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WETLANDS IN TODAY'S PERSPECTIVE: A CASE STUDY OF WETLANDS OF MURSHIDABAD DISTRICT. WEST BENGAL.

Suman Halder[1] and Dr. Anuradha Sengupta[2]
[1]Research Scholar, Seacom Skills University, Bolpur, Birbhum, West Bengal.
[2]Professor, Department of Geography, Seacom Skills University, Bolpur, Birbhum, West Bengal.

ABSTRACT:

The present theme "- WETLANDS IN TODAY'S PERSPECTIVE- A Case study of wetlands of Murshidabad District" has been conceptualized, with an emphasis on the intricacies of wetland characteristics. Based on this, study has been initiated to understand the efficacies of wetland and comprehensive causes and consequences especially its impacting features. Water and wetlands are complementary to each other in their existence and so indispensable that this has become one of the most burning topics in the field of environment, ecology, and well being of our planet. Starting from the fresh water availability for human beings, agriculture, climate, flood control, deforestation, GHG equilibrium and all other criteria, wetlands have an immense contribution in the survival of living beings on this planet. Anthropogenic contributions in the distortion of the sanctity of the wetlands are limitless leading to the degradation and extinction of many species of flora and fauna of wetlands. There were no concepts of wetland management, conservation for long till the Ramsar Convention 1971, convened international convention on wetlands of international importance and an international treaty for the conservation and sustainable use of wetlands. The Ramsar Convention holds that wetland management implies the need to understand the past and present human use of wetlands, their current or future impacts, and ways to achieve optimal (sustainable) wetland use. In the past 40 years, under the guidance of wetland management, wetlands in many developed areas have been protected or even restored. There are concerted efforts from all members who signed the treaty, for sustainable management of wetlands and the restoration of all wetlands which have been degraded or lost their sanctity. The inland wetlands act like a super bowl absorbing and storing excess flood water and reduces the impact of the flood and marine/coastal wetlands serve as a protective barrier against tidal waves and storm surges. Murshidabad district, the case study area, comprises a number of large and small wetlands and an attempt is made here to contribute to the management, conservation and restoration of wetlands of the region. Colloquially these wetlands are called beels in the region.

KEYWORDS: *sustainable management, conservation and restoration, ecological health, population growth, production and productivity, greenhouse gasses(GHG).*

INTRODUCTION

Wetland globally was considered to be a wasteland till researchers and scientists from multidisciplinary faculty discovered its importance and tabled it in different national and international forums where it was debated over its importance and applicability in the ecology and environment. The definition of wetland too had different connotations till Ramsar convention in Iran put an end to all differences of opinions and reached a consensus.

Worldwide accepted definition from Ramsar Convention (1971) is "Wetlands are "areas of marsh, fen, peatland, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide, does not exceed six meters. Wetlands may incorporate riparian or coastal zones adjacent to wetlands, and islands or bodies of marine water not more than 6 meters at low tide lying within the wetlands". According to Ramsar definition, inclusion of lakes is in the purview of wetland with water up to 6 meters deep. Wetlands in the study area have been referred to as beel is a colloquial term for inland water body. Worldwide wetlands are considered to be the most threatened ecosystem where plants and animals species convert it as their habitat or breeding ground. Services that wetlands provide to mankind and other plant and animal kingdom, to the environment and ecosystem are innumerable and can be treated as indispensable. An attempt has been made to comprehensively underline the background of the services provided by the wetlands and their consequences in saving the Murshidabad wetlands.

OBJECTIVES:

To understand the recent global perspective of wetlands and developments and status of wetlands in Murshidabad district as a case study. Strategy formulated to undertake the research has been with the following considerations:

1. Review of Wetlands and Updates on modern tools and techniques.
2. Wetland ecology & Pollution.
3. Wetland & Threats.
4. Wetland Management, conservation & restoration.
5. Murshidabad wetlands.

LOCATION:

The study area, Murshidabad district, is geographically located between 23°43'30" and 24°50'20" North latitude and 87°4917' and 88°46' East longitude (Fig No: 1), with an area of 5,324 Sq.Km. It is one of the most densely populated districts of the state.

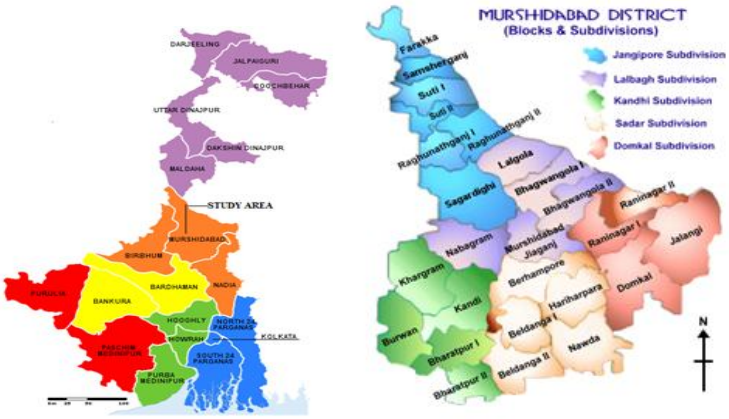


Fig No 1: Location Map of the study area Murshidabad district, West Bengal

PHYSIOGRAPHY:

The River Bhagirathi, flowing from north to south through the district, broadly divides the district into two almost equal portions, with a striking contrast in their geology, their physical characteristics. Murshidabad is situated at an average height of 19 meters above the mean sea level (MSL). Between River Bhagirathi and River Ganga, lie the intermediate tract and the deltaic plain, called Murshidabad, originated from the confluence point of these two rivers upstream. Murshidabad district has been divided into two parts by the River Bhagirathi, one in the east called Rarh, and the other one

Bagri in the west. Rarh tract is basically a continuation of Sub Vindhyan Region. Numerous swamps are found along the old river bank and the surface topography is undulating. The elevation is maximum along the western boundary towards Birbhum district. The land situated in the extreme Western boundary slopes gently upwards towards the Birbhum district and the Rajmahal hills, which rise a few miles beyond the North-Western boundary of the district. The soil of the Rarh area contains clay and lateritic clay. The Bagri or eastern tract is marked by the number of swamps and contains alluvial soil.

DATABASE:

Though the wetlands are sparsely located in the district, all areas were not covered, but wetlands of characteristic features were considered. Both Primary and Secondary data have been used in this paper. Primary data has been generated using questionnaire survey, interview, field visit and the secondary data collected from various sources such as Census Book of India 2011, 2001&1991, Irrigation Department, Survey of India, District Statistical Hand Book and Annual Reports. Some photographs have been used wherever found necessary and were collected during field visits by the author.

METHODOLOGY:

Methodology adopted:

The study made use of various secondary data mainly vector data used for land cover and land use changes

1. Data acquisition – this step has been divided into 2 parts- vector file format of the study area has been downloaded, LANDSAT Satellite Imageries.
2. Census reports of 1981-2011 published by Govt. of India
3. District Statistical Handbook, Murshidabad-1990 to 2011 published by the Bureau of Applied Economics and Statistics, Govt. of West Bengal.

Review of Wetlands:

Worldwide one of the most important contributing factors which puts wetland status in jeopardy is relentless anthropogenic stampede and deplorable activities. They are the most misunderstood and abused water bodies on the earth though they cover about 7 percent of the earth's surface and 10 million Sq. Km. (The Global Lakes and Wetlands Database (GLWD), Germany). Wetlands conceptually considered being one of the discoveries of the recent past when its value in terms of services, ecological virtues, and environmental consociation have been recognized. There is an intimate relationship between wetland and ecosystem and they are among the most productive ecosystems in the world. Wetlands also provide shelter for different plant and animal species and enormous volumes of food that attracts scores of species. They also use the existing value added aquatic system for their entire or part life cycle. The major determinants for wetland characteristics are climate, topology and geomorphology and others. The wetland study has been taken up in this research work to contemplate the background score of wetlands. The benefits that are going to be reaped out of the wetlands, certain tangible like purveying food, potable water and certain intangible like flood control, storage, soil fertility, nutrient replenishment, carbon sink or storage etc, would warrant the wetland to be healthy and capable of delivering the goods. Ecological conditions of wetlands may be affected by habitat fragmentation, polluted runoff, water level changes and invasive species. The ravaging effect of multifold population growth, indiscriminate encroachment of wetland and mushrooming of settlements in and around the wetland would surely end up in a situation that goes against the ethics of wetland conservation and restoration. More concerted efforts from the local administration and state government are needed to bail out of this crisis.

Wetland degradation and human activities are complementary to each other and are a key component of the topography. One of the most productive Ecosystems on earth, the wetlands, their functions and values have been recognized very late. This is evident as interest in understanding wetland science and protection and conservation of these ecosystems has increased. Human activities

degrade wetland by changing water quality and quantity, increase pollutants from different sources and create ecological imbalance. Wetlands have a very delicately balanced ecosystem, which maintains water and soil chemistry, atmospheric natural gasses such as oxides of carbon, nitrogen and methane and other gasses. Each of these gasses is extremely important in the atmospheric cycle. One of the most important services of wetland is the GreenHouse Gas primary effect. Three primary gasses make up 99.9% by volume of the Earth's atmosphere-nitrogen (78.09%), oxygen (20.95%) and argon (0.93%). However, it is the rare trace gasses, that is, carbon dioxide (CO_2), methane (CH_4), carbon monoxide (CO), nitrogen oxide (NO_x), chlorofluorocarbons (CFC_s) and ozone (O_3) that have the greatest effect on our climate. Water vapor, in abundance (0.5-4%) also has a strong influence on climate. Without the greenhouse warming effect of the atmosphere, the Earth's average surface temperature would be about -20^0C instead of 15^0C. The essence is that GHG traps solar heat in the lower atmosphere and keeps the Earth warm otherwise it would be in a frozen state.

Wetlands are believed to be carbon sinks and a prominent source of GHG. The wetlands clarity whether it is a net sink or net source would depend on the degradation it has undergone due to anthropogenic activities. Flora, fauna and soil composition plays an important role in the carbon sequestration. The flora generally grow at a very fast pace and capture voluminous amounts of carbon and may develop reserves for many years. The soil being anaerobic assimilates and stays for long as carbon storage and considered GHG sink. Methane and Nitrous Oxide both are released from the wetlands in large amounts and especially Methane released is largest from a single largest source. Nitrogen fixation is happening in the aerobic part of the wetland and simultaneously denitrification is also happening from which nitrite transforms into Nitrous oxide and on reaching the atmosphere becomes a part of GHG. There is a balance between GHG production and annihilation. The importance of GHG and wetland equilibrium is pinning on the razor sharp thin edge and needs to be protected to maintain status-quo. The equilibrium whenever disturbed by human activities, the wetland services are in danger.

One of the developments in the direction of aerial change is the Wetland Extent Trends (WET) index. This is the world's first indicator, which reflects the change in area of any wetland. WET index is also used as global biodiversity indicators which help in tracking progress towards international environmental targets. The WET index is revealing that marine and coastal wetlands are declining more quickly than inland wetlands. Any indicator tracking changes in the services of wetland and its extent could be treated as an important tool and development.

Wetland & Threats:

Worldwide there are more than 2303 (Ramsar website) wetlands distributed unevenly in different continents. There are four impacting factors that pose a major threat to wetlands worldwide. One of them is pollution which can be attributed to the increasing population growth and human activities ((54%), followed by the biological resources use (53%) which is pertaining to use of services received from the wetland and (53%), natural system modification (53%) and agriculture and aquaculture (42%) both of which are predominantly human induced. The acreage and environment are the most affected of all the degraded objects, occurring in 75% and 69% respectively of the wetland sites. The Land area encroachment, biodiversity, climate has the greatest impact on river wetlands, lake wetlands and on the marine/coastal wetlands. Environmental degradation has the greatest impact on coastal and river wetlands.

River and lake wetlands, marine/ coastal wetlands are vulnerable to the land encroachment, environmental pollution, species invasion and the climate change attributed to topographical features and geographical environment of the lake and proximity and rain is the main source of water. The over populated biological resources in the marshy wetlands have been over exploited by human beings, affecting biological resources of marshland.

The threats to wetlands are not just one point source but multiple attributes are contributing to it. One of the greatest threats comes from none other than human beings. This can be influenced by

human as well as natural stressors. Some of them are directly and some indirectly threatening the very existence of the lakes, inland wetlands and marine and coastal wetlands worldwide.

Highlighting the major threats:

Population growth is increasing exponentially contributing to destruction of the natural assets, wetlands are no exception. The population growth and incremental density of population act differently in urban and rural areas and so are their implications.

Wetland pollution and ecology:

The relationship between wetland and pollution are interwoven. Wetlands, besides detoxing water, render services like nutrients it provides to flora and fauna to the habitats of wetlands, and acts as a filter for many toxins and pathogens. Water during their passage in a controlled wetland system, breaks down toxic compounds by the chemical and biological activities and pathogens lose their entity or are consumed by other organisms present.

Wetlands are treated as water treatment plants decontaminating the untreated solid liquid waste and effluents from NonPoint Sources. To decrease the NPS pollution and degradation of wetlands, different methods and techniques are adopted to save wetlands. The ability of wetlands to act as a sink for phosphorus and also conversion of nitrate to nitrogen gas by denitrification serves as the important NPS pollution abatement functions performed by natural wetlands and constructed wetlands. Agricultural waste like fertilizers, pesticides and insecticides all enter wetlands are biggest threats to wetland pollution, affecting the reproduction of the plants and animals and reducing biodiversity. Drainage of wetland for additional cropland, construction of highways, channelization of an adjoining highways, deposition excavated materials, all adds to the pollution of wetlands. Non-biodegradable plastics is one of the major pollutants creating worldwide uproar for its ban. 8–12 million tons of plastic finds its way into our oceans each year. It is projected that plastic production will continue to rise in future. The characteristics of any wetland is considered to be a function of climate, hydrology, substrate and topographic features of landscape. Though the size and features vary greatly, specific characteristics define wetland which are water, substrate, biota, nutrient cycle etc. The wetlands ecosystem is distinctly different from other ecosystems on the earth.Each wetland will have distinctive features of terrestrial, aquatic or a mix of both wherever there is an interface of two. The hydrology, biogeochemical role and productivity in terms of its value is dependent on the spatial distribution.

Hydrology is the driving force for the abiotic and biotic characteristics of wetlands . Soil color, soil texture, and water quality of abiotic type depend on the distribution and movement of water, as do the abundance, diversity, and productivity of plants, vertebrates, invertebrates, and microbes.

The relationship between wetland and pollution are interwoven. They have the potential to remove up to 60% of metals, trap and retain up to 90% of sediment runoff and eliminate up to 90% of nitrogen. Wetlands besides detoxing water, render services like nutrients it provides to flora and fauna to the habitats of wetlands, and acts as a filter for many toxins and pathogens. Water during their passage in a controlled wetland system, breaks down toxic compounds by the chemical and biological activities and pathogens lose their entity or are consumed by other organisms present. Wetlands are treated as water treatment plants decontaminating the untreated solid liquid waste and effluents from non point sources.

LULC impact. Land encroachment of the wetland area for agriculture and construction purposes has become a common phenomenon at the expense of wetland virtues. Encroachment has been found to be adjacent to the wetlands for settlements at a price below par, increasing the impervious coverage area, resulting in greater runoff, loading of sediments and other pollutants. The Water quality, changes in hydrology and geomorphology, aquatic and terrestrial habitat loss are the effects of encroachment. Water storage for flood water and fish and wildlife habitat, rare, threatened and endangered species habitat losses are exemplary.

Climate change is considered to be a major threat to wetlands. Climate change can affect wetlands by direct and indirect effects of rising temperature, changes in rainfall intensity and

frequency, may lose services provided by the wetlands e.g. water purification, nutrient equilibrium, carbon sink etc. and overall change in the ecosystem.

Hydrologic changes are due to change in water quality index (WQI) which upsets the habitat environment and ecology. Effluents from the industries, city household waste or sewage are dumped and drained into the wetlands, treating them as a dumping ground. These solid-liquid wastes contaminate the wetlands, lakes and degrade the water quality, creating imbalance in the flora fauna habitats, leading to ecological and environmental degradation.

UPDATES ON MODERN TOOLS AND TECHNIQUES:

One of the most modern tools that can be used for modern management of wetland is Satellite applications. To use the satellite application, primarily it provides a software platform built on the free and open source QGIS Geographic Information System (GIS). The optical and radar observations combining long-time data sets from different satellites can be used for studying wetland status and trends. To identify different landforms, wetland status and trends, different optical and radar data combined with a multi-temporal classification approach and long term database are used. The wetland inventory, inundated region, water quality parameters, mangrove extent, changes wetland areal extent etc using Landsat and Sentinel of different modules. Satellite-based remote sensing technology is being complemented by a new generation of Earth-based sensors including camera traps (Rovero and Zimmermann, 2016), acoustic recording devices (e.g., Alvarez-Berríos et al., 2016) and unmanned aerial vehicles or drones (Wich and Koh, 2018). These sensors can enhance the quality and volume of monitoring data, reduce the fieldwork involved in data collection and, if used in systematic ways (e.g., Beaudrot et al., 2016), help fill data gaps in high biodiversity tropical countries (McRae et al., 2017). Uses of such devices include the use of camera traps in monitoring cryptic waterbird species (Colyn et al., 2017) and acoustic monitoring of frogs (Measey et al., 2017). Environmental DNA monitoring is another evolving technique, especially useful for tracking community composition in freshwater systems (e.g., Biggs et al., 2015; Valentini et al., 2016). The scope to use this tool for monitoring trends over time should be explored.

Species distribution modeling (SDM) given a new dimension in monitoring for predicting shifts of species due to climate and land use change (e.g., Pauls et al., 2013) or predicting the advance of alien invasive species, and monitoring those hotspots identified in models (e.g., Bazzichetto et al., 2018). SDM has the potential to focus monitoring efforts on key sites or species, saving time and effort. More sophisticated instruments and newer concepts are being developed worldwide to understand wetland better, however sharing and transferring the knowledge is essential to make the world better.

WETLAND MANAGEMENT, CONSERVATION AND RESTORATION :

There were no concepts of wetland management, conservation for long till the Ramsar Convention 1971, convened international convention on wetlands of international importance and an international treaty for the conservation and sustainable use of wetlands. The Ramsar Convention holds that wetland management implies the need to understand the past and present human use of wetlands, their current or future impacts, and ways to achieve optimal (sustainable) wetland use. In the past 40 years, under the guidance of wetland management, wetlands in many developed areas have been protected or even restored (Ramsar Secretariat). There are concerted efforts from all members who signed the treaty, for sustainable management of wetlands and the restoration of all wetlands which have been degraded or lost their sanctity. The inland wetlands act like a super bowl absorbing and storing excess flood water and reduces the impact of the flood and marine/coastal wetlands serve as a protective barrier against tidal waves and storm surges. Of all the Ramsar sites, most effective planning, design, and execution for conservation and restoration of wetlands have been from the European continent, especially UK. The developing and under developing countries find it difficult to implement the norms laid down due to bureaucratic impediment or fund inadequacy.

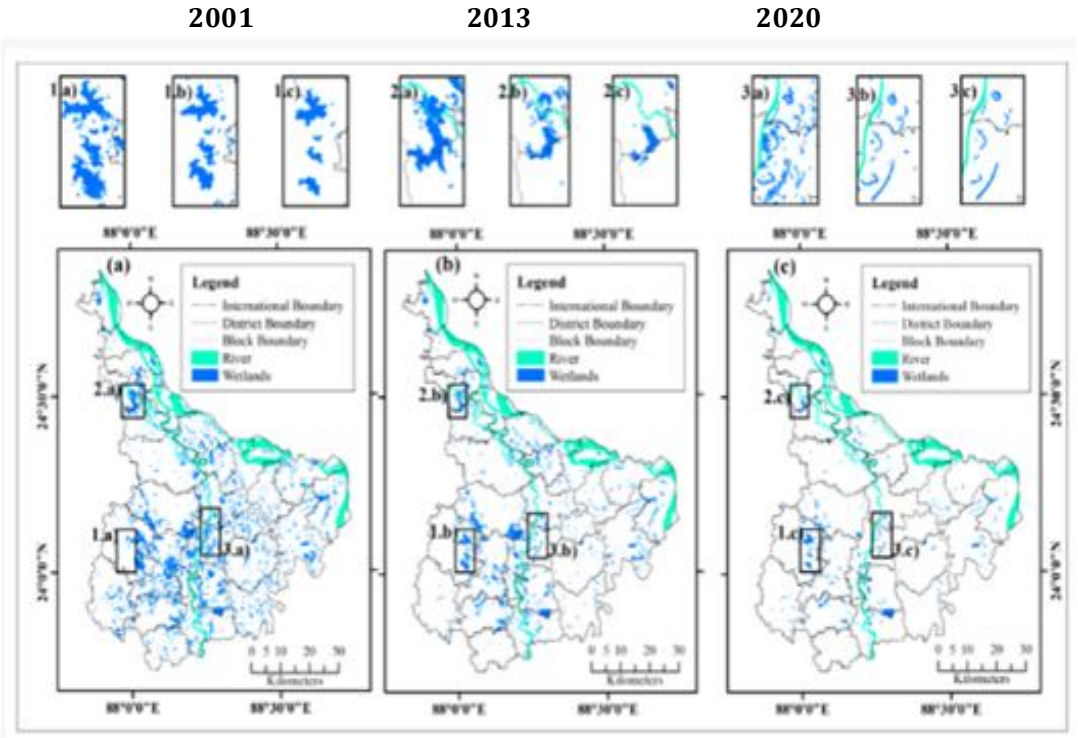
There is a difference between terrestrial soil and wetland soil. The terrestrial soil which generally has organic matter concentrated near the top soil and the ionic bonded reaches below

through leaching whereas the reduced soil instead of leaching goes through a chemical transformation in the reduced elements. This kind of distinctive difference in soil chemistry can be used as a marker for identifying wetland soil and terrestrial soil. Microbial growth occurs only in reduced rather than oxidized conditions which can be only provided by wetlands. For chemical transformation of elements in the biogeochemical cycles, globally wetland claims its stake. The species variation and function of wetland varies with the frequency and scale of the flood. The diversity and abundance of wildlife species necessitates fluctuation in water level which results in the necessary changes for their survival. The effect of flooding on soil chemistry changes very rapidly. Hydric plants characterize wetlands and adaptability is paramount for survival. They have adapted to survive in low oxygen content or hypoxia state in the soil with different modifications in their structural framework, morphological, disintegration of cells and metabolic adaptation depending on the type of lakes or wetlands.

Murshidabad Wetlands:

Fig NO: 2 Ramsar Wetland in West Bengal and some wetlands in Murshidabad district, West Bengal.

There are 46 Ramsar wetland sites in India. Out of the 46 sites, one inland wetland, East Kolkata wetland and other one, Sundarban wetland are in the state of West Bengal(Fig No: 2). Sundarban Wetland is located within the largest mangrove forest in the world, the Sundarbans that encompasses hundreds of islands and a maze of rivers, rivulets and creeks, in the delta of the Rivers Ganges and Brahmaputra on the Bay of Bengal in India and Bangladesh This district contain 43 wetlands in total of different sizes, large (.500 ha) and 30 of these wetlands are frequently used for organized fisheries and rest wetlands are virgin in nature. These wetlands have a large spread of flora and fauna, including migratory bird species. There 376 species of birds have been identified and updated ((Avibase, The World Bird Database, USA, 2021). Some of the most common including migratory birds are (Anseriformes: anatidae, galliformes: phasianidae, podicipediformes: podicipedidae, columbiformes: columbidae, otidiformes: otididae, cuculiformes: cuculidae pelecaniformes: ardeidae, common kingfisher etc).



Source: Assessment of Wetland Ecosystem Health Using the Pressure–State–Response (PSR) Model: A Case Study of Murshidabad District of West Bengal (India) subhasis das et al 2020.

Fig No: 3 Distribution and degradation of wetlands across Murshidabad district in 2001-2013-2020.

Due to meandering of River Bhagirathi/ Ganga and its tributaries, most of the beels genetically formed Ox-Bow Lake. The most prominent wetlands are Khairamari, Ramnagar, Kathalia Boar, Kodla, Motijhil, Ahiron etc and each of them are genetically formed as an Ox-Bow Lake. The reduction in the number of native species and especially migratory bird species are attributed mainly to anthropogenic activities. One of the prominent wetlands in the form of an Ox Bow Lake is Motijheel in Murshidabad, which is now threatened due to urbanization and the high anthropogenic footfall in the constructed Ecopark. Another landmark beel located in Suti I CD block in the Jangipur subdivision of Murshidabad district is the Ahiran beel . It is famous for the bird sanctuary but losing its charm due to construction of Farakka Barrage, the feeder canal for supply of water to the beel has stopped. This has resulted in drying of the beel. The migratory birds who come to these beels for breeding, nesting and rearing young ones are finding it extremely difficult to treat them as their habitat. There has been extinction of some of the avifauna and decrease in the migratory birds who generally take refuge in and around the beel in search of food or for breeding purposes. The exorbitant increase in population growth in the district which is about 314% in a period of 50 years from 1971, exacerbated the degradation and deterioration of the conditions of flora and fauna of all the wetlands in the district. The wetlands provide a unique habitat for avifauna including the migratory species. Any subtle change generally disturbs the ecology and any unprecedented scale of change in the ecology completely imbalances the equilibrium leading to change in hydrology, water quality and quantity, climate, biodiversity and environment.

The wetland area in Murshidabad district was 28069.39 ha in 2001 whereas by 2020 the area reduced by 76.50% to 6594.15ha (subhasis das et al, 2020) (Fig No: 3). The extent of reduction of the wetland area clearly indicates the encroachment and this phenomenon is visible in most of the

wetlands in the region and globally too. The impact of the encroachment is perishing, resulting in degradation of the wetland and services provided by the wetlands would gradually start disappearing. Floods in Murshidabad district is a very common occurrence almost every year due to excessive rainfall and also discharges from the catchment and barrages constructed upstream The overflowing River Bhagirathi during monsoon inundated the entire area. Almost the entire eighteenth and nineteenth century Murshidabad had undergone successive spate of flood, the magnitude of the flood at had been devastating, bringing misery to the people in terms of life, and loss of immovable and movable property, countless intangible losses to the wetlands including ecology, biodiversity and environment.

The exponential increase in population is another contributing factor for the degradation of wetlands in the district. The dynamics of the wetland changes whenever there is change in increase in population density which has happened in case of Murshidabad district. Population growth is increasing exponentially contributing to destruction of the natural assets, wetlands are no exception. The population growth and incremental density of population act differently in urban and rural areas and so are their implications.The population status refers to the land available per person and will take the liberty for its settlement as per one's convenience and economic capabilities. Urbanization has had its impact on the population by defining the limit for the lateral extension of limit for the population settlement and as vertical limit has not been defined yet, urban population latching on to that. In contrast, the rural population migrating to urban areas for jobs and settlements, finds it easier to encroach on the wetland areas which would suit their budget for settlement. The settlement and the land resource exploitation are intensified further when this kind of easy development takes place.

The density of population has increased by almost 22% in just 10 years from 2001 to 2011, change in Landcover and Land Use observed and change or shift in primary occupation to secondary or tertiary sector too.

CONCLUSION :

The title" PROBLEMS AND PROSPECTS OF WETLANDS-A CASE STUDY OF MURSHIDABAD DISTRICT WEST BENGAL" comprehensively elucidates the intricate details of the wetland functioning, problems and prospects. The wise use and restoration of wetlands are essential to protect and function, defining its role in the perspective of ground water quality improvements, groundwater recharge, climate,carbon sink ,replenishing nutrients, GHG equilibrium,flood water control, biodiversity, ecological productivity and environment. Wetlands globally conserve and act as carbon sinks and the total carbon stored totally in the wetlands is more than all of the world's forests combined thereby helping to mitigate climate changes. Wetlands provide a conducive environment to threatened and endangered species ,reduce risk of wildlife habitats and refuge to migratory birds. Each of these are extremely important and play a vital role in maintaining the global environment and saving the planet.

Wetlands in Murshidabad are spread over the district and of different aerial extent. One of the major determinants in degradation of wetlands in the district is population growth. The excessive growth has resulted in high population density thereby degradation of wetland in the form of discharge of solid-liquid wastes, as no proper planning is in place for waste disposal and a similar situation exists for encroached land around the wetlands too. Encroachment is another major contributor to wetland degradation. The reduction of wetland area in Murshidabad district to the tune of almost 77% in just 20 years from 2001 to 2020 . The depletion of wetland area due to encroachment has reduced the holding capacity of the wetlands and the excess flood water, thereby inundating the total area. Recurrent flood has devastated the socioeconomic conditions of the area. Agriculture being the most opted occupation of the area, its runoff containing fertilizers, pesticides also contribute to the deterioration of the wetland.The Ahiron and Motijheel and other beels are threatened due to urbanization, non availability of water and as a consequence, reduction of the flock of migratory birds visiting these beels observed. There has been a shift of primary sector agricultural occupation to secondary or tertiary sectors due to fragmentation of land, water scarcity, out migration for want of quick money.

Murshidabad is facing an acute crisis of water shortage, degradation of water quality , the basic ingredient for human living, agriculture and degradation of ecology and environment , most of them can be attributed to degradation and deterioration of the health of wetlands in the area . To save wetland, concerted efforts from local population, administration and the state government are desired.

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