Census population data of 2011 is used to look on the socio economic set up of area.
e. Rainfall and Temperature data of wetland area in East Kolkata.

Parameters

a. Total area of Wetland.
b. Land use changes of area.
c. Migratory Birds.
d. Dominating characteristic of Promoting.

East Kolkata wetland and biodiversity

Before going on with stating the loss of biodiversity in the study area in trems of birds and fish species composition as biological indicators, we need to precisely understand what biodiversity is an attribute of an area and specifically refers to the variety within and among living organisms, assemblages of living organisms biotic communities and biotic processes whether naturally occurring or modified by humans.

Evaluation of East Kolkata wetland

Kolkata, situated on the low-lying banks of the Hugh, 100 miles from the open sea, perhaps Could be one of the most unlikely and unpromising locations to be developed as the major Terminal port in pre-independent India and a city carrying one of the World's largest Concentrations of urban population. "Less than two centuries ago, the site of the present city of Kolkata presented the ordinary aspect of a rural district in the delta of Lower Bengal - a flat rice-swamp interspersed with patches of jungle, with a few scattered villages on the river-bank. Few would have ventured to predict that here would shortly arise a 'City of Palaces'; that physical drawbacks would be made to yield. that in spite of morasses, malaria, hurricanes, and the difficult navigation of a treacherous river, Calcutta (Kolkata) would in the nineteenth century be an emporium of trade of the finest magnitude, and capital of an Empire in the East.

Kolkata is located on the lower deltaic plain on the composite Ganga delta and is covered by the Quaternary sediments, deposited by the river systems flowing through the Area. The natural alluvial levee offers a narrow strip of land just above the flood height, on Which Kolkata is located as a linear metropolitan formation stretching for more than 70 km from Kalyani on the north-east to Uluberia on the south-west on eastern flanks of the Hugli River as it was the highest and the most suitable land for urban development in the vicinity?

Over the centuries, the Hugli has deposited large quantities of alluvial silts along its banks, forming a natural levee of high land suitable for settlement Thus, the slope of the land is away from the river. Within a very short distance from both banks, the level falls quickly and the low-lying lands, being either

perennial marsh or swamp or liable to annual inundation

Kolkata metropolitan areas such as

- The area is more or less flat; the contour variations are from 3 m to 9 m.
- The relief in the northern side (Kalyani, Bansberia, Chunchura, and Naihati) is higher i.e. about 9.0 m above MSL and in the southern side (Uluberia, Budge Budge), it is About 3.0 m and the regional master slope is from North to South. Moreover, the land Slopes away from the Hugli mainly towards east at Kolkata and towards west at Howrah side
- River Hugli forms the principal drainage in the area. It enters Kolkata Metropolitan Area at Tribeni and flows out in the south at Uluberia.
- The highlands are thus found along the levee of River Hugli and moderately highlands occur in between the highlands and low-lying areas.

Topographically, the Kolkata city area (KMC) is almost flat, with many depressions bounded by Hugli River on the west and wetlands on the east the physiographic setting of
Kolkata city (22° 34' N and 88° 22' E) both at the time of its foundation and at the present day is dominated by the meandering River Hugli (Gupta, 1990). The surface elevation ranges between 3 m to 6-7 m above mean sea level in Kolkata. The slope of the land is not uniformand it is primarily away from the river to the east and south-east direction.
The Reduced Level Model (Figure 3.2) shows that the highest ground, i.e.above 5 m to 6 m is found in Bagbazar and Sovabazar areas in the north and also along the levee of eastern bank of the Hugli, mainly in Garden Reach, Fort William and Khidirpur areas. The land below 3 m represents the back swamp area beyond the levee covered by marshes, small and large. Many of these represent river scars of the past drainage channels of the Bhagirathi and Bidyadhari. In between these two lands, the moderate high grounds with 3 to 5 m.

Statues of the east Kolkata wetland system

An atteesterem has been made in this paper to use water birds species as indictors of the state of the wetlands habitat and of human induced changes to this habitat. Using organisms to indicate the state of the environment and the changes in environment has numerous tried and tested applications. There are three distinct uses of the term indicator species in research ecology and biodiversity. There are a species or a group of species

1. Reflect the biotic and a biotic state of an environment.
2. Revel evidence for or the impact of environmental ecosystem.
3. Indicate the biodiversity of other species taxes or entire communities within an area.

The focus is mainly laid an various species of Water birds based in and around the East Kolkata wetland and the changes it shows. It is a fact that living organisms are sensitive to the state of their environment. Pollution from human activities kills many species and reduces the abundance of other. These changes in abundance are used to analyze the state of the environment in the study area. Monitoring the presence, abundance as well as nature of birds species in the study area not only tells as about the current state of an environment.
There is a rapid change in bird diversity in recent years. Zoological survey of India recorded 248 species of birds from Salt lakes in 1960's.
Banabithan is another spot at the heart Salt Lake City which is an abode of avifauna. As the entire Salt Lake city is reclaimed out of Wetlands this site is naturally having good vegetation cover as well as huge natural water bodies along with high protection level. Areas in and around the waste water canals also show the significant absence of number of water birds. Data shows that the areas which are either provided high level of ecological protection and or kept at almost similar condition of natural wetlands are rich in water birds.
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The fundamental difference between the present study and the past one is that today the site of observation is totally controlled by the human agencies. As the fisheries are controlled and fish species composition is regulated by humans for a few selected fish and also very little vegetation is all over to grow other than water hyacinth fringing the fish ponds along complete absence of reed beds, the estuary sites rosary grounds and thus shelters of water birds are last.

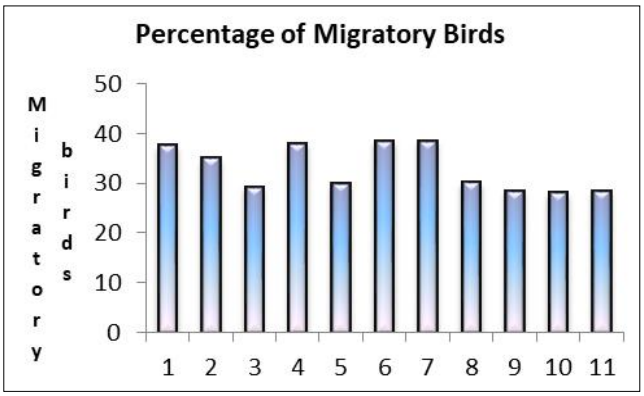


Fig 2

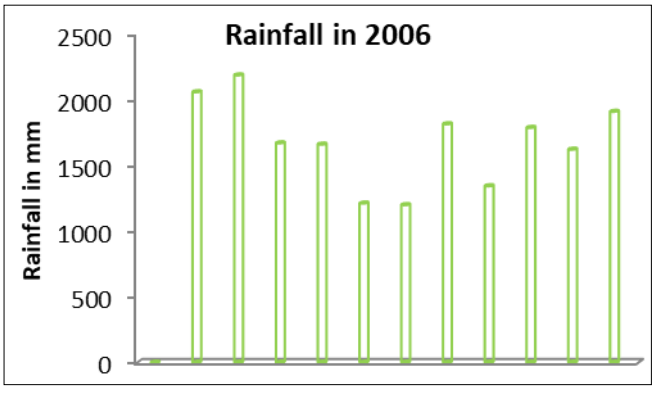
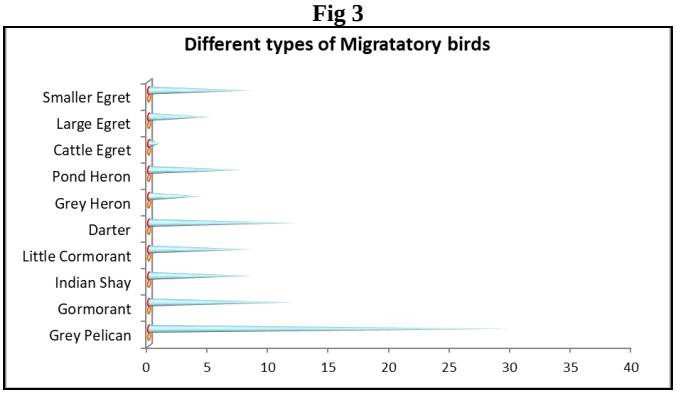
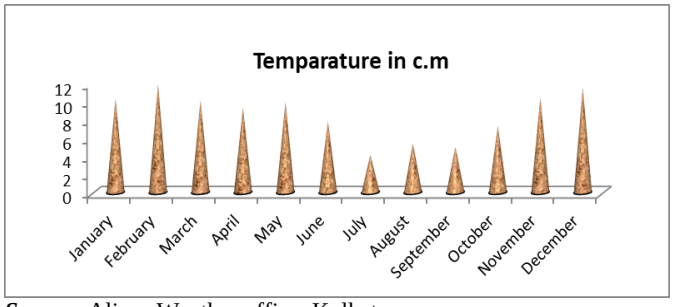


Fig 3



***Source*:** Alipur Weather office, Migratory birds department, Kolkata

Fig 4



***Source*:** Alipur Weather office, Kolkata

Fig 5

Data shows that the sighting is very high on particularly two location, Nalbon and Banabithan. Nalbon is an ecotourium site of about 20 hectores on the North West corner of East Kolkata Wetland, Initially developed for recreational purpose that site has now become a sanctuary for water birds. Adjoins areas are extensity used for fisheries and allied activities. This may have resulted into habitat degradation for water birds**.**

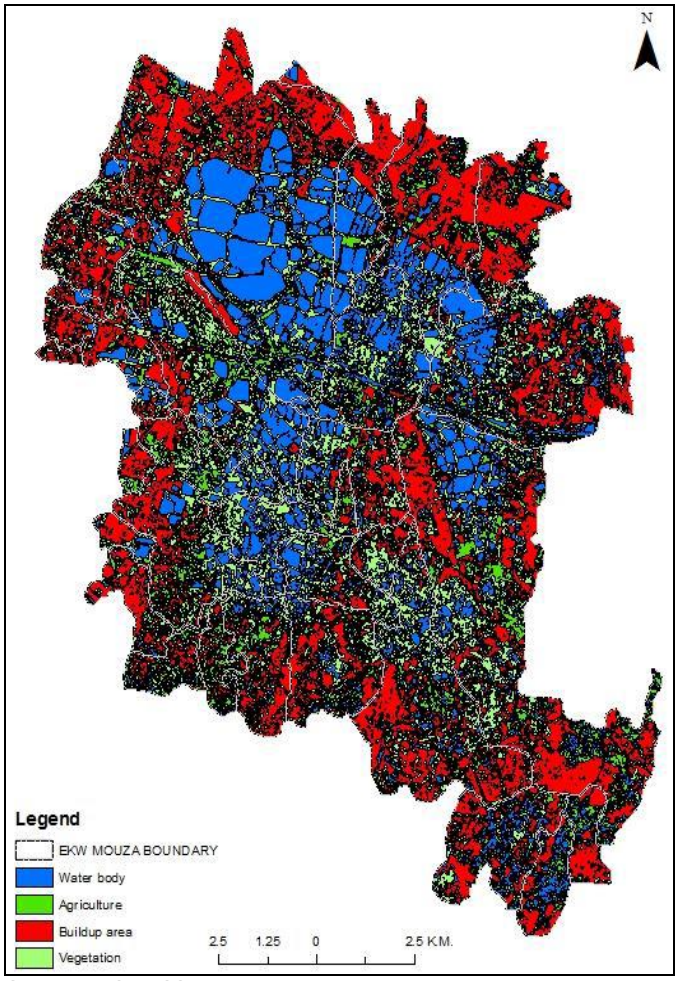
The east Kolkata wetland Act 2006 represents an important landmark as it paved way for establishment of the East Kolkata Wetlands Management Authority for conservation and Management of the East Kolkata Management. The EKWMA is constituted under section 3 of the Act, 2006. The EKWMA is a nineteen member body with the secretaries of different Department of state Govt. as well as other other Govt. officials and 3 represent actives from NGOs under the chairmanship of chief Secretary Government of West Bengal.

Rainfall

The Sub-surface geological set up as discussed above indicates that the ground water occurs under confined to Semi confined condition. However at some places in the area the top confining bed is either less than 10m tick or is absent. A place where the top confining bed is absent a thick column of sand occurs from the top of the geological succession indicatory channel deposition. These pockets where groundwater occurs under unconfined condition. act as recharge area.

Though the topography of the area in and around ECW is more or less flat, local ground water mounds and troughs have developed due to various rates of groundwater withdrawal at different places. The regional flow of groundwater with in area is from east to west and is controlled by a ground water trough defined by the 13.7m below mean sea level contour near south central Kolkata. Therefore, any leakage of contaminated water from ECW and Dhapa soild waste dumping ground may pollute Kolkata's aquifers.

Land use and land cover map of east Calcutta wetland



***Source*:** IRS, LISS –III

Fig 6

Conclusion

In some cases the complete disappearances of certain species and their local extinction can also be attributing to the follow by.

1. Lack of niche due to reclamation and hunting.
2. Lack of food which are again based on the presence and absence of other species.
3. Heavy usage of Chemical in agro-culture and fishery related activities.
4. From the present observations it can be concluded that all these sites are important wintering grounds for a number of water birds and wetland associated species.
5. However, additional observations at these sites at other times of the year, and over several years, are needed to provide a deeper insight into their value for water birds.
6. Water birds as a biological indicates also indicates that there is a change in the wetland habit and for which the human activities are chiefly responsible.
7. Land use and land cover data shows highly fragmented Wetlands in the core zone.
8. Number of locally extinct species of water birds is substantially high followed by species which are migrant and fairly common. Alternative in structure i.e, fragmentation of wetlands into water bodies and release into changes in wetland habitat.
9. Water birds are now mostly found in the relatively undisturbed and protected pockets is of this wetland which also includes ecotourism spots. In some instances it was found that the nearby areas with natural vegetation cover and big water bodies even at the heart of the urban areas are attractively the water birds away from the wetlands.

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